Effectively, the systematization of scientific understanding comes from:

1. **Methodification** - creation and selection of a method ("being methodical").
2. **Rationalization** - visualizing objects and identifying their conceptual relationships ("being rational").
3. **Experimentation** - controlling [testing] and reporting observations ("being experimental").

Science requires a context for its definition:

1. **Research/experimental science** - Science is a systematic method that builds and organizes knowledge in the form of testable explanations and predictions about the universe. This science is all about data discovery by experimentally controlling systems, and observing and analyzing results. Experimental science discovers causes of effects. After analyzing the results, that data is then used to build (engineer) new technologies. In other words, research science experimentally control phenomenological systems and applied scientists (a.k.a., engineers) use that data to build technologies.
   A. In in sense, society is the science of engineering how human and biospheric systems work together for global human and ecological fulfillment.
2. **Rational science's critique of general definition** - If science cannot explain in a rational manner, how can science test the explanation? What many scientists are testing is a description; they describe, but do not explain. Rational science is rational explanation; explanation of the real-world where there exist objects that occupy space in a real-world. Rational science explains causes via mechanisms through visualization of objects.
3. **Engineering production (technology development, technic engineering) applied science** - the sum of techniques, skills, methods, and processes used in the production of goods and services or in the accomplishment of objects. To develop technology someone does not have to understand the fundamental underlying mechanism, they simply have to work through trial and error. Simply because a technology is developed doesn't mean the developer understands the underlying mechanism. The creation and presence of a technology does not mean that the fundamental underlying mechanism is understood; it nor or may not be.
   A. **Technology** - Technology is developing usable material systems that perform functions) by trial and error.
4. **Science engineering** - Certainty development (knowledge for socio-technical understanding) - is the data discovery by experimentally controlling systems and using that data to build technologies.
   A. Society is the science of engineering how human and biospheric systems work together for global human and ecological fulfillment.

Summarily, science exists to describe, explain, and understand the natural world. Engineering exists to take these discoveries and construct a more fulfilled and thought-responsive environment.

> **INSIGHT:** *The constituent parts of every system exist in a world of cause and effect.*

3.1 What are the methods of science?

There are two primary scientific methods (i.e., the methods of science):

1. **The experimental-mathematical scientific method**:
   A. Science is interventional and descriptive of results. The results of this type of science are based on mathematics, including statistics (i.e., every scientific paper is based on statistics). Note: technically speaking, reviews of science (scientific literature reviews) are not science. Herein, science is interventional and experimental. In the early 21st century, many literature reviews are actually opinion pieces.
2. **The rational-visual scientific method:**
   A. Science is rational explanation [of physical phenomena] through visualization (through images of objects and animation of objects, simulation) using objects to name and convey understanding. The real world requires rational visualization of objects understood.

Table 22. *Simplified comparison between experimental (mathematical) science and rational science.*

Experimental Science	Rational Science
Mathematical description and statistical analysis (statistical explanation)	Conceptual definition, visual naming, and visual explanation
Reasoning with math	Reasoning with objects
Experiment, evidence	Point to, draw
Describe, predict	Explain, define and visualize
Show math results	Understand
Formula knowledge, proof (and fact)	Objective causes, mechanisms
Mass	Objects
Observations, measurement	Existence
Numbers, units, number-lines	Dimensions, coordinates, vectors

Experimental Science	Rational Science
Displacement/distance travelled	Distance/separation
Energy, force, charge, field	Physical [object] mediators
Time	Location

Science uses mathematics (Read: universal pattern language) as a fundamental tool in order to have the ability to do the processes of:

1. **Quantification (Read: counting, numbering):** Mathematics provides a precise way to quantify and measure (count) natural phenomena, allowing scientists to describe and analyze them with accuracy.
2. **Predictive power (Read: controlling):** Mathematical models enable scientists to make predictions about the behavior of physical systems (i.e., their patterns), allow for the testing of hypotheses.
3. **Communication (Read: defining):** Mathematics provides a universal language to communicate quantitative findings and pattern descriptions.
4. **Application (Read: technology development):** Mathematics allows scientists to apply their findings to technological creation. Equations and formulas describe and facilitate the analysis of real-world situations using mathematical principles (i.e., the principles of patterns, logic).

Science uses visualization (Read: to see objects and the movement of objects) as a fundamental tool in order to have the ability to do the processes of:

1. **Objectification:** Visualization requires identifying what exists (object with location).
2. **Understanding power:** Visualization enables someone to point to an object and name it, and to understand how it moves (or, how multiple objects move).
3. **Communication (Read: defining):** Mathematics provides a universal language to communicate quantitative findings and pattern descriptions.
4. **Application (Read: technology development):** Mathematics allows scientists to apply their findings to technological creation. Equations and formulas describe and facilitate the analysis of real-world situations using mathematical principles (i.e., the principles of patterns, logic).

The experimental scientific method uses experimentation, mathematical descriptions, and statistical explanations. The scientist observes/studies the results of an experiment, and then, describes the observation. The question of understanding then arises: If "you" observe something does that mean "you" understand it? The scientific method is often stated as, "the study of..." Yet, someone may study something all week, and still not understand it. To study something does not mean that it is understood. Studying itself does not give "you" understanding. The rational scientific method is about explanations. The scientists thinks through visualization of what is occurring or has been observed. Further, predictions can be done with equations. But, the fact that something can be predicted does not necessarily convey an explanation. For example, it is possible to predict the location and amount of light given off by the moon, but that doesn't necessarily mean someone understands orbital physics. An equation is a description, not an explanation. Instead, a visualization/simulation must be included to form a full explanation.

Experimental science is a description of the way the world works, and if someone doesn't know the way the world works, then s/he is not going to be able to correctly describe some things occurrence. Herein, it is important to remember that experimental science is a method for sampling reality in controlled environments. Experimental science is about the building and organizing of knowledge in the form of testable explanations and predictions, and statistical analysis on results of controlled experimentation, from which objective visual understanding is "rational understanding". Scientists use outcome statistics from data sets to communicate. Experimental science is the systematic nullification of hypotheses until a hypothesis is discovered that "scientists" can't yet nullify, and then it moves to a "theory" (Read: best working model). A "theory" is the current best guess/model for how the universe works until something disproves it. In this way, science is a practice for creating better and more usable models.

Rational science is a rational explanation for the way the world works, and if someone doesn't know the way the world works, then one is not going to be able to correctly understand some things occurrence. The language of rational physics is illustration; the proposal has to be able to illustrate a mechanism (a rational physical interpretation; something that can be visualized). Alternatively, the language of experimental physics is statistics, math. Certain aspects of reality can be symbolically defined in mathematical terms. Therein, calculation is a mathematical process of comprehension.

It is important to note here that science (experimental or rational) is not the reality system itself. Science is not reality itself, and therefore, may not be capable of being used to fully explain reality (if it is a larger system). Instead, science supports consciousness in discovering more about the system within which it exists. A system can only be understood by its existence in a larger system. And hence, science by itself cannot lead to the full understanding of consciousness; instead, that requires first-hand conscious experience.

Why are experimental science and rational science different? Because, experimental science uses predictions. A prediction is a description. If a prediction comes true, then the description is accurate. However, the description is not the explanation. Rational science

uses visualization (concept and object) to convey understanding. Together, experimental [mathematical] science and visualization [rational] science form systems science.

> **MAXIM:** *Things are of scientific interest mainly based upon their capacity to be observed repeatedly. Therein, to observe regularities, "you" might have to look through something regular.*

3.2 Experimental-statistical science

> *A.k.a., Maths science, the experimentation and statistical explanation method, experimental science, the scientific research method, the experimental-statistical scientific method, research science, the scientific process, the scientific research process, the scientific research method, the experimental scientific method, the experimental scientific process, the experimental method, the experimental scientific method, controlled observational research and statistical analysis, interventional science.*

Experimental science is the systematic study of the universe through experimentation and statistical analysis. An experiment is reproducible if experimenters can run the same experiment and get the same results at a later date. If an experiments is truly revealing some fundamental truth about the world, then that experiment should yield the same results, under the same conditions, anywhere and at any time. Interpreting results through experimentation and observation. The scientific method calls for the elaboration of a predictive model of the system under study. The model should reproduce the existing experimental results and should be predictive regarding future experiments. By performing these experiments we validate the model, or refine it to a better model that captures more facts about the system. Science works by studying problems in isolation. In science, if you want to show that a model is wrong (i.e., doesn't describe reality). All you have to do is make a prediction from that model, and then show that it doesn't accurately describe reality. Reality is the ultimate judge.

> **NOTE:** *Experiments involve controlled testing and statistical analysis of the results.*

Science exists to help us predict so that we can design the improvement of the quality and fulfillment of our lives. Science is self-regulating because studies are repeated. Experimental science is working out what is likely and probable to happen.

In experimental science, correct prediction means that there may be some degree of understanding.

In experimental science, theory is a framework of testable predictions that accounts for all known evidence and can account for more evidence that is not yet known. The essential process of science is to duplicate the science and try and find something wrong with it.

Falsifiability means that there has to be some way of proving it wrong in order for it to be right. To be falsifiable in a physics viewpoint there has to be a physical experiment that shows (or verifies) the model, and could possibly show that the model is wrong. Experimental science often misses the assumptions that rational science is the foundation of rational science.

In an experimental scientific paper, the author is supposed to state:

1. What information was available.
2. What was done.
3. The results/conclusions from what was done.
4. What are the limits and the problems still left to be resolved.

More completely, an experimental scientific paper (a.k.a., scientific research paper) involves the following data categories and concerns:

1. An introduction to what are the numbers being collected.
2. What is the dependent variable?
3. What is the independent variable?
4. What was the population?
5. How long did it go for?
6. What were the controls?
7. What are the results?
8. What are the statistical procedures, statistical outcomes, and statistical inferences?
9. Be careful with conclusions because that is primarily where the researchers biases will show (conclusions are unnecessary).

The fundamental assumptions are:

1. The universe/reality exists. Currently we cannot have an observation independent of an existing universe/reality.
2. We/individuals can learn something about reality.
3. Models with predictive capability are more useful than models without. Here, there are two categories: models that have predictive capability, and models that do not have predictive capability. Science asks, does a specific model have predictive capability? If it does, then it is "robust". If it is highly robust (i.e., highly predictive), then it is called a theory. Theories are things with a high degree of predictive capability.
4. The brain is a pattern recognition, model forming system.

Science can only explain why things are the way that they are if there is an observed causal progression, a "history" (an information trace in an environment) that caused them to become the way that they are

- an iteration. Hence, scientific explanation requires verification and necessitates hypotheses that are vulnerable to falsification. Notice that the concept of falsification is based on the assumption that all facts are physical, because a physical experiment is required. A 'theory' is not a 'theory' if it cannot be tested. There must exist some experimental signal that can be triggered and observed.

The [experimental] scientific method assumes that a system with perfect integrity and optimization yields a singular extrapolation within its organization that one can test against observed results. Where the results of the test match the expectations of the scientific hypothesis, integrity exists between the cause and effect of the hypothesis by way of its methods and measures, which create a space of probable certainty. Where the results of the test do not match, the exact causal relationship delineated in the hypothesis does not exist.

The scientific method cannot accomplish anything if the phenomena being explored with it are not consistent by means of 'reliability' and 'verifiability'. It is important to bear in mind that validity and reliability are not an all or none issue, but a matter of probable degree. Fractional measurement is an important part of the scientific process, and therein, the two main measures in science are 'reliability' and 'validity':

1. **Reliability** - a measure of the internal consistency and stability of a measuring device. Measurements are reliable to the extent that they are repeatable and that any random influence which tends to make measurements different from occasion to occasion or circumstance to circumstance is a source of measurement error.
2. **Validity** - an indication of whether the measuring device measures what it claims to. Validity is the extent to which an instrument measures what it is supposed to measure. The question to ask is "how valid is this test for the decision that I need to make?" Or, "How valid is the interpretation I propose for the test?" We can divide and classify the types of validity into *logical* (or *non-empirical*) and *empirical*. Scientists distinguish among different types of validity, and different disciplines refer to the same type of validity using different names, which sometimes can create confusion about what type of validity is being assessed.
   A. The validity of ideas is not subjective. The question of validity will be valid until the end of time, because the emergent nature of knowledge causes consciousness (and the information systems it creates) to change its understanding of every phenomena, given newly available information.

Science is not based upon the consensus of others' opinions. Our values and beliefs do not exist in a vacuum, and as such, they have consequence on the rest of the world; therefore, it is of paramount importance that we continually update our values (and beliefs) as our abilities allow us using the tools available to us. Science is one of those tools that allows us to see past opinion to create more reliable and valid models which we may use to more greatly orient ourselves toward a higher potential of fulfillment.

The scientific method is a common systematic procedure used in science. Science is procedurally implemented. It consist of 4 tasked actions (or "steps") [performed by a "procedural construction entity"]:

1. **Observe reality:** Making any kind of measurements about a particular behaviour or effect within reality.
2. **Generate hypotheses:** Coming up with several different theories about why this behaviour is observed. For this the scientist looks for similarities between known phenomena and this newly observed effect.
3. **Extrapolate:** The most likely hypothesis is selected, refined and a blue print for an experiment is designed which can be used to verify predictions on what kind of behaviour is to be expected under a particular set of initial conditions
4. **Verify theory** in a repeatable experiment: In order to verify the hypothesis an experiment is performed in order to check if the expected reaction to certain inputs fits with calculated output of the theory. It is important that these experiments are repeatable.

Herein, "labelling" improves (or, allows) for probing capability within a navigable environment. The right kind of strategy will prevent "you" from missing things as "you" navigate with the tool as 'science'. "Labelling" is a navigation strategy that is necessary for the facilitation of integration [at scale]. However, the labels themselves must be corrected for by [the integration of] evidence. Although "labelling can be disabling", it is also necessary to subject that very thought to integration.

The methods of science involve a systematic process of inquiry by which we "prove" or "disprove" our perspectives and evolve our knowledge and eventually our technologies. Fundamentally, the function of science is to produce better explanations - the drawing of increasingly appropriate connections, and information validation. The methods prevent aimless wandering that occupies time and resources without validating anything for its benefit.

The scientific reasoning process has been used in combination with other "naturalistic knowing processes" (e.g., shamanistic and other intentionally and introspectively mindful communication forms) used by many types of organizations across historic time to develop knowledge bases and build up an understanding of their environment.

The scientific method enables progress in a desired

direction by discovering and clarifying phenomenal regulations in reality. When engineers design systems-based solutions they desire the most updated scientific view to work with so that they have the information to arrive at optimal design decisions, to generate the most informed solution for a specific function. Engineers design for 'function'.

We recognize the emergent nature of knowledge, and therefore, any knowledge we gain through the use of the methods of science is also in emergent in our awareness. Findings as a result of following scientific methods are always subject to review, replication, and scrutiny. And, as logical ideas emerge they are accepted or rejected on the basis of empirical evidence. Yet, not having evidence for something doesn't mean that it isn't relevant or unimportant. Even the definition of a human being has changed over the centuries and is still changing as we learn more.

We understand that things do not have to be shown by science in order to be true. Many things were obviously true and real before science discovered, modelled and questioned them. Science is simply an effective and natural way of collecting knowledge, testing theories, and discovering how things work. Yet, without questions (i.e., inquiry) there is no science. If questions are not asked, then scientific knowledge does not advance.

Nonetheless, is not "the only way". At a personal level, direct conscious experience and observation, void of science, and engaged in pure mindfulness, are other valid means by which we gain personal knowledge of our world. Therein, ayahuasca and DMT (as biochemical information technologies), like science, are a structural tool for confronting one's own presuppositions about oneself, others, and universal reality. Fundamentally, experience provides the potential for verification and greater certainty. Self-verification and re-verification are excellent (even, necessary) filters for accuracy.

Science, however, involves rules of alignment. It is a more socially specialized tool of investigation than just observation and direct experience (which are also part of science). Science is a designed investigation into the rule set that we are all bound by. Scientific thinking will emerge and flourish naturally if a conducive environment exists. Even children do have the ability to think scientifically as evidenced by Cook et al., (2011) and Mcshanahan (2011).

Scientific theories are not necessarily absolutely true, but they are by far a closer approximation to reality than speculation. If a measuring system is inconsistent it cannot be used as a working hypothesis. The very fact that computers and smartphones work as well as they do is because the scientific system has functional usefulness to humankind.

Science is not about "proof", science is about evidence. Instead of using the term "proof", one might say that the evidence is so far beyond chance, and very likely not to be artifacts or mistakes, that for all intents and purposes, the phenomena are real and the theory has a high degree of verifiable accuracy. Science is fundamentally based on evidence. Proof is for mathematics and logic, which science uses as tools. The filter of logic describes a phenomenon and the scientific method provides independent verification. The scientific method depends on reason to deduce some conclusion(s) about the experiments and discoveries that have been made about how nature works. Herein, abstraction leads to reason, without which we cannot explain how a discovery may be useful or dangerous.

Mathematics is a fundamental means of description Statistics is all about finding statistical patterns in the form of regularity. A fundamental concept in statistics is that of correlation, not a minor concept but actually the heart of statistics in a sense. in the universe. Scientists use tools (mathematical and physical objects) to establish probable associations (or relationships) between variables in the real world. Statistics is one of these mathematical probability tools.

Alternatively, the basic mathematical structure used to model [networks] is called a graph. The graph is a fundamental concept in discrete mathematics (a.k.a., object versus statistical mathematics). Informally, we may view a graph as a structure consisting of a set of points and a set of lines joining these points. Such points are called vertices or nodes, and the lines between them are called edges or links. In principle, a graph is a pair G = (V,E) comprising a set V of vertices and a set E of edges, which are 2-element subsets of V. Graphs are very easy to represent and understand, and can be easily processed by computer programs. An edge between vertices u and v is given by the set (or unordered pair) {u,v}. Here, u and v are called endpoints of the edge. In the interests of simplicity, we may relabel an edge {u,v} as uv by identifying its endpoints. An edge whose two endpoints coincide is called a loop.

Many real world systems can be represented as graphed models [networks]. In a biological network, nodes and edges can represent different things. A node can be a protein, peptide, or non-protein biomolecule. Edges can be biological relationships, interactions, regulations, reactions, transformations, activation, inhibitions. One can construct bipartite or tripartite networks, for instance, between genes, proteins, and drugs. A dynamical system (i.e., a system that changes over time) has two aspects, a state space and a function, and is described in terms of them. Let us see what they are. Each change marks a state, and a change to values in the model, or even, the model itself.

Logic and mathematics require proofs. Experimental science has a requirement for evidence. And, science uses logical identification and integration, which involve logical proofing. However, the concept of 'evidence' leaves room for uncertainty and probability. Proof does not (i.e., deductive logic does not). In science there is always uncertainty. We haven't discovered every aspect of reality, so we are left with probabilities of that which exists and "probable futures" of that which may exist.

Science involves the idea of theory - the idea that not everything is yet known, emergence. In all

scientific results there is room left for uncertainty and probability. Asking for proof in science is silly. It is nearly impossible to "prove" anything. Science does not produce proof(s), it produces and requires evidence. That "my" conclusion could be wrong is 1 in 10000, an assessment of error in an experiment. The assessment of the error is the bounds around the problem. Science does not come from observation (i.e., empiricism) by itself, for alone observation cannot demonstrate causation. Observation shows spatial proximity, but not causation. Causation is revealed through the integration of evidence from controlling (or "focusing") experimental inquiry (i.e., the scientific method) into usefully universal (or "fulfilling") theoretical models.

It is important to point out here that even the most objective and unbiased scientific research can have inaccuracies (or "be wrong"); human researchers are not infallible. Scientists track their identifiable errors (or even, potential errors). They identify statistical values that highlight the reality of an occurrence as opposed to chance. In statistics, this is called "significance". There are 'significance values' that facilitate the credibility of the results of an experiment.

Science asks fundamental questions about what are known as 'phenomena' - a fact, occurrence, or circumstance observed or observable:

1. How does a phenomenon emerge, develop, and disappear? (≈ the Aristotelian "material cause")
2. What form does a phenomenon take and why? (≈ the Aristotelian "formal cause")
3. What is the system within which the phenomenon operates? (≈ the Aristotelian "efficient cause")
4. For what purpose, goal, or intention does a phenomenon function? (≈ the Aristotelian "final cause")

Abstracting from Aristotle's writings, the four questions above generally fit his notions of material, formal, efficient, and final causes (or causation). However, they are not meant to be strict interpretations. In order to achieve progress in a discipline, one should always go beyond (i.e., develop, extend, build upon) the writing of others (not treat them as completed works that require the strictest adherence).

What matters in scientific research is:

1. Whether the conclusions drawn from an investigation are appropriate for the methods used and outcomes reported.
2. The quality and coherency of the research, not where it is published.
3. The cogency and import of the criticism, not where it is published.*

**Many peer review associations receive funding from industry and/or States, and have less than transparent ties to industry and/or States.*

A hypothesis is a proposed explanation (Read: reasoned guess) for a phenomenon. It is a testable proposition explaining the occurrence of a phenomenon or phenomena, often asserted as a conjecture to guide further investigation. In science, a hypothesis allows for the focus of attention (and inquiry). It is a tentative explanation derived from limited evidence in order to start another investigation to explain an event, phenomena, or mathematical model. It is also known as an "educated guess", as there is no assumption of truth involved. A hypothesis can be a single proposition or be made up of several propositions which will trigger a set of scientific experiments to provide evidence. If a proposition contains some component that defies testing or detection, then the proposition is not a scientific hypothesis. A hypothesis must also be 'falsifiable'. That is, there must be a possible negative answer (i.e., it must be possible to disprove or refute with evidence). Socially intelligent humans can consider a hypothesis and withhold 'belief' for 'evidence'.

For a hypothesis to be a scientific hypothesis it must be testable via the scientific method. In other words, falsifiability defines the inherent testability of any scientific hypothesis. Scientists generally base scientific hypotheses on previous observations that cannot satisfactorily be explained with the available scientific theories.

Hypothesis are subjective. That is why they must be tested against objective evidence. The only interpretation of the evidence is whether or not it contradicts the hypothesis. Any subjective implications based on the experimental data would require further testing.

Hypothesis testing is the critical thought process in the scientific method; assumptions must be tested. And, the two potential errors when testing an assumption are: first, rejecting the null hypothesis (H_0, original assumption) for the alternative (H_1, #1 assumption), and second, not rejecting the null hypothesis.

Even though the words "hypothesis" and "theory" are often used synonymously, a scientific hypothesis is not the same as a scientific theory. A scientific hypothesis is a proposed explanation, a 'hypothetical model', of a phenomenon that still has to be rigorously tested. In contrast, a scientific theory has undergone extensive testing and is generally accepted to be the accurate explanation, or 'theoretical model', behind an observation. It is a coherent set of propositions that explain a class of phenomena, that are supported by extensive factual evidence, and that may be used for prediction of future observations [through the restructuring of information based upon their principles]. It is formed out of a statistical preponderance of corroborating evidence. A 'working hypothesis' is a provisionally accepted 'information set' proposed for further research. A 'theory' usual includes several different hypotheses - each of which must have withstood all attempts to prove them "false". A scientific

theory explains observations and laws by providing the mechanism [of action] that makes them work.

Every experimental scientific theory begins with certain premises or assumptions; from that conclusions are derived or deduced, and then, experiments are designed to test the conclusions or predictions of the theory in a real world. If conclusions match theory expectations /predictions, then the theory remains, and if not, the theory changes. If, however, the conclusions are not deduced from the premises validly (as in, they don't contradict), then the theory is wrong (partly or completely). Also, the conclusion could happen to be right, but the process of reasoning that gets to that conclusion is wrong. Theories are either rejected or corrected. A correct theory accounts for what is observed.

A theory must also be falsifiable in order to be valuable. If a theory is not falsifiable, then it is not scientific. A theory is only as good as what it able to predict. Someone has to be able to do a controlled experiment to show that what is being claimed is or is not going to happen (is certain to happen).

A scientific theory is the confirmation of not only that which is known, but also of that which is unknown. All theories maintain the claim that, "this theory is what we know under these conditions up to this point in time". Theories leave open the idea that at some point in the future one might discover new information, new realizations, and new conditions that one is currently unaware of. A scientist speaks the truth when saying, "Maybe we don't know everything, but this is what we do know up until this point".

A 'fact' is an undeniable observation intended to accurately describe an object or event. Facts add up to theories. In other words, theories make use of facts. Theories tell us not only what will happen, but why. They're created to describe facts and relationships between facts. They're used to predict facts and to explain facts.

Take note if you do not know this already, but there are no longer any "laws" in science. All the things they told you were "laws" in school, scientists now use the word "theory" for them. "Laws of nature" are now "theoretical descriptions of regularities" in nature. No laws are ever broken when a new discovery is encountered.

A theory is a model that identifies, as accurately as currently understood, the patterned regulation of phenomenological space. The application of the concept of patterning, as a "representation of something simpler", to phenomena is a useful way to model the world. Objectivity makes no claim of permanence. The only thing science presupposes is the existence of coherent, consistent, and continuous relationships.

Every scientific model principally involves the questions of whether the model is accurate and enables the prediction of what is going to happen: does it explain all the things you know that happened, and does it explain everything that people knew in times past? If the model works, then it is a good theory, but it is always provisional. As soon as you start to believe you know everything and you have "all the edges tied down", you will [if open to it] discover a new or contradictory relationship. Good scientists always leave their models "open ended" and are always open to learning more, so that they might improve their models.

Scientific results are only limited by the questions asked and the universal boundaries in which they are asked. No matter how strongly a theory is supported by empirical evidence, it is always theoretically conceivable that one day, some data will come in that will force the scientists to modify or even eliminate the theory. Even if the scientists are 99.99% certain that the theory is "true", it is philosophically incorrect to say that it is 100% true and to call it the Truth with the capital T.

Yet, 'truth' is that which has undergone the actuality of occurring. It is that which has occurred and is occurring. Scientifically speaking, it is the collapse of the wave functions of possibility into actuality. There is possibility that exists in the present moment and in some future moment that wave function of possibility, of all the things that are possible in the now at some future point will collapse to become that which actually has occurred in the past and are occurring in the present.

All individuals with common sense instruments and conceptual minds have the potential of observing the same existence. Two people look at the color red: One person can point to it and the other can say, "that is the color red". Hence, science is based on the correspondence theory of truth, and it is why the scientific method works. The correspondence theory of truth is the view that truth is correspondence to a fact. Truth is concurrent with that which is. That which is can be verified to be so through experiment. Science relies on repeatable experiments for verification. And, when an controlled experiment is completed all observers to that experiment observe (or sense) the same actions and relationships (or at least they have the potential if their own sensory and cognitive instruments are functionally operative). In other words, all who see the experiment can correlate that observation; so that is "true".

Experimental science in its most pure form is the unbiased search, the open inquiry, for natural explanations for all phenomena (i.e., all behavioral signals); and as observational sensory evidence it has the following attributes:

1. **Descriptive of phenomenological relationships (predictive)** - has written text, and mathematical-counting, descriptions that are predictive.
2. **Statistical** - has had statistical methods applied.
3. **Consistent** - internally and externally consistent; unifying conclusions. Something is more likely to be true if scientific experimental control situations (Read: experiments) are consistently predict correctly.
4. **Repeatable** (replicability) - the same types of situations/actions lead to the same results.

5. **Correctable** and **dynamic** (re-evaluation)- changes are made as new information discovered.
6. **Empirically testable** and **falsifiable** (falsifiability)- based upon controlled and repeated **experiments** and **evidence**; includes observations, predictions, and controlled verification.
7. **Parsimonious** - careful and sparing in proposed entities or explanations; Occam's razor. Note that being parsimonious can be useful, but it can also be an impediment to understanding a complex and dynamic system. There is also the saying, "Be careful with Occam's razor, for it can cut you".
8. **Progressive** (integratable) - achieves all that previous theories have and more; accurate and non-contradictory integration.
9. **Tentative** (emergent) - admits that there may be more to know rather than asserting certainty, emergent.
10. **Useful** (applicable) - describes and explains observed phenomena with a rational mechanism, and may be applied toward function optimization and human extensionality (i.e., technology).

The constants of nature are precise and knowable, or at least probable approximations of them are, and the universe is clearly highly self-regulating or we wouldn't exist. This scientific method is primarily an analytical approach to the acquisition of knowledge and to problem solving. A correct analysis, and eventual solution, requires accurate and factuality (a.k.a., certainty) of information (i.e., data with knowledge certainty of the result of a controlled situation). The analytical approach separates a whole into its constituent parts in order to study the parts (name then, observe them, and their relations independently.

> **MAXIM:** *Things are of scientific interest mainly based upon their capacity to be observed repeatedly. Therein, to observe regularities, "you" might have to look through something regular.*

Science is unique in that it involves the statistical verification (a.k.a., "PhD" academic level, which stands for doctor of philosophy) of its own methods. The methods of science are transparently fed into the new refresh of our current model of reality, which represent an unbiased approach to the most developed theory. Once we experience a signalled frequency, then we can begin the process of isolation. The more we can control the isolation of the signal, the more closely we are targeting the source of the signals frequency.

The application of the scientific method involves controls - controls on the conditions of the experiment and under which a given phenomena takes place, in order to conduct research and results analysis. Manipulation of the environment in an experiment provides a way to minimize the number of alternate explanations for the data and increases the likelihood of arriving at the correct conclusion, prediction, in the future (for further inquiry and for technical engineering purposes). In many experiments, a "control group" is a form of such control [about the source of a signal and intentional control over it]. Herein, it is relevant to note that 'observational studies' find *associative descriptions* only. Non-controlled observational data generates *correlational descriptives* (description) as opposed to *causative visualizations (causation*) *descriptions*, and this type of category of data cannot be used to draw scientific [rational-visual] conclusions; yet, such data can be used to facilitate the formation of a hypothesis. Highly controlled studies can be used to draw resulting statistical [predictable control] conclusions. And, if results show that there is no correlation; that provides evidence ("proves") there is no causation; because, there has to be at least correlation if there is a cause and effect relationship.

Controlled research science demands significant sample groups, peer analysis ("peer review"), independent repetition of results, and double-blind experiments to filter out anomalies as well as honest human error. There no scientific study or experimental design in which individuals can learn anything of scientific value without a control group, certainly not about safety and efficacy.

> **APHORISM:** *The science of today may be dis-proven by the science of tomorrow.*

The more general purpose of science is to create hypotheses, but also to destroy them, to discover, and to learn. Science is explanation so that other people can understand, so we can evolve and fulfill together. In the literature, the word science has many definitions. Those definitions include, but are not limited to:

1. Science involves observation, identification, description, experimental investigation, and theoretical explanation of phenomena.
2. Science is the systematic study of the structure and behavior of the physical and natural world through observation and experiment.
3. Science forms predictive, and hence, useful models of utility about reality.
4. Science is the systematic building and organizing of knowledge in the form of testable explanations and predictions about the universe.
5. Science is understanding objects and mechanisms in a physical environment.
6. Science involves conscious experience in a spatial environment and creation in a spatial environment.

In science,

1. There are things which exist, and have been verified.
2. There are things which exist, and have not been verified to exist.

3. There are self-contradictory entities, which cannot exist.

In general, science is a process for discovering and codifying an understanding of how objects function and interact with one another. Those objects must exist somehow in the real work (i.e., they must have some real embodiment). Science is referred to as an objective process, in part, because science is concerned with real world objects that may be commonly sensed and understood by humans. Fundamentally, in science, there is a lot to be learned from investigating all possibilities; though all possibilities may not be capable or desirable to be explored.

In general, science is a process for discovering and codifying an understanding of how objects function and interact with one another. Those objects must exist somehow in the real world (i.e., they must have some real embodiment). Science is referred to as an objective process, in part, because science is concerned with real world objects that may be commonly sensed and understood by humans.

Science is about modeling and predicting the behavior of nature, not what nature is, essentially, because science is a method in the system of nature. By modeling and predicting nature, inside the natural system, organisms can create technology that extends their own functionality. Science is a method for predicting and modeling behavior. Modeling appears innate to entities with the capability of integrating an adaptive response to an environmental stimulus. As a process of discovery and integration, science may inform the construction of models and tools that facilitate the efficiency of self-directed creation within a physical "though-responsive" space. When we do science, through discover to self-integration, our understandings lead to new creations.

Scientific facts are determined by evidence (in experimental science) and visualization (in rational science), not consensus. Both evidence and visualization are a form of verification. Science is the way we know how nature works.

Science is a self-correcting process (the self-correcting process for the systems engineering). And yet, It is possible during scientific discovery to build inaccurate findings on previous inaccurate findings, compounding the inaccuracy. Full retraction of inaccurate findings is easily to reduce this effect.

Science, done properly, is bounded by a set of rules and practices that help to distinguish reality from fantasy, objectivity from subjectivity. The rule-set that composes this physical reality does not change with time (i.e., the laws of physics do not change with time). However, our understanding of this reality system may change with time as we discover and learn more about it. The laws of physics remain the same across all frames of reference. Physics [as a source of knowledge] is the fundamental modeling and understanding of reality. The laws (Read: rules/principles) of physics, and engineering therein, work whether humans believe in them or not.

The world operates via rules, which means it is predictable to some degree; it is independent of culture and language. If people share a blueprint or standard, it has uniform interpretation among those people. There is no cultural way of building something to technical specification, there is an engineered, mathematical and technical way. Science is about learning about the rule-set, and unless someone thinks s/he knows everything there is to know, s/he is going to learn something new in time and have a change of mind.

In the early 21st century, there is huge amounts of [research] money, prestige, power, and social influence associated with scientific publishing and consulting. When there is socio-economic vested interest, there is highly likely to be manipulation. Further, amid valid science, it is easy to create an environment of confusion by paying off just a few spokesman.

Humanity can use scientific study (i.e., the scientific study of the world) to harmonize humanity's behavior with nature. Science is an important part of an emergent social system. An established system is unlikely to see a value in science, because one of the advantages of using science to approaching humankind's problems is that it advances humankind. Those who apply science without market and authoritarian filters are unlikely to hold onto old, outdated, falsified ideas and concepts. Established systems do not seek advancement or evolvement. In an emergent system there are no final frontiers. Science necessitates the rejection of the appeal to authority.

3.2.1 The experimental scientific method

The method of experimental/research science:

- Through observation, experimentation, measurement, collection of data, calculation, and statistical analysis, experimental scientists reveal progressively better answers to how the universe works.

The data classifications of experimentally controlled research are:

1. Participant and non-participant observations.
2. Structured and unstructured observations.
3. Controlled and uncontrolled observations.
4. Measurement ordering and numbering (mathematical, statistical, and spatial coordinate) observations.

Therefore, the experimental scientific method can be generalized to:

1. Make observation.
2. Describe behavior.
   A. Describe observation and recording of the behavior of individuals for the purpose of describing such behavior.
3. Ask a question and state assumptions.

   A. Inquire after description of individuals for the purpose of discovering new [existent information] relationships.
4. Form a hypothetical question (hypothesis) and testable description (of actual relationships).
   A. Design a [technical engineering] way of controlling the relationships [intentionally]; model and inquire.
5. Make prediction based on the hypothetical model. Predictions, as statements of what will occur as described by the visualized model; are the results of the experiment aligned with the predicted model, and with what certainty?
   A. State the assumptions of what will occur (a.k.a., opinion, position, etc.).
6. Test the prediction.
   A. Run the controlled experiment to make a new measurement-observation.
7. Iterate the whole analytically descriptive method, and use the results to make new hypotheses or predictions; repeat the controlled experiments, analysis, and assumed predictions (certainty of knowledge) about the real-existent world. Repeated research clarifies the certainty of information. Observations lead to further investigation; further research (into technical existent relationships).
8. Revise conclusions (theories, models, and new hypotheses) based on all available data.

NOTE: *Herein, a hypothesis is only "true" (with some certainty) if it can be tested by repeated experiments.*

A more complete stepwise view of the method of research is:

1. Observe.
2. Make a prediction (hypothesis).
3. Run an experiment (to confirm and verify, or dis-confirm and disprove a prediction, behavior and/or description).
4. Measure.
5. Collect data for evidence.
6. Describe with an equation (quantitatively)
7. Discover a novel behavior.
8. Present evidence (to persuade/convince peers).
9. Result = knowledge.
10. Repeat the process to confirm knowledge (increase certainty of knowledge).
11. Invention of a technology by means of the application of knowledge.

Herein, if someone cannot test it, then it is not science. The experimental scientific method can be viewed in greater detail:

1. Observation and description of phenomenon. The observations are made visually or with the aid of scientific equipment.
2. Formulation of a hypothesis to explain the phenomenon in the form of a causal mechanism and/or a mathematical relation.
3. Test the hypothesis by analyzing the results of observations or by prediction and observing the existence of new phenomena that follow from the hypothesis. If experiments do not confirm the hypothesis, the hypothesis must be rejected or modified (i.e., go back to Step 2).
4. Establish a theory based on repeated verification of the results.
5. Develop new technology based on the theory.

Herein, what scientists are most often looking for is a layer of efficacy in their procedures, and for many scientists, efficacy means [an emergent] truth.

Experimental scientists do the following:

1. Plan and design experimental interventional programs to inform on aspects of cause an effect in the real world.
2. Conduct experiments and make observations under discipline and control.
3. Report what was observed.

It is important to note here that science is not occurring when the "scientist" adjusts the observations so that they report something other than what was observed.

APHORISM: *Absence of evidence is not evidence of absence.*

3.2.2 Evidence

MAXIM: *What can be asserted without evidence can be dismissed without evidence. Therein, denial without evidence hinders scientific inquiry.*

Science is decided by the empirical data, and not by anyone's opinion of it. In a community, the veracity of claims to knowledge cannot be determined by whether something is told to all, many, or told to none. The community must use at least unbiased evidence and corroboration, logical reasoning, and complete transparency with the scientific methods of observation and analysis.

What is the alternative to accepting a claim on the basis of sufficient evidence in support of it? Two logical alternatives exist: (1) accepting a claim with insufficient evidence supporting it; and (2) accepting a claim without any evidence supporting it whatsoever.

All technical truths about our common reality have the potential for eventually being verified or demonstrated. If a truth cannot be reliably demonstrated, then this is solely due to our current limitations. A truth may also

be an element of a greater truth, a larger system [of understanding], so the realization of truth is always evolving.

The question then becomes: is there anything that demonstrates or tends to prove that evidence is necessary for rationally accepting claims of truth? And, what evidence is there for supposing that claims to knowledge need evidence in order to be rationally viable as a factor in orienting and deciding? The evidence is three-fold:

1. The nature of human consciousness.
2. The nature of knowledge.
3. The nature of reason.

Let us examine each of these individually, keeping in mind the definition of 'evidence'. According to one common online dictionary (2012), evidence is "that which tends to prove or disprove something; ground for belief; proof." The Oxford English Dictionary (2012) defines 'evidence' as: "testimony or facts tending to prove or disprove any conclusion". Social proof is evidence so strong that someone can't statistically or reasonably deny it, because it is commonly/equally computable, visualizable, and/or able to be pointed at.

In regard to the nature of human consciousness, the very fundamental fact that consciousness is consciousness of something [a self-evident] has pervasive importance to the present area of inquiry. It means that consciousness needs an object, and it is this object which conscious activity beyond the perceptual level of cognition (i.e., conceptualization) identifies and integrates into this grand phenomenon known as knowledge. The objects of awareness inform consciousness so that our consciousness has content, has awareness of something. Without content to be conscious of, there is no consciousness. Consciousness with nothing to be conscious of is a contradiction in terms. Since consciousness needs an object, any activity which consciousness performs must have an object – whether it is in the form of direct perception or inference based ultimately on direct perception. The object(s) of awareness inform its activity with the content it requires to act on in the first place. Consciousness is conscious of its surroundings [by degree] and it can discover the nature of reality and identify it by an objective process (if such a process is revealed and selectively integrated by the conscious). Consciousness inquiries into and discovers evidence of a true existence.

In essence, consciousness refers to the phenomena of awareness, irrespective of who/what is being aware of who/what/when. Imagine for a moment, trying to study anything, without implicitly acknowledging the existence of the phenomena of awareness. Imagine trying to explain the causes of **sensation** (which is merely the awareness of a stimuli), or **perception** (the awareness of not just individual stimuli, but of other existents based on the integration of multiple stimuli), and finally **concepts** (let's just call this awareness of complex patterns among many existents), without first integrating and using the concept "consciousness" (which identifies the fact that awareness exists, has as its object an existent or more, and is dependent on time - but that's it, it identifies nothing more). Here, it is through mindfulness and introspection that we develop our self-awareness.

When we know ourselves, then we may exchange information with "other" selves, accurately (i.e., *usefully*; through *precise* coordination and through *knowledge*). Through the accurate exchange of basic information about objects in the surrounding environment, we can come to more coherently create toward our fulfillment (as opposed to individual achievement at the expense of our fulfillment).

In regard to the nature of knowledge, we must keep in mind that, just as consciousness is consciousness of something, knowledge is also knowledge of something. Knowledge of nothing at all is likewise a contradiction in terms. Knowledge must have an object, and it is ultimately our awareness of objects which provide the basis of knowledge as such. In reality, knowledge is earned by the cognitive effort of the mind which possesses it. The content of objective knowledge is the facts of reality. This ties in directly with the proper understanding of the concept of objectivity, which is defined by objectivism: "To be 'objective' in one's conceptual activities is to volitionally (i.e., through will) adhere to reality by following certain rules of method, a method based on facts and appropriate to man's form of cognition" (Peikoff, 1993:117). If what one claims to "know" is not based on facts gathered by "a method based on facts and appropriate to man's form of cognition," then it is not legitimate knowledge. Facts that inform knowledge are the evidence that provides knowledge with its objective content. Consequently, without evidence to inform one's knowledge, what someone may call "knowledge" is not fact-based, and thus it is not really knowledge at all.

In regard to the nature of reason, consider first of all what reason is: "Reason is the faculty that identifies and integrates the material provided by man's senses" (Rand, 2011:20). Without "the material provided by man's senses," there is no content for reason to identify and integrate. Reason is a conceptual activity, and conceptual activity requires input (i.e., evidence) from reality, beginning with perceptual awareness. Concepts are formed in part by isolating and integrating objects which a knower perceives in the world around him or her. Thus, evidence is a non-negotiable part of rational knowledge – knowledge with a logical connection to the real world.

As a concept, reason is defined as the neuro-cognitive processes that identify and integrate the material provided by a human's senses. Reason integrates perceptions by means of forming conceptions or abstractions. The ability to reason provides the human organism with a larger decision space than other organisms on the planet; a decision space that has the potential to include knowledge of the complexly systematic and technical nature of reality, which provides

the ability to consciously caretake an environment. This "faculty", reason, allows for the emergence of strategic planning and other survival-oriented process[ing] strategies.

Since reason is a distinctive tool of survival for the human organism, a process or method is needed to discover when reason is being utilized "properly" or "improperly", in alignment with reality and with verifiable human fulfillment. The concept of logic provides for this. Logic is the nested central process and method of all proper reasoning. Logic is defined herein as the process of non-contradictory identification. It is a creative process by which a consciousness identifies and relates to things [interfaced with] in reality in an integral (as unifying) way. For example, A is A, A is not non-A. A thing cannot be itself and not itself in the same way in the same respect for that would be a contradiction. Logic provides the potential for identifying non-contradictory relationships in a unified reality. And, there are no contradictions in a unified, objective reality; there are just errors in understanding and integrating the perceptions of this reality. Thus, the task for individuals, for our minds, depending upon our level of development, is to understand reality in a non-contradictory way [through the process of logic) so that we can commonly devise ways of deciding and creating that accord with the reality of our existent needs, rather than opposing them.

To integrate and effectively explore reality individuals must examine the real, relational conceptions that drive their behaviors. Logic, as the artistic expression of non-contradictory identification, is a way to understand concepts as they are related to each other and to reality; and hence, as they relate to the fulfillment of real human needs. Evidence is gathered in the form of data

In all three cases, the nature of human consciousness, the nature of knowledge and the nature of reason, evidence (i.e., factual content gathered from reality by an objective process) is vital to accurate human cognition and fulfillment. These are the evidences, as intimate to the human mind as they are, underwriting the epistemological proposition that evidence is necessary for rationally accepting truth claims. Starving the mind of evidence will not produce knowledge of reality. On the contrary, it will only scramble the mind and turn it loose in a fantasy-world of its own partial creation as it surreptitiously borrows from the very realm it seeks to reject.

Something which must be borne in mind is the fact that an arbitrary claim is one for which there is no evidence, either perceptual or conceptual. (Porter, 1999:64) Such a claim has no tie to reality and "has no relation to man's means of knowledge" (Ibid.). Evidence ties knowledge to reality, making what we know, "knowledge of reality". Our only cognitive contact with reality is perceptual awareness. Conceptual structures are informed by the evidence of the senses, and ideally formed according to the strictures of an objective process, and consistent with the norms of rationality, are objective. The only alternative to this is to abandon objectivity in preference for faith and belief, which lead to the bypassing of reality systems that are unpredictable in their orientation toward human fulfillment.

Today, emotional thinking often drives the beliefs that people hold. What is a belief? The word 'belief' represents a concept. This concept has the distinguishing characteristics of a mental process by which someone has integrated something, with an element of faith that may or may not be based on the facts of reality. It is something for which there is not sufficient evidence to accept as true[ly in alignment with existent reality]. There are overwhelming multiplicities of beliefs in people's minds today that are not based upon the facts of reality. The same applies to opinions. Fundamentally, to achieve a world where people treat each other with conscience and maintain an authenticity in their communication, then we must begin to view our world from a logical and objective perspective [and which may be tied with empathic language, such as non-violent communication (NVC).

Without the proper understanding of the nature of concepts and the process by which they are formed, all these points will be lost, and those who follow such fractured thinking will continue to press divisive debating schemes as though there were no alternative because one has not stopped long enough to examine such matters objectively and according to a rational and informed understanding of how the human mind operates.

3.2.2.1 Scientific evidence and decisioning

> **MAXIM:** *Seek to encompass the paradoxical until you see that it isn't paradoxical. There is no trick in the universe; we only trick ourselves.*

Science is about re-calibrating ideas to reality to produce knowledge with some certainty. Therein, not all information is useful for decisioning. Repeatability is one of the criteria for determining whether a test is useful. If scientists and engineers can't repeatedly get close to the same results, then the information cannot be relied on it for taking decisions. Evidential information has some associable certainty, and is the primary type of information used in decisioning.

However, it is important to note here that certainty can be a barrier to open mind exploration of ideas and experiences; certainty without some degree of openness to new information, blocks someone from seeing and observing the real. When someone has certainty s/he may fail to test and visualize reality, which would otherwise reveal his or her misunderstandings about reality.

The types of evidence (Read: information useful for decisioning) include, but may not be limited to:

1. Pattern language (systems logic, rational reasoning with a visual mechanism)
   A. The rational scientific method (rational science)

2. Sensory observation of object or process (experimental control, differential reasoning with a statistical/mathematical mechanism)
   A. The experimental scientific method (experimental science)
3. Visual survey of object, object motion, or the result of an informational operation:
   A. Identify user demands (user issues with fulfillment, user accounting).
   B. Identify evidence of available resources (resource accounting).
   C. Identify evidence of knowledge, skill, and technology (team capability accounting).

All experience occurs within consciousness, and consciousness can have awareness of itself and its surroundings in a physicalized reality where socio-technical interconnection is possible, and therein, self-discovery and evolution. Evidence provides useful certainty when constructing individual and social vehicles to navigate a common and emergently discoverable environment. Evidence is necessarily experiential by consciousness. Conscious can derive inaccurate conclusions from the experience of evidence; evidence can be misinterpreted. Yet, nothing is more powerful at delivering "proof" than first-hand, conscious experience.

If an individual's experience is the method of proof, then reality can be:

1. **Understood and communicated** *between*
   A. **Conceptually** - for example: 2+2=4; a dog's fur is white.
   B. **Visually** - for example: those two objects together; that dog's fur is white.
2. **Experimented** *with*
   A. **Experientially** - for example: I am experiencing more of that type of object [of which there were initially two]; I am perceiving that a dog's fur is white.

3.2.3 Statistical analysis

A.k.a., Statistical studies.

There are two designs of study upon which statistical analysis of data can be performed:

1. **Experimental studies (Read: controlled studies, research controlled studies, experimental science, interventional studies)** - shows likelihood of causation. Experimental is where "you" control certain variables and try to determine if there is any causality. These studies involve interventions or manipulations by researchers to study the effects. Here, the scientist observes/studies the results of an experiment, and then, describes the observation. Experimental studies are used to determine the predictability of a factual cause.
   A. The results of statistical analysis with experimental data are causational statements (causational assertions) with a "certainty" value.
2. **Associational studies (Read: observational studies)** - shows likelihood of association only. Observational is where "you" observe certain variables and try to determine if there is any correlation. Here, the "scientist" observes/studies, and then, describes the observation. Associational studies are used to show and determine the significance of associations.
   A. The results of statistical analysis with associational data are correlational statements (associational assertions) with a "significance" value.

3.2.3.1 Associational studies

A.k.a., Observational studies, correlational studies, co-relational studies, epidemiological studies, survey studies, observational trials.

Associational studies, also known as observational studies, examine relationships between variables without intervening or manipulating any factors. These studies include cohort studies, case-control studies, and cross-sectional studies. Associational (observational) studies will show co-incidence, but specific causative attributes (e.g., risk) cannot be ultimately determined. Incidence is the simple occurrence of something; it does not inform on cause and effect. Incidence are correlational, and not causal. Causative inference cannot be drawn from observational (epidemiological) studies. It is only possible to correlate, and correlation is not causation. Associations cannot establish causation/causality (i.e., association does not and cannot establish causality). There is no way to identify a percentage of causality by looking at associations [in a multivariate analysis]. Associative studies show markers of [co-] incidence (only); they show co-incidence between factors (co-incidence relationships). Associational studies co-related (correlate) data only. Unlike experimental research in controlled laboratory settings, observational studies involve the collection of data in natural contexts. In an observational study, the allocation (assignment) of factors is not under control of the investigator. Associational studies are inferential, which should be used to guide scientists (who do controlled/interventional experiments) as to where to look and where to do the actual science. Importantly, associational studies can give scientists who run experiments a clue as to where to look to run their next experiment to investigate causation.

NOTE: *Observational studies involve statistical studies.*

There is only one form of scientific evidence -- experimental, interventional, controlled research undertaken by qualified scientists according to the scientific discipline. Science involves properly designed, controlled, and randomized observational-interventional research studies undertaken by qualified personnel according to the scientific discipline, to establish cause and effect. The only thing that is important is the data (e.g., the numbers), and not the opinion (which may be the scientists' themselves). Scientists control in the design of their research and they collect data according to their disciplines.

> **CLARIFICATION:** *In science, either a connection between two things is causal or it is not causal. If a connection is causal, it must always associate. The purpose of science is to identify causal connections. Herein, to do so, scientists must report what they have observed under control.*

There is only one form of evidence [that can convey high certainty], that is experimental (Read: interventional) evidence. If the definition of evidence were to be broadened to include epidemiology, then it could be said that epidemiological (associational and observational) studies provide evidence of association/co-incidence only. If a study is just observational (i.e., just watching what happens and not intervening), then, technically speaking, science is not being done.

The data from purely observational studies are: relative outcome statistics. The statistics are relative to the selected population, the situational context, and confounding variables (i.e., uncontrolled variables). There is a signal to noise ratio with all observational only studies. Some will have more noise and less signal, and others will have more signal and less noise.

> **SCIENTIFIC APHORISM:** *If you do not have reason and cause to state that you have knowledge of a causal relationship between two variables, then you should refrain from stating that you have knowledge. Scientists make statements that are supportable and unambiguous, because they have the data collected according to the right disciplines, to support those statements (assertions).*

3.2.3.2 Experimental studies

> *A.k.a., Experimental trials, experimental research, scientific research, etc.*

In comparison to associational studies, experimental scientists plan an investigation where they will control everything, expect for one variable which they will allow to vary. And then they will make an observation of the outcome variable of interest and see if there is a relationship between the outcome variable and the moderated variable (or, experimental variable). And then, they report what they actually observed. Experimental scientists will only use associational studies to guide research into potential cause and effect mechanisms of "significance": if a study shows the change in incidence ("significance") between populations in the range of thousands of percent, not tens of percent.

3.2.3.3 Meta-analysis statistical technique [set]

Meta-analysis is a statistical technique used to combine and analyze data from multiple independent studies (trials) on a particular topic or research question. It allows researchers to systematically review and synthesize findings from individual studies to obtain a more comprehensive and significant estimate of the effect size or outcome of interest. Meta-analysis is a set of statistical (mathematical) techniques applied to data that can encompass a wide range of study types, including both associational and interventional studies. Meta-analyses can synthesize data from multiple studies to draw associations and assess the strength of associations between variables.

It is important to recognize that it is easy with meta-analyses to be fooled (i.e., for the reader/user to be be reading manipulated data). A reader must look at every single trial in extreme detail, especially to determine the trials efficacy and if it was adequately controlled. Forest plots and pooled risk ratios can be easily manipulated. Trials with inadequate controls are inappropriately, though frequently, included in forest plots to manipulate the substantiation of a claim. Often, there are clear flaws in trials that may be included in forest plots to substantiate biased false narratives.

The meta-analysis method is:

1. **Identify studies:** Discover and include all well-disciplined studies (only).
2. **Data extraction:** Collect all appropriate and relevant data and organize it into a tabled record.
3. **Effect size calculated estimation**: calculate effect sizes for each study. Common effect size measures include: Cohen's d, odds ratios, risk ratios, correlation coefficients, or others based on the nature of the data.
   A. Standardize the effect sizes to a common metric if different studies use different measures.
4. **Statistical analysis:** Perform a meta-analysis using statistical software. Different models like fixed-effects or random-effects models can be applied. Create forest plots to visualize the effect sizes and confidence/significance intervals for individual studies and the overall effect.
5. **Assessing heterogeneity:** Evaluate heterogeneity among study results using statistical tests (e.g., Cochran's Q test, I-squared statistic). Explore sources of heterogeneity through subgroup analyses or meta-regression if applicable.
6. **Sensitivity analysis:** Conduct analysis of study and of the potential bias(es) of the researchers.

The primary goal of meta-analysis is to pool data from multiple studies and integrate it (using statistical operations) to produce more useful information (with which to take better decisions):

1. Identify the effect size.
2. Assess the consistency of findings across studies.
3. Potentially, uncover patterns or relationships that might not be apparent in a single study.

3.2.3.4 Epidemiology

A.k.a., Epidemiological studies.

Epidemiology, as a field, is closely related to meta-analysis because it deals with the study of disease patterns, causes, and effects within populations. Epidemiologists use various study designs and statistical techniques, including observational and interventional studies, to understand the distribution and determinants of health and disease. Epidemiology is statistical analysis applied to interventional (controlled) and associational (non-controlled) studies concerning the health and medical situation of humans. A more common usage of the term is, "epidemiology is the study of how often diseases occur in different groups of people and why". Epidemiology can be useful. For example, it can trace the source of a toxin in the environment. Which is a useful and sensible use of the tool.

Epidemiology is medical statistics, most often used to assess the health and medical environment of people. In a strict sense, epidemiology is not science as experimentation, because it does not control and is not interventional. Some epidemiology uses observational studies only (without intervention). Where there are no interventions there is no function[al control] to draw causative [control] inferences. Epidemiological studies that are solely associational studies are incapable of informing on causes and effect -- associative studies (i.e., non-interventional studies) cannot inform on cause and effect. If a study infers cause and effect, the study method must be capable of relating that information to some control[led] variables.

Epidemiological analysts need to be aware of the two types of common sources of bias:

1. **Evidence level -** the highest level of controlled evidence, for example, in experimental epidemiology is sufficiently sampled and appropriately designed randomized control trial.
2. **Con-founding variables** (a.k.a., confounders, uncontrolled factors) - variables in the study that cannot be controlled for. Confounders in observational studies are always possible, which completely remove any possibility that observational studies could inform on causality.
3. **Researcher bias** - the biases of the analyst, opinion. In concern to epidemiological studies, when the context and surrounding cultural narrative are different, often, epidemiological results are different. In other words, the observed relationships become different when there are different cultural narratives.
4. **Reductionism** - is looking at the totality phenomena in isolation to the context in which they are found, and leading to vastly false conclusions.

In general, no [statistical] correction(s) should ever be applied to raw data. If corrections are applied to raw data, then the likely result will be false or biased data. Often, data adjustment is another name for data fabrication. Often, the word adjustment is a euphemism for data fabrication (or, manipulation).

A scientist should not adjust the incident observations and call oneself a scientist. Adjustment is based on the fundamental fallacy that association can inform on causality. A single variate regression cannot inform on causality. Hence, multiple variate regression is similarly unable to inform on causality. A scientist ought not correct out the influences of any factors; because their causal contributions to the [hard health] outcomes (e.g., death, diagnosis of disease process, etc.) have not been determined. Instead, to make cause and effect statements [about risk] there has to be a mechanism established with experimental science and corroborated with experimental science (properly applied under the required discipline) to collect such data.

Epidemiological studies frequently use the statistic method called "multiple regression analysis". While this method is generally accepted as statistically appropriate, it is not scientifically appropriate. In general practice, it is a means by which to report some outcome other than the actual outcome that was in fact observed in a given study. It is frequently used as a technique for the misrepresentation of outcome statistics. Using multivariate regression analysis (multivariate adjustment), data is adjusted (i.e., changed relative to what was actually observed/reported). It is a fallacy to use relative statistics in the absence of giving absolute [baseline] outcome statistics. Outcome statistics should not be adjusted (manipulated) to fit hypotheses, beliefs or opinions. Scientists report what they observed.

What is actually occurring during multi-variate regression is that someone is taking a group of associations and superimposing them one upon the other, and then, claiming to be able to discover the causal influence of each one mathematically, which is impossible. Multivariate regression also makes an assumption that the various factors being put into a sum do not share co-linearity.

Multivariate regression [analysis] is a procedure used to produce a trend line with much lower residuals than should be reported (Note: The lower the residual, the more "accurate" the predictions in the regression are). This inflates the power of the result, but more importantly, it can completely change the result from

what was actually observed, thus departing entirely from reality and potentially even fabricating outcome statistics. Scientists look at relationships and report what they observed. Scientists don't look at relationships and then estimate what they might have observed if they had actually introduced a control, when there was no control in the science. Adjustment of a data set can easily lead to outcomes that are diametrically opposed to what was observed.

> **INSIGHT:** *Absence of evidence is not evidence of absence.*

3.2.3.5 The "Bradford Hill" epidemiological investigation criteria

> *"All scientific work is incomplete. All scientific work is liable to be upset or modified by advancing knowledge. That does not confer upon us a freedom to ignore the knowledge we already have, or to postpone the action that it appears to demand at a given time."*
> *- Bradford Hill*

The "Bradford Hill" epidemiological investigation criteria are a set of nine principles for establishing how certain epidemiology should be for an inference (causal inference; inferring that the relationship is causal). The list of criteria are:

1. **Strength (effect size):** A small association does not mean that there is not a causal effect, though the larger the association, the more likely that it is causal.
2. **Consistency (reproducibility):** Consistent findings observed at different times and in different places with different samples strengthens the likelihood of an effect.
3. **Specificity:** Causation is likely if there is a very specific population at a specific site and disease with no other likely explanation. The more specific an association between a factor and an effect is, the bigger the probability of a causal relationship.
4. **Temporality:** The effect has to occur after the cause (and if there is an expected delay between the cause and expected effect, then the effect must occur after that delay).
5. **Biological gradient** (dose–response relationship): Greater exposure should generally lead to greater incidence of the effect. However, in some cases, the mere presence of the factor can trigger the effect. In other cases, an inverse proportion is observed: greater exposure leads to lower incidence.
6. **Plausibility:** A plausible mechanism between cause and effect is helpful (and, knowledge of the mechanism is limited by current knowledge).
7. **Coherence:** Coherence between epidemiological and controlled findings increases the likelihood of an effect. However, Hill stated that "lack of such [controlled experimental] evidence cannot nullify the epidemiological effect on associations".
8. **Experiment:** Controlled study, laboratory, evidence is optimal.
9. **Analogy:** The use of analogies or similarities between the observed association and any other associations is possible, but should always be considered weak (because analogies can become belief traps).

> **APHORISM:** *Correlation is not causation, but when there is substantial amounts of evidence of correlation, in some cases, there may be the real possibility of causation — or at least, interrelation — with significance. In other words, when you have substantial amounts of evidence of correlation, you'd better take the possibility of causation — or at least, interrelation — very seriously.*

3.3 Rational science

> *A.k.a., Rational physics, the rational scientific process, rational science, the rational scientific method.*

Rational science is defined as rational explanation. The only precise form of explanation of spatial objects is visual, so a rational explanation must be visual (at least). Visualization starts with 'objects', wherein properties, relationships, and motions are "concepts". There has to be the seeing of an object, first, before motion of objects can be watched. In physics, what would there be to study without an object? In order to do physics rationally, there has to be an object, as a premise (an axiom). Only objects can perform motions. Concepts, which are not objects, cannot perform motions. When objects move, concepts describe motion (a.k.a., verbs). When objects are perceived, concepts describe perception (a.k.a., adjectives, adverbs, articles, adpositions). Rational science (rational physics) is about explaining, not studying. The rational scientific method is about explaining rationally using objects and concepts. Scientists don't just study, they must explain. Herein, all definitions are descriptions, and all explanations are rationally understandable visualizations. In rational science, science is rational explanations. In other words, the purpose of rational science is to give rational explanations (i.e., to be rational while giving explanations). Hence, rational science is a body of rational explanations, and a rational method, which is itself an explanation. (Gaede, 2014) Rational science is explaining physics rationally. What does "rational" mean? It means that science involves:

1. Science involves the motion and states of 'objects' in relation to one another as "concepts".
   A. Only objects are reified (i.e., physical) and can be moved. Concepts cannot be reified/moved (i.e., concepts cannot be made physical as 'objects'

and moved around).

B. The only way to move an object is to have it come into contact with another object (Read: cause, mechanism).
   1. Science involves an objective explanations of mechanisms (a.k.a., causes). What is object-ive is presenting a visualization (a.k.a., movie, animation) made to explain a mechanism with objects motions/relations labeled as "concepts". Objectivity and not subjectivity is engaged by someone doing science rationally:
      i. **Objectivity (object-ive):** Free of subjective interpretation (i.e., free of belief or opinion), because there is a clear visual explanation. A context in which a "claim of cause of change" (causative theory) is presented visually, and everyone clarifies until, it is understood.
      ii. **Subjective (subject-ive):** Includes belief/opinion. A context in which a "claim of cause of change" (causative theory) is not presented visually, and/or is not clarifiable, and therefore, it is not commonly understood.

A mechanism is an objective cause of an action. Each mechanism is a complex assemblage of objects that can cause a specific motion/action. To “understand” a mechanism means that its functioning can be explained and visualized. If a mechanism cannot be visualized, then it has not been explained. A mechanism may be described informally with natural language, or formally with math.

1. Objects can be assembled [by life] to have a complex function (e.g., human engineering mechanisms).
   A. Objects have functions (to life).
      1. The final function of the assembly has a concept that labels the function.
2. Objects have natural phenomenological, physical functions (i.e., natural physics mechanisms).
   A. Objects have real physical attributes/properties.
   B. The object's attributes have conceptual labels.

In rational physics, every word in the dictionary can be classified as either an object or a concept. There are only two categories of words (Read: two word categories) in any dictionary:

1. **Object(s)** - a word that embodies that which has shape. Objects are pointed to and named. Objects are not defined. Objects, their names, are identified with an 'object-label', an object's name, a 'noun'. All objects can be pointed to an named as 'nouns'. We show objects to one another statically in a pictio-nary, and visualize the movements of objects in a animated film (a.k.a., movie). Objects are only those "we" can point to. In physics, only objects can be 'nouns'. Herein, it is important not to confuse 'objects' with 'objects' in motion. A kangaroo is an object, a jumping kangaroo is an 'object' in motion. No verb can be included as a criterion for the definition of object.
   A. Objects are presented in pictionaries (i.e., collections of imaged and named objects). Objects are visualized by drawing the object.
2. **Concept(s)** - a word that embodies two objects, or two words treated momentarily as objects. Concepts are defined in a dictionary. Concepts are not pointed to. Concepts are identified with a "concept-label", a concept's name. Concepts are only those that "we" can define. There are no concepts that are 'nouns'. No concept is a 'noun'. 'Nouns' are not concepts (neither static nor dynamic concepts). A 'noun' is the name of an object. The only things that can serve as nouns are objects (as that which has shape).
   A. Concepts are presented in dictionaries (i.e., collections of named and defined concepts). Concepts cannot be visualized like objects (i.e., they cannot be drawn); however, concepts can be modeled in a concept model. A concept model is a diagrammatic or symbolic depiction of concepts and their interrelationships.

Anything that has shape is an object. If "you" define it, then it is a concept, if "you" point it, it is an object. Objects are pointed to, and concepts are defined. All objects in rational science are presented by pointing and naming -- point to something not moving and say its name. All concepts are presented in rational science by naming the concept and giving the definition. Object is to one [1] as concept is to two [2], and nothing is zero [0]. Objects cannot change "time", because "time" is a concept; concepts do not have motion (i.e., motion cannot happen to concepts, only to objects). However, objects can be imagined in the past and future (tenses), and accessed in the present (tense).

Every word in the universal information system (a.k.a., universal dictionary) is either an object or concept; there is no third category. The rational scientific method has two sets of categorical information about the real-world; the primary real-world (a.k.a., ontological) societal information sets. Every word in the [universal] dictionary [of rational science] can be divided into these two categories only.

It could be said that there are two branches of rational science, physics and philosophy. Physics is about rational physical interpretations, and philosophy is rational explanations of purposes and reasons (i.e., why people act and behave the way they do). Philosophy asks science questions about values, reasons, and purposes

(standards), and physics asks science questions about objects, causes and mechanisms:

1. **Philosophy** is concepts, reason, and purpose. Philosophy requires a concept.
   A. Is the language of meaning in signed form.
   B. Explanations in philosophy: Interpretation of the reasons and purposes behind an organisms action (organismal phenomena).
2. **Physics** is objects, causes and mechanisms. Physics requires an object.
   A. Is the visualization of a shaped object form.
   B. Explanations in rational physics: Interpretations of the causes and mechanisms underlying a physical phenomena.

CLARIFICATION: *Societal systems science combines physics, philosophy, and mathematics.*

3.3.1 The method of rational science

Rational science involves the presentation of a visually workable model and the "destruction" (a.k.a., elimination and loss) of observably-visually false explanations/ models. The method of rational science is the method of defining concepts and visualizing objects and their motion for rational explanation. An irrational explanation is the movement of concepts. A rational explanation. Rational science starts with objects and definitions, and what follows is object[ive] explanations of causes and mechanisms. Rational physics begins with objects; there has to be an object to do physics. A rational explanation provides conceptual definitions and shows objects as causes/mechanisms of action between matter.

A simplified view of the strategy for the method is:

1. Objects have shape, point and name them.
2. Because objects have shape, objects can be pointed to; objects can be visualized (visually express and communicate in pictionaries and simulations).
3. Objects [that exist and can be counted] have location (local and non-local coordinates, coordinate systems); conceptualize the attributes (relative to other objects) and express the concept's definition in dictionaries.
4. Objects [that exist and can be counted] will move; conceptualize the motion and express the concept's definition in dictionaries. Motion [of any and all objects] always has 2 or more locations (local or non-local coordinates).
   A. For motion via a local coordinate system, an object is 'moving' in relation to one, or more, other objects.
   B. For motion via a non-local coordinate system, an object's location is expressed as a [mathematical-physical] equation/formula, and in order to move, the objects new location is replaces the old location in the equation/ formula.

The method of rational science is:

1. **Step 1:** Hypothesis (synonym of assumptions) - a document containing all objects and conceptual definitions. Herein, a hypothesis is not "true" or "false", it is simply an initial model with a set of assumptions.
   A. Assumptions - an assumption means "you" concede it in order to understand what the theory/explanation.
   B. Objects - all objects must be named first and pointed to.
   C. Definition - all terms/concepts must be defined first.
      1. Initial scene/first [static] frame(s).
2. **Step 2:** Theory (explanation) - a theory is only an objective explanation, for the purpose of understanding:
   A. Mechanisms (show static and dynamic concepts).
   B. Causes (show movies).
      1. A "theory" is an [objective] explanation of action.
      2. "Mathematics" is a description of motion of objects.
3. **Step 3:** Conclusions - a synthesized result of the integration and association provides valuable results for decisioning:
   A. Understandings (individual "does" or "does not" understand)?
   B. Interpretations.
   C. Corollaries.

Herein, if there is not visualization and explanation, then there is not [rational] science occurring.

The three elements of a rational form of science are:

1. Image of object with contrast.
   A. 1 Frame of the "universal movie" (stillness, static concepts only).
2. Animation of object.
   A. More than 1 Frame of the "universal movie" (memory of motion; dynamic concepts in relationship with static concepts only) .
3. Philosophy [of science] to explain a fulfilled human life.

3.3.2 Visual explanation (visualization) via the universal movie

All explanation in rational science necessitates

visualization. There are two ways to visualize objects: single images and animations of multiple images:

1. **Image (a.k.a., single frame with contrast):** Static single frame showing object with contrast (a.k.a., nothing). One frame of the universal movie shows a photograph/static image (a.k.a., frame) of an object with contrast (temporarily treated as a second object). Static images (picture snapshots) with contrast around the object (contrast treated as secondary object). There is nothing moving in a single snapshot, frame. The static image of an objects must be shown prior to defining anything related to motion (i.e., changing or visualized). The contrast around the object becomes a temporary object for naming in the static image. In a static image, an object rotating around itself may be shown. A true [spatial] object has to stand alone and is made of a single, static visualizable piece; it is then pointed to as an object and named.
2. **Animation of images (a.k.a., film, universal movie):** Multi-frame animated movie (showing object moving in relation to self and to other objects. More than one frame of a universal movie shows animation shows motion and change of an object(s). Animations (universal movies) are a tool for visualizing moving objects. Objects are visualized in a universal movie where their individual position changes in spatial relation to other objects. An object in motion is visualized using animation.

The "universal movie" is a tool to observe objects and invent real-world and fulfillment-relevant concepts. An observer looks at a single frame of the movie, sees and names objects, and invents static concepts. The observer then looks at more than one frame of the movie and sees objects change location, and composition, whereby inventing concepts to facilitate in understanding and engineering objects in motion. The universal movie is a sequence of all snapshot of everything in the universe at a given location; and when one snapshot is looked at, it is as if the universe was frozen. There is no motion in a snapshot; there is only what [object(s)] exists. The universal movie is composed of snapshots of objects in locations in series, and it allows a user of the cognitive tool to look at the universe as a series of single snapshot frames, frame-by-frame. Each frame in the movie is a single snapshot/frame. There is nothing moving in a single snapshot, frame. Looking at a snapshot of an object allows the user of the universal movie/film tool to separate static concepts from dynamic concepts. All dynamic concepts require at least two frames (of the universal movie); because, there is motion, and all motion requires at least two frames. The universal movie [tool] has one frame for every location of every object in the universe. Every frame has only static concepts. Dynamic concepts require at least two frames to conceptualize. Time is two or more frames of the universal movie. Time is a synonym for "interval", wherein, there is an interval between frames of the universal movie. Motion is two locations, two frames of the universal movie. An object has one location in one snapshot of the universal movie. If it is an object, then it can be moved. If it is a concept, then it cannot be moved; concepts in rational physics cannot be moved like objects.

The "universal movie" is a tool that is composed of:

1. Objects (nouns).
2. Frames (static concepts of state).
   A. The states of objects.
3. Animation (change of object composition and/or location).
   A. The motions of objects.

A universal movie may be used to account for:

1. Length = surface to surface.
2. Continuous = made of a single piece of surface.
3. Sense = motion of a surface.
4. Time = a comparison of two motions.
5. Motion = a comparison of two locations.
6. Locations = have object position.
7. Object position = have conscious qualities.
8. Objects with qualities have quantities.

3.3.3 Rational science dictionary definitions

Concepts are defined in dictionaries in symbolic language, which has shared meaning among a population. All language is conceptual. All words in a (pic-)dictionary are either concepts or objects. The word "object" is also defined in the dictionary. The second word defined in any dictionary is "concept". Objects are physical, some exist and some do not, and all concepts are in the mind and are not an object with location. A descriptive explanation of a word states its place as an object (i.e., noun) or concept (e.g., verb, adverb, etc.). One or two numbered statements describe the word. Many words have synonyms (also known as, a.k.a.,). Many words have antonyms (a.k.a., the opposite of).

> **Definition** *(scientific)* **:** *symbolic limitation placed on the extent or usage of a word for logical thinking and communicating.*

The initial dictionary words and definitions of a rational science dictionary are:

1. **Object**
   noun
   1. That which has shape.
   2. Something is that which has shape.
   Synonyms: *noun, something, shape, surface, thing, anything, matter, figure, finite, material,*

resource, form, body, boundary, structure, entity, subject, medium, article, spatial, physical, gizmo, widget.
Antonyms: *no-thing, nothing, space.*

CLARIFICATIONS:

All objects in the universe have shape. Shape is a universal property of all objects. There is no object that can be imagined that does not have shape. An object is what 'it' is; an object is that which has shape. Shape is the only universal property (or attribute) that all objects have. An object is an identifiable shape [of matter], which is constrained by an identifiable shape [of boundary]. All objects are static objects made out of a single piece, or an object assembly. A supra-object made from many single-piece static objects. An object is enclosed all around; it is shape[d] all around. If it has shape, then it is physical (spatial, material); if it is physical, then it has shape. All objects in the universe [of potential objects] have shape. The only condition for the word 'object' is that it has shape. Shape applies to every object and it is the only property or attribute that all objects in the universe have -- shape is the universal property of all objects. Objects may be added to a pictionary to share named objects. An object has a defined boundary that distinguishes it from its surroundings or other objects -- an object has a boundary.

2. **Concept**
verb, adverb, adjective, article, adposition
1. Evokes or embodies two or more objects, or two words treated momentarily as objects; is a relation between [two or more] objects.
2. That which has no shape.
3. Category is that which has definition.
Synonyms: *abstraction, comparison, contrast, change, idea, mental, cognitive, notion, relation, thought.*
Antonym: *no-thought.*

CLARIFICATIONS:

A concept is what is happening to 'it', what 'it' does. Concepts are a relationship between one or more 'objects'. Concepts state how objects move and/or could be moved. Concepts do not have shape. Not a single concept has shape. Concepts do not have physical presence. Concepts have meaning; objects have shape. All concepts are relations. All properties (attributes) and categories of motion and function of objects are concepts. The word "relation" is a synonym of the word "concept". It cannot be said that there is a stand alone concept, because a concept is a relation between two or more objects. Concepts do not have shape; there is no concept that has shape. Concepts have no shape, no length, width, or height dimensions. Concepts cannot be pointed to, only objects can be pointed to. Simply, concept is motion (or that which associates motion). A concept can mean that an object is changing shape, changing the location of its shape, or changing the properties of its shape. Examples of concepts include, but are not limited to: energy, information, space-time, intelligence, field, plasma, wave, hologram, electricity, charge, torsion, love, color, motion. In logical order, the definition of the word 'object' precedes the definition of the word "concept". Concepts do not exist (existence in the real-world is physical presence = object + location). Someone may or may not have awareness of a particular concept in his/her mind. Human individuals have awareness of what a concept is, and have awareness of many concepts, in their minds.

3. **Exist**
noun
1. Physical presence as object + location.
   1. **Physical**: that which has *shape* (1 object).
   2. **Presence**: that which has *location* (distances between 2 or more objects; the set of distances).

2. Existence is an object that has location; matter are objects that exist.
Synonyms: *matter, existence, presence, real, reality, actual, objective. physics (science of existence), materials.*
Antonym: *nothing, vacuum.*

CLARIFICATION:

There has to be distance between one object and another for something to exist. If there is no distance between a claimed object and someone (or, some other thing), then the claimed object does not exist.

It is not possible to say that a "concept" exists in rational physics. Exist is object + location. A concept is not an object + location. To have existence, there must be an object at a location. In rational physics it is irrational to say that a concept exists. There is no such thing in rational science as a concept existing. Concepts do not exist, only objects can be said to exist. The word existence embodies objects; only objects can be said to exist. Concepts do not exist; humans have awareness of concepts, and can think using conceptual language (a.k.a., abstract language).

Object does not equal exist, because some objects exist and some do not exist. Objects can exist and objects can be imagined to exist. It is possible to imagine, draw, and name objects that do not exist. Not all objects exist, there are some objects that do not exist. To say that some thing exists means that it has location. Not all objects have location. 2D objects and imagined objects do not have location.

4. **Reality**
noun

1. Physical presence of an object (i.e., object + location).
Synonyms: *exist, real, actual, possible, objective, interface.*
Antonyms: *illusion, fantasy, cult, indoctrination.*

CLARIFICATIONS:

There is no need to put physical in front of reality (as in, physical reality), because reality is physical. What is only real to a person is subjective, but what is real to all persons is objective.

When there is an object with location, then there is reality, existence. It is then possible to say, "that object is real, or that object exists". In other words, reality is not what someone visualizes or images; instead, it is an object in some physical real-world location.

Clarification: Reality can also mean the combination of: (1) what exists (or has existed), with (2) what any given individual (or group of people) has as encoded as concepts, in their mind and mental model, about how the universe/reality works, has worked, and could work.

5. **Nothing**
noun
1. That which does not have shape.
2. Nothing is that which has no shape. Space is nothing; space is without shape.
Synonyms: *space, vacuum, void, emptiness, nothingness, no thing, no-thing, Torr.*
Antonym: *something.*

CLARIFICATIONS:

'Nothing' (space) is that which doesn't have shape - nothing (space) is that which has no shape, and is measured in Torr of atoms. In contrast, a thing (object) is that which has shape. That which does not have shape is 'vacuum'. 'Vacuum' is measured in Torr of atoms [of real, physical shape]. Space cannot be pointed to, only objects can be pointed to; there is nothing (no thing) there.

6. **Physics**
verb
1. The understanding of objects.
2. The study of that which has shape.
Synonym: *rational physics.*
Antonym: *Irrational physics.*

CLARIFICATIONS:

Physics is the study of objects, and it cannot be done without objects. Physics is the science that explains how the world works. In physics objects are pointed to (pointed out) and concepts are defined (Informationally bounded). Physics is the explanation of physical causes and mechanisms [by spatial objects]. Physics only studies objects that exist. Physics is the science of existence, of existing objects. Exist is a word circumscribed to objects. Physics cannot be done without objects, and specifically, objects that exist. Physics is the discipline that deals with what an object is. Here, causes only have objects as mechanisms.

7. **Universe**
verb
1. That which contains all objects, space (nothing), and consciousness.
2. space (treated as physical object, unified contrast object) + matter (physical object, shape).

8. **Motion**
verb
1. More than one location of an object.
Synonyms: *verb, movement, animation, action, vector, displacement.*

A high-level conceptual breakdown would show the following logic:

1. **Objects are pointed to point and named in a pic-tionary with other objects.** Someone can point to:
   A. An existing physical object that exists in the real world and has location
   B. An image/photo of the object.
      1. A collection of named objects is a piction-ary (like dictionary, but for objects).
   C. A universal movie is a visualization of the movement of objects. Someone can point to and name moving objects:
      1. In the real-world with changing location.
      2. Within the replaying of a recording of the objects moving in the real-world sometime in the past (i.e., a recorded video).
      3. A simulated animation of the objects moving using a computer.
2. **Concepts are named/labeled and defined in a dic-tionary with other concepts.** Every concept is either static or dynamic:
   A. Static concepts are seen in a single image (i.e., single video frame) of one or more objects. Use a single frame of the universal movie to define static concepts and name objects. Static concepts include, but are not limited to:
      1. Distance (separation of two or more objects).
      2. Location (set of separations).
         i. Conceptually, location is a cross-section of time, whereas an event requires an interval of time. A cross-section of time consists solely of static objects.
      3. Condition (state of object at location; in a single frame of the animation).
      4. Instant (a.k.a., existence) - all objects at fixed

location with respect to each other.
   B. Dynamic concepts are seen over multiple images of an object in motion.
      1. Use multiple frames of the universal movie (process), including:
         i. Position (recorded graph measurement).
         ii. Motion (delta position; i.e., change of position).
         iii. Animation - the visualization of the motion of objects consists of objects on a timeline (number-line; counting).

More operationally speaking, objects have motions and humans have decisions:

1. Object (noun) - point to and name.
   A. Item category or one of (article).
   B. Descriptor of object (adjective) - point to and describe.
2. Motion (verb) - name of motion/change.
   A. Definition of motion (adverb).
3. Decision (adposition).
   A. Position (modifier).
   B. Location (qualifier).
   C. Time (tense).
   D. Construction (engineering procedures).
   E. Allocation (identifier; role).

Summarily,

1. Objects have shape.
2. No concept has shape.
3. All causes only have objects as mechanisms.
4. All concepts are relations, comparisons between objects.
   A. All critiques are statements of potentially better fulfillment by a new configuration of objects (e.g., community habitats).
5. Objects, we point to and [commonly] name. Objects can be pointed to, because there is shape there to point to.
   A. Objects have 'contrasts'.
   B. Space is the contrast of all objects. In other words, space serves as contrast to all objects. Space also happens to be the antonym of the word object. The word space is unique and falls into both categories.
      1. Nothing (space) *is true and different than* Something (object). When you point to space (dark "stuff" around an astronomical object, e.g., the moon), you are implicitly treating space as an object. Space may be temporarily treated as an object to provide contrast to the actual (target) object.
6. Concepts, we define and describe in a dictionary. Concepts cannot be pointed to, because there is no shape there to point to.
   A. Concepts have 'antonyms'.

Simply,

1. Objects - names, nouns.
2. Static concepts - defined states. A state is a cross-section of time with static objects therein.
3. Dynamic concepts - verbs, action-states. Action is motion of objects over a countable timeline. Generally end in "-z/-t/-ion", and continuous present actions end in "-ing"
4. Values - orientational adverbs.
   A. Orientational adverbs: end in -ent/-ly
5. Approaches - conjunctive adverbs
   A. Conjunctive adverb (subordinating conjunction): often, -ly, but no standardized suffix in the English language.

NOTE: *A state does not include anything about its (a system's) history. The 'path' concept of how an object got from point A to point B is not a 'state'. State is the condition of the system at a given time (i.e., at a given frame of the universal movie, where objects can be pointed to). Transitions are distinguished from states; transitions include motion and states are single frame-no motion. State is a static concept. A phase is a transition, necessarily, with motion, and hence, a dynamic concept. Phase/transition is a dynamic concept involving motion, time, etc. Consciousness has to have two frames of the "universal film" (universal movie) to compare before and after, to show the transition.*

Table 23. *Table shows an example list of objects (presented in photos) and associated (concepts in movies).*

One [1] Ojbect [photo] What it IS	Two [2] Concept [movie] What it DOES
air	wind
clock	time
hand	force
atom	mass
person	run
bird	fly
fish	swim
water	wave
gas	plasma

3.3.4 The characteristics of objects

A.k.a., The attributes/properties of objects.

Objects have the following characteristics:

1. All objects have shape (a.k.a., visual pattern, occupied space).

2. Objects are depicted, named, and communicated in one frame (a.k.a., photo) of the universal movie.
   A. Objects are visualized and/or pointed to, and named.
   B. To communicate about an object, point to the physical static object and/or the snapshot visualization of the object, and give its name[d understandable category]. Objects are pointed to and their name is said. All objects can be pointed to or visualized, and named. The object being pointed to should be static, not moving, when pointed to and named.
3. A noun is the 'name' of an object; it is not a concept.
   A. Nouns exist within a taxonomy (hierarchy of categorical labels).
4. Some objects are real (exist) and some are not.
5. All objects that exist are three-dimensional (3D), having the three [spatial] dimensions of: length, width, and height (of object). In other words, all existing objects have the property of length, width, and height. 3D is required for an object to exist. Everything that exists is 3D, but not everything that could exist is currently 3D. 2D objects that only have two dimensions cannot exist.
6. Objects can become accessible and inaccessible (to subjects) in the real-world.
   A. Objects can exist.
   B. Objects can be imagined and come to exist.
   C. Objects can be imaged and do not exist.
   D. Not all objects can be seen or touched, or exist.
7. The axiomatic properties of objects include:
   A. **Position** - the volume of space that an object takes up. The region of space occupied by an object. A hypothetical or imaginary volume of space occupied by a real object; the object itself. Position is seen in a single frame of the universal movie, is the object (named) in position (static concept). Here, the static concept, "position", could be replaced with the object itself.
      1. **Length** - what an object has, continuous matter, from one end of an object to the other end.
   B. **Distance** - separation between two objects. Distance only exists between two or more objects. There is no distance between concepts. Distance refers to that which lies between the lengths of two objects. Note that distance and location are essentially synonyms. Distance is one example of a concept. The space separating the surfaces of any two objects is called distance. Simply, distance is spatial separation between two objects. Distance is seen in a single frame of the universal movie, is a static concept.
   C. **Location** - the set of distances from one object to all others (the set of objects; set of distances). A set of distances. Location is a set of distances from one object to the rest. The set of distances from the test/marked object to the remaining objects. For location to have meaning, two or more objects must inhabit a single fame in the universal movie.
   D. **Itinerary** - more than one location; route (e.g., a trajectory or orbit).
   E. **Matter** - set of objects that exist.
   F. **Event** - location with human involvement, or relevance.
   G. **Motion** (a.k.a., change, verb, animation, action) - two or more locations [of an object]. Motion is change; motion refers to two or more locations, a change of locations. Motion is a category of change (e.g., run, conveying, flying).
   H. **Time** - comparison of two motions.
   I. **Mathematical equation** - description of motion.
   J. **Material** - the material composition of the object; the makeup of the object.

An object is not:

1. A concept: What doesn't have shape is a concept.
2. See and touch: An object is not that which we can touch and see; an object is that which has shape. Some objects cannot be touched or seen by human eyes (e.g., electric and magnetic disturbances, EM waves, EM ropes). An 'object' is not a "force" (a.k.a., concept). Some objects can be detected by the senses, and some objects cannot. The [consciousness] senses are also an object. Organisms interact with spatial (real-world) objects through their physical body. Some objects cannot be detected by the human sense (i.e., they are invisible to human senses).

All objects can be categorized in society by physics/phenomena and habitat service (i.e., all objects have these properties):

1. Matter type (intrinsic property; e.g., solid, liquid, gas, etc.) and chemical composition. The intrinsic property of an object categorizes what it is (e.g., mass, spin, charge, chemical composition, phase of matter, etc.). This includes geometry, surface and body composition.
2. Functional service usage type (extrinsic property; e.g., life support, cultivation, power production, etc.). Objects in a habitat may function as use/service in a category of support (e.g., life, technology, exploratory).The extrinsic property an categorizes what an object is doing, what it is

supposed to do, or what it did. (e.g., wave, wind, fall, production, fulfillment-service, destruction, advertising, etc.). For human benefit, objects can perform one or more types of interaction:
   A. See: Humans see the object in real life, and/or see a picture of the object. Humans see objects; they see nouns.
   B. Watch: Humans watch the object move in real life, and/or watch an animated movie with the object. Humans do not see verbs; they watch verbs.
   C. Interact: Humans touch, hold, and take in and take out.
   D. Actuate: Humans extend their physical abilities through machines and devices.
   E. Invisible to (no interaction available): Humans cannot interact with these objects directly, except via electromagnetism (EM).
3. A property/quality is a comparison of one object to another in a category/phenomena (e.g., color, texture, etc.).
   A. Scientific adjectives (e.g., color, texture, surface tension, etc.).
      1. Yellow color is a relation. It is a comparison to other colors; "color" has a nm measured range. For instance, a wall is an object that can be a yellow color. In such case, the wall has an attribute of color, and that specific color is yellow at a set nm measurable range. Similarly, a crayon is an object, but the colors of all crayons are not an objects.
   B. Human value adjectives (e.g., beauty, love, like, etc.).
      1. Deep love is a relation where one human feels a deep connection with another.

At the material-physical (behavioral) level, everything made of atoms has shape, because atoms have shape. If there is a first shape, then the [hydrogen] atom is the first shape. The first atom that has shape is the hydrogen atom. Anything that has matter (i.e., atoms) has shape. For example, a bat is an object, a ball is an object, a tree is an object, a table is an object. The following are also objects: a rock, tree, dog, circle, leprechaun, angel, water, air, Zeus, unicorn, horse, sun, and rope.

3.3.5 The characteristics of concepts

A.k.a., The attributes/properties of concepts.

Concepts have the following principles:

1. A concept is a relation between objects that has meaning [to consciousness]. What doesn't have meaning is an object itself; objects can only be pointed to and have shape.
2. The axiomatic properties of concepts are: definition, property, usage, and data.
3. A single concept stands alone and represents a unique thought (a.k.a., meaning, thought pattern, thought "object").
4. Concepts are expressed in the following ways:
   A. Vocal (talking).
   B. Write (writing, texting).
   C. Draw (visualizing).
5. Concepts may reference other concepts or objects.
6. Organisms interact with concepts (conceptual objects) through their mind (mental body) and communicate their thoughts to one another through their physical bodies (e.g., voice, writing, etc.).
7. Concepts are defined with language and [universal] movie production.
8. There are only two types of concepts, which are together representable by a conceptual tool known as, the "universal movie" of individually sequenced snapshots.
   A. Static concepts - one frame of the universal movie.
   B. Dynamic concepts - more than one frame of the universal movie.

Table 24. *Table shows an examples of static concepts (shown in a single frame) and dynamic concepts (shown in more than one frame).*

Static Concepts Photo (single frame)	Dynamic Concepts Movie (>1 frame)
distance	meter
direction	forward
perpendicular	breadth
parallel	tandem
surface	perimeter
that	love / economy / intelligence
here	infinity
me	people
stand	walk
location	motion
exist	living

3.3.5.1 Word classes in rational physics

CLARIFICATION: *English has four major word classes: nouns, verbs, adjectives and adverbs.*

Simply, in rational physics, the following word classes apply to objects, the description of objects, and explanations of their motions:

1. **Objects (nouns)** are that which have shape.
2. **Adjectives (static concepts)** are used to qualify/describe objects in one frame of the universal

movie. Adjectives cannot be used to qualify motion; they only qualify nouns (objects). Adjectives cannot be turned into nouns.
   A. If qualifying an object, or another concept, then call it an adjective.
3. **Verbs (1st level dynamic concepts)** are the motion of objects.
4. **Adverbs (2nd level dynamic concepts)** are used to qualify motion (i.e., to describe the motion of objects).
   A. If qualifying the motion of objects, then call it an adverb.

3.3.5.2 Static concepts ("object", adjectives, and functional words)

Static concepts are present in only one frame of a universal movie of snapshots (state concepts) -- **what is in a single frame of the universal movie.** A static concept (single frame of universal movie) is a state; it is not a verb. Static concepts are revealed in a single frame of the universal move, only.

1. **Static concepts are concepts embodied in 1 frame of the universal movie.** Static concepts are concepts that can be invented (imagined) for a single frame of the universal movie. Static concepts are seen in static/stationary images (a.k.a., photos). Nouns (objects) and the static concepts of "state" are shown through one frame of the universal movie. Static concepts are invented in a single frame of the "universal movie" (static concepts; state). A static concept is one frame of the universal movie. The word does not involve two frames of the movie. There is no motion. In that single frame, every atom in the universe has a certain distance from every other atom in the universe. Nothing is moving in a single frame of the universal movie. All static concepts are in only one frame of the universal movie. Static concepts must always be defined before dynamic concepts. There is no motion involved in a static concept. A static image is a photo showing objects that don't move. A static concept is a single, static visualization that includes two objects, for which there is a distance present (a distance between two or more objects).
   A. A noun (object) is shown (and pointed to) through only one frame of the universal movie.
      1. Adjectives add observed metadata (attributes of objects) to states.
   B. There is nothing moving here; there is no object in motion.
   C. A static concept is illustrated by means of an illustration of two or more objects (and a description of the relationship between the objects).
      1. Static concept for a reified object (e.g., "money"). For instance, "money" is a static concept wherein what must be shown in the static image for "money" is: two humans with a "priced" socio-technical relationship between them, and owning static property. Money is an abstraction that humans give value to. Herein, "trade" is the dynamic concept describing the exchange of money for money, money for object, or object for object.
      2. Static concepts for an actual/visual object:
         i. Static concepts for an actual object in a static image (i.e., adjective). For example, shape, distance, location, exist, existence, standing, orientation, sitting, position, pointing, facing, perpendicular, straight, dimension, coordinate, parallel, angle, etc.
         ii. Static concepts for an object in motion (i.e., adverb). For example, static-orientation, current speed, other relative object speed (e.g., fast, slow, meandering), temperature (e.g., hot, cold), etc.
   D. **Static visualization (a.k.a., state visualization)** - creating a single-frame image of the object statically.
      1. Matter type [of object] - either solid, liquid, or gas (i.e., the state of matter of an object).
      2. Imaged shape [of object] - lighted single-frame shape of object.
      3. Located shape [of object] - position of object.
      4. Density [of object] - density of object (i.e., mass).
      5. Spectra [of object] - spectra of object (i.e., light).
         i. Intensity [of light].
         ii. Color [of light].
         iii. Gradient [of light].
   E. **Primary static-concept word [language] classes:**
      1. Adjectives and adverbs:
         i. Adjectives are qualitative (grammatical category) of objects.
         ii. Adverbs are qualitative of verbs (qualify motion).
      2. Functional words:
         i. Articles and adpositions.
   F. **The primary static-concept object identification classes** are (static concepts represented by a single frame photo, such as, distance, direction, perpendicular, parallel, surface, that, here, me, stand, location, exist, now, present, color, etc.):
      1. The "object" static concepts:
         i. Object (shape).

ii. Distance (number line, magnitude from zero). Distance is separation between two objects. It is a static separation.
iii. Dimensions (orientation).
1. Length.
2. Height.
3. Width.
iv. Location (coordinate).
1. Longitude.
2. Latitude.
3. Altitude.
v. Existence (object + location).

2. The qualifier [static] objects:
i. **Adjectives:** A qualifier/modifier of nouns/objects. A word that qualifies an object; and, may only be used in the context of objects. Adjectives describe what an object is like. Adjectives must be defined unambiguously and before use. The usage of an adjective must qualify a physical object.
1. An adjective is a conceptual word that is:
a. Motion-less, and
b. Time-less.
2. Shape is an adjective (static concept), because it describes an object (Read: a named object).
3. For example: straight, curved, bent, finite, infinite, continuous, bound, flat, warped, perpendicular, segmented, inert, exist, 2D, 3D.

3. The mathematical static concepts:
i. All words in mathematics are exclusively quantitative adverbs; mathematics is a language exclusively of quantitative adverbs. Mathematics has no use for adjectives such as straight, continuous, or flat.

2. **Fundamental static concepts are:**

A. **State (a.k.a., condition):** the condition of a thing at a cross-section visualization (single-frame of an object(s) in time (in the universal movie). State is a static concept; it is, conceptually, a cross-section of "time" in the analogy of a "universal movie"; it is a static image (a single frame in the "universal movie"). There is no motion embodied in a "state" (i.e., in a single frame of the "universal movie", there is no motion). There is no time in a single frame of the universal movie. A state (static concept) is motionless. A state/condition is a particular mode of being, configuration, status, etc., of a thing; its existing state, probable state, future state, current state, etc. The particular condition that someone or something is in at a specific time.
1. State is a condition at a specific location:
i. The condition of a thing.
ii. The condition of existence of a thing.
2. State = stat+ic concepts:
i. State = single frame.
ii. State = motionless.
iii. State = existence (if has location).
1. Existence = location (of an object, a real-world shape, with a distance to all other objects in the universe).
2. Matter = solid, liquid, gas.
iv. Location = shape + distance.
v. Present = now.
1. Location of every atom in the universe.
2. Single frame of the Universal Movie.

B. **Exist:** object + location.
1. Exist: physical (<-object) presence (<-location), is in the real-world.
2. Exist = static concept (because, the definition of 'exist' contains no provision for motion).
3. If the object has no location, then it doesn't exist.

C. **Location:** set of distances (i.e., set of separations between objects). Location (a.k.a., without inertia) consists of the set of distances from one object to the remaining ones in the system. Simply, location is set of distances. Objects can change location (i.e., re-locating).
1. Location is determined by coordinates. If it is an object without a location, then it doesn't exist (i.e., the object doesn't exist if it doesn't have location/position). Object without location equals an object that doesn't exist; because exist equals object and location, and location is a set of distances between real-world separated objects.
i. Location is set of distances (set of separations). 'Distance' is separation, and 'location' is set of distances.

D. **Extinction:** lack of any present existence of a given object category (e.g., species); where there was once, there now is none in that object category. An individual of the organism can live and die, but when a whole species does (i.e., all objects in the category), it can be said to be extinct.

3.3.5.3 Dynamic concepts (verbs and adverbs)

Any thing/object in motion is defined with/by a dynamic concept. And, dynamic concepts are revealed in many frames of the universal movie, only. Dynamic concepts are present in more than one frame of the universal movie (process/phase concepts) where an object(s) must

be present. Dynamic concepts cover what is happening over more than one frame of the universal movie. A dynamic concept (more than one frame of universal movie) is a process/phase; it is a verb. Adverbs add calculated metadata to processes.

1. **Dynamic concepts are concepts embodied in more than 1 frame of the universal movie.** Dynamic concepts require more than one frame of the movie. Dynamic concepts are concepts that can be invented (imaged) for more than one frame of the universal movie. Over more than one frame, there will be motion, position, field, energy, time, wave, electricity, plasma, orbit, force, work, charge, line, point, numberline, number (counting), vector, position, love, fulfillment, society, etc. There is motion present in a dynamic concept. Dynamic concepts are "verbs" (a.k.a., process, phase, dynamic concept) is shown through more than one frame of the universal movie. A dynamic concept is a description of a relation involving motion (all mathematical concepts are equations that describes motion). A dynamic concept involves more than one visualization (i.e., requires a video), because there is motion. A dynamic concept is invented because there is more than one frame (dynamic concepts; process/phase). There is motion between the objects, which is showed as change over consecutive visualizations (i.e., over multiple video frames).
   A. An acting/moving object (verb) is shown and pointed to changing shape, separation, or attribute over more than one frame of the universal movie.
      1. Adverbs add observed metadata (about changes in relationships) to processes.
   B. There is something moving here; there is one or more objects in motion.
   C. A dynamic concept is animated by means of a video of objects in motion.
      1. For example, trade is a dynamic concept; trade means that something is being exchanged. Other examples of dynamic concepts include, but are not limited to: running, jumping, energy, mass, field, wave, time, equation, function, vector, spin, orbit, orbital, space-time, tunneling, vortex, electricity, fire, etc.
   D. **Dynamic concept qualifiers:**
      1. **Adverbs:** A qualifier/modifier of verbs/motion/concepts. A word that is used to qualify motion or alignment. Adverbs describe what an object is doing. Adverbs cannot be used to qualify objects. Adverbs may only be used to modify a series of objects or displacement of one object.
         i. For example: deflected, diverted, swerved, incessant, ceaseless, perpetual, constant, curvilinear, rectilinear, dead, alive, living, being, 4D.
   E. **Dynamic visualization (i.e., a visualization that embodies motion)** involves the use of dynamic concepts, including but not limited to:
      1. **Process:** action of an object or interaction between objects.
      2. **Phase:** varying modes or conditions.
      3. **Phase:** a stage in a process of change.
      4. **Phase:** series of events, process of change.
      5. **Phase:** a process of change. Phase equals motion, for example, ice turning into water.
      6. **Stage:** a single step in a process; a particular phase, period.
2. **Fundamental dynamic concepts are:**
   A. **Process:** motion of object(s). Process is a dynamic concept. Process (a.k.a., phase, time, etc.) does not equal state. If a process is to be presented, then a movie must be accompanying the presentation. A process cannot be put in a photograph. A process requires animation (more than one frame of a movie). Time, like motion, requires at least two frames, showing more than one location. Time cannot be defined without motion and memory. Neither time nor motion are synonyms of state, they are synonyms of phase (a.k.a., process). State is neither motion nor time, its location, distance, and existence.
      1. Process/phase (dynam) = dynam + ic.
      2. Process/phase (dynam) = more than one frame.
      3. Process/phase = action of existent.
      4. Process/phase = motion.
   B. **Motion:** two locations of an object (i.e., more than one location; two or more locations). Motion is a change of position/location over time. Motion (a.k.a., with inertia) consists of the movement of objects relative to one another. Motion occurs (is recorded) in/with time (Read: number line counting). Hence, motion means the change in location of an object (in time), and its visualization/explanation can be animated. Objects are observed and/or imagined along a number line called time.
      1. There are three perpendicular directions (vectors, directions of motion) any given object can move in:
         i. Depth (x motion) - downwards motion.
         ii. Breadth (y motion) - sideways motion.
         iii. Elevation (z motion) - upwards motion.
      2. Motion can be visualized through animation

of an object, showing the object relative to others in sequential frames:
i. Location (L) 1 / Frame (F) 1 > L2/F2 > L3/F3 > ...

3. Plasma, for example, is always in motion; it is ionizing, it is a dynamic concept. Plasma embodies motion whereas solids liquids and gasses do not.

C. **Distance**: separation between two objects.
D. **Location:** set of distances.
E. **Time**: more than one location [of an object].
F. **Number:** to count objects (locations) and concepts (data).
G. **Dynamic visualization:** creating a series of images of one or more objects in motion (animation).
1. Position [of object].
2. Direction [of object].
3. Speed [of object].
H. **Function**: an equation that represents motion.
I. **Navigation:** controlling where a object is going over time.
1. Direction - object with a vector target/goal.
2. Orientation - object's alignment with surroundings.
3. Approach - manner or method for moving object to the goal.

In concern to the engineering (Read: development) of society, there are relevant static and dynamic concepts:

1. Human value/static concepts include, but are not limited to:
A. Money - only given value/usage because people believe in it.
B. Need - describes the process of completing human requirements for physical objects (and services inclusive of objects) in order to sustain human survival and achieve human flourishing.
C. Freedom (is defined based on societal configuration type).
D. Justice (is defined based on societal configuration type).
E. Efficiency (is defined based on societal configuration type).
2. Human interaction/dynamic concepts include, but are not limited to:
A. Trade (a.k.a., exchange) - describes the process of exchanging two objects, or information treated as an object.
B. Violence - describes the process of using verbal or physical aggression sufficient to do harm to the psychology or physiology of another.
C. Collaboration (cooperation) - describes the process of working together and using common resources to produce and/or use assemblies of objects for a common purpose/direction.
D. Work - describes the process of using the body or mind to assemble, disassemble, use, or monitor some socio-technical system.

3.3.6 What is the axiomatic chain of understanding in rational science?

CLARIFICATION: *Objects have motions and humans have decisions.*

All rational statements in physics have at least an "object". The only universal property of all objects is that they have shape. An object is not that which someone can touch or see; it is that which has shape. The sensations of see and touch require a second object (sensory organ), as well as the principle object itself. See and touch involves two objects, something that is seeing and being seen, or something that is touching and being touched. Hence, the see touch criteria can't be used to construct a hypothesis of what exists. In other words, an object is that which has shape; an object is not necessarily that which can be seen or touched. Object does not equal see or touch. An object is that which has shape, only. However, if someone can see or touch an object, then the object being referred to is an object that exists. All that is seen or touched are objects that exist. However, shape is the only universal property all objects have.

Physics works with objects that exist, three dimensional (3D) objects that exist. All objects that exist are 3D. Two dimensional (2D) objects do not exist, but you can draw a table, which is an object. Someone can imagine or visualize a chair. That chair doesn't exist, it is only imaginary. Imaginary objects don't exist, and neither do 2D objects. Someone cannot see or touch a magnetic "field" around on object, yet that "field" has shape. Air cannot be seen, yet it too is an object that exists. The only universal property of objects (things) is that they have shape. Some objects (things) have thickness and weight. Some things are three dimensional (3D) and others are two dimensional (2D). Hence, an object is not that which has weight, thickness or 3D, because only some objects have these attributes.

For clarification of an object in the context of dimensions:

1. **1 Dimension (1D meaning):** Definitions are 1D and provide conceptual-linguistic clarity. Definitions provide linguistic clarity.
2. **2 Dimensions (2D object / concept vision):** Not all objects are 3D, some are 2D (i.e., there are 3D and 2D shapes). 2D visualizations provide visual concept model (schema) and object model (image) understanding.
A. **Plane model (plane shape, 2D shape) -** is a 2D concept (e.g., circle, triangle, polygon, etc.).

   B. **Concept model (concept shape, mental model, schema)** - is a 2D concept composed of many 1D concepts.
3. **3 Dimensions (3D static object vision)**: All existing objects are 3D (i.e., have length, width, and height). 3D visualizations provide visual recognition of the objects (i.e., a static frame in the universal movie).
   A. **Surface** is a 3D concept (e.g., skin, enclosure, etc.).
4. **4 Dimensions (4D dynamic/motion object vision):** All existing objects can move in 3D (i.e., have potential elevation, breadth, and depth vectors). 3D visualizations provide visual recognition of the concepts (i.e., the universal movie).
   A. **Simulation** is a 4D concept (e.g., simulation engine interface).

NOTE: *Some shapes are not 3D (i.e., not all shapes are 3D). For example, a triangle is not a 3D shape. A 'table' that exists in the world is 3D, but a 'table' imagined in the mind is not yet 3D. A triangle is flat. Flat means 0 thickness (Read: flat). Flat means 2D. In geometry, a 'plane' is flat.*

An object (figure) is that which is contained by any boundary or boundaries. A boundary is that which is the extremity of any thing. An object (shape, figure) is that which is contained by any boundary or boundaries. That which has shape is that which has boundary. In other words, a shape (figure) is that which is contained by any boundary or boundaries. Boundary is that which surrounds a shape. Shape is an enclosed boundary within space (Read: within no thing). Shape is what is encapsulated by space (i. E., the region within the boundary).

All objects are finite; and thus, have shape [within space/nothing, which provides contrast to the shape]. Space has no shape. Therein, space provides contrast to the shape; space has no shape itself.

This means that objects have the following characteristics:

1. Only one universal property (Read: shape).
2. Objects are standalone.
3. Objects are independent.
4. Can point to it.
5. Sole object in the universe when it is presented.
6. Motionless.
7. Timeless.
8. Can be named.
9. Occupies a single frame of a movie (show slides and object with contrast is one slide of several, other movie real slides are white blank)... If the background wasn't there the object would be infinite, and there, it wouldn't be an object; because an object is that which has shape.

QUESTION: *How do we communicate the identification of an object? Point to it. Name it. Whatever is being pointed to, draw/illustrate it. Objects are described only after they are pointed to.*

Mathematics applied to the universe includes the following definitions:

1. **Space-time** - four dimensional space whose points are events.
   A. Three dimensions (Read: measurements) of distance (sometimes called, space vectors):
      1. Forward-back *vector*.
      2. Left-right *vector*.
      3. Up-down *vector*.
   B. One dimension of time (Read: timeline, sequencing).
2. **Event:** a point in space-time, specified by its time and place (location).

Thereafter,

1. **Volume** - region occupied by an object.
2. **Mass** - the process of weighing an object. Mass is a dynamic concept. Mass is determined through weighing.
3. **See and touch** - these invoke another object (i.e., these invoke a sensory system, which is another object).

Objects all have the associable information attributes of:

1. Length is the distance between points (i.e., a number-line count, vector).
2. Time is the distance between events (i.e., event-line count, magnitude). If mass is present in time "now", then the mass "exists".
3. Mass is the amount of matter in an object (object quantity count, mass).
4. Location where mass takes up existence as an object (volume location).
5. Area is top down view of object taking up volume at a location.
6. Temperature is vibration of matter (thermal and radioactive quantity count, heat and fission).
7. Weight is mass relative to gravity.
8. Objects are at set angles to the vector pull of gravity.

None of the following emergent criteria of an object can be used to define the word, "object" (because, none of these criteria equal a standalone shape):

1. See - Tangible objects can be seen, but there are also intangible objects that cannot be seen (e.g.,

magnetism). Some objects may not be see-able.
2. Touch - Touch is a verb (motion, a change in sensation). Touch requires two objects to come together and "touch" (the external object and the sensory system). Some objects may not be touch-able.
3. Mass - amount of atoms. Some objects may be visualized and not in existence.
4. Volume - total area of atoms occupied in a vacuous space. Some objects may be visualized and not in existence.
5. Motion - movement, force between objects.
6. Made of - object composed of elemental objects.
7. Temporal - sequencing and change counting of objects.
8. Subject - phase of matter of an object as solid, liquid, or gas.
9. Noun - the name of the object.
10. Color - surface properties of the object, specifically visible light properties.
11. Exist - the location of the object.
12. Three dimensions (3D) - the potential creation, or existence, of an object.

That which has physical presence is that which has shape and location [relative to all other objects in the universe]. In science, the questions must be asked, what exists independent of the observer? If the observer is removed, what exists? Fundamentally, object and locations exist independent of an observer.

It is only possible to talk about the existence of objects in rational science. It is ordinary speech it is possible to about the existence of concepts. For the purposes of physics, it cannot be said that 'information', 'love', 'intelligence', or 'effect' exists. Rational physics is the science of existence.

The word 'exists' belongs exclusively to physics:

1. Exist: physical presence.
2. Exist: physical [object] presence [location].

That which exists (i.e., is in existence) is anything that is physical; anything that has physical presence. Something which is physical cannot be an concept; it has to be an object. Per this criteria, something which exists must have shape and location the set of distances to all other objects in the universe for it to exist as a tangible object.

There are intangible objects also. Not all objects have location. There are objects, like triangles, which have shape, but not location. Hence, those are objects that do not exist, because exist is object + location. The only property all objects in the universe have is shape. That which is physical, is that which has shape. That which has shape may not be visible or touchable by an organism. Shape is what characterizes an object, not seeing and touching. Intangible objects are physical objects, but cannot be touched. Tangible objects are physical objects, but can be touched. The noun is the object, the thing. Shape is the first pattern(s) of universality. There must be a physical interpretation, and to understand a correct physical interpretation there must be a physical mechanism.

For the purposes of physics, a noun is that which has shape (only). If it does not have shape, then it is not a noun. For instance, orbit is not a noun, privacy and anonymity are not nouns; instead, these are verbs. A noun is only some thing that has shape, which is the definition of an object. Only objects can be nouns in rational physics, because only objects can be visualized as having shape.

> **CLARIFICATION:** *Anyone can study and not understand or explain. Science is about explaining, not studying.*

3.3.7 Definitions and rational science

Definitions must be used consistently. There should be no undefined words in definitions. Definitions should not contain antonyms, synonyms, or double negatives. Words must be defined in terms that are not synonyms; otherwise, the logic is circular (irrational, not rational). When an antonym or synonym is used in a definition, then it becomes a circular definition and the word/term has not actually been defined. For example, definitionally speaking, a "thing" or "object" cannot be defined as "no nothing" (as in, "thing: no nothing"), because an antonym is used. If "thing" is "no nothing", then what is "thing" or "object", is it "no nothing"? No it is not, because using double negatives, antonyms, and synonyms is not appropriate in definitions. Hence, it is irrational to state that "nothing" is a word used to define the absence of a thing. "Nothing" may mean the same thing as "no thing", but that is not a definition, that is only an synonym. For example, it is not logical to define a "horse" as "not a dog, cat, owl, etc." Similarly, it is not logical to define "intelligence" as "not love, energy, mass, etc." Circular definitions are no definition at all.

Rational physics has different definitions for words that appear in both math and rational physics:

1. Position in math = ordered pair (x, y).
   A. Here, position refers to a specific location for which there are geographic or other coordinates (e.g., the global positioning system, GPS).
2. Place in rational physics = the volume a body occupies.
   1. Position in rational physics = place.
   2. From a physics perspective, place and position are synonyms, because they both refer to the object itself. A fish in the ocean displaces water. The exact volume displaced is the place and position. Therein, the ocean is space.

3. In rational physics, there is no need for place or position (i.e., there is no need for those two words), because it is the object itself.

3.3.8 Describing

A.k.a., Description, mathematics.

A description of physical phenomena contains:

1. A listing of attributes/properties of a physical object or concept.
2. In science, adjectives describe objects and adverbs qualify or characterize motion.

Descriptions (grammar) are different than explanations (mechanism, cause). Descriptions precede explanations:

1. A description is a listing of properties.
   A. A concept is a description. A description is a listing of properties. A chair has four legs, is brown. It fell at a 9.8m/s. Explanation reveals causes and mechanisms for phenomena. In other words, something happened and you are going to understand, say how it happened and why.
      1. A mathematical equation is a description, and not an explanation.
2. An explanation is revealing causes and mechanisms for phenomena.
   A. Something happened, and the explainer says how it happened (meaning, not a description, but why did it do what it did and not something else).
   B. The best way to explain any mechanism is with language, visual or verbal/textual.

There is a difference between technological advancement and comprehension (i.e., wisdom). Individuals, and society, can advance technologically, but not advance equally in comprehension. For instance, a society could have the knowledge to produce magnets, but not comprehend how magnets function. A society could produce something highly complex as seen in nature, but that doesn't mean their (1) explanation of it and comprehension of what it is, and (2) how it works, is accurate or even close.

INSIGHT: *Rationality is understanding, evidence is experience.*

3.3.9 Explaining

A.k.a., Explanation, objective explanation, theorize, theory.

Explanation is the fundamental purpose of rational science. Before causality can be established scientifically, a mechanism [of action] must be established. Rational science is explanation of a mechanism (and not, description solely). In rational science, a theory is an explanation (and, an explanation is a theory). Here, mechanisms must be explained (at least) visually by showing images of objects and animations of objects in motion. A mechanism cannot be explained without an object. Explanation comes from visual reasoning (Read: visualization + spatial-pattern logic). Spatial-pattern logic refers to the identification objects (as patterns with sub-patterns), and understanding how objects interact and fit together, including how they may be perceived from different spatial oriented perceptions.

In rational physics, everything has to be connected by a[n object] mechanism, which can be visualized, and thus, understood (by individuated consciousnesses). Intelligence (here, navigation) requires understanding, otherwise one could not say, "it is intelligence". And therein, understanding needs awareness, otherwise one could not say, "it is understanding". Where awareness is blocked by belief, there is a filter/lens narrowing a complete understanding and perception.

Explanations are not descriptions. Explanations can be visualized as moving objects (physicalization), concepts relate two or more objects and cannot be moved (in the sense of navigation), unlike objects. Concepts are not entities, physically separated and moved around some physical location set. An object is that which has shape (physical, and hence, visual, and hence, understandable), and a concept is that which does not have shape, and thus, must be definitional/descriptional. Concepts cannot be reified. An entity either has to have shape, or it does not have shape (and is a relationship). It cannot be both at the same time, except for in the context of consciousness.

The language of rational physics is illustration; the proposal has to be able to illustrate a mechanism (a rational physical interpretation). Alternatively, the language of experimental physics is statistics, math.

An explanation of physical phenomena contains:

1. The causes (Physics) or reasons (Philosophy) underlying a phenomena.
2. How (mechanisms as physics) or why (purpose as philosophy) a consummated event happened. An explanation deals exclusively with the past.
3. A theory is an explanation, and a hypothesis is an assumption. In experimental science, a hypothesis is a theory that has no evidence, or it's a speculation, a speculative theory. An explanation in rational physics must include an object as a physical mediator. The mediator has only 1 criteria, and that is, shape. Vacuum, space is a synonym for nothing (i.e., that which does not have shape). The antonym to vacuum is shape (i.e., something). Illustration (visualization) ensures there is no mis-interpretation. Objects can be visualized, and

through visualization, clearly understood and communicated among a population.

The rational scientific method does not use the senses (i.e., does not use vision, hearing, smell, taste, or touch). Instead, it uses the brain and intellect (i.e., individuals have to use their own brain and intellect to understand; they have to think for themselves). Science explains objectively so that others understand, not so that others believe.

APHORISM: *The interested describe, the wise explain, the curious search.*

3.3.10 What is irrational

I.e., Irrational explanations.

What is the difference between a rational and an irrational definition. An irrational "explanation" is no explanation at all. There are rational models, and hence, rational understandings as well as irrational models, and thereafter, irrational understandings. An irrational explanation is the movement of concepts. A rational explanation is he movement of objects. Science starts with objects and definitions, and what follows is object[ive] explanations of causes and mechanisms. Physics begins with objects; there has to be an object to do physics. The explanation of causes and mechanisms.

INSIGHT: *Irrational explanation is treating objects as concepts, or concepts as objects.*

The first and second rule of rational physics is:

1. Physics requires an object; physics cannot be done without an object. Physics can only be done with objects.
2. Moving any concept is irrational; treating any concept as an object is irrational.

Hence, it is irrational to say that a concept exists; because all that can exist (object + location) are objects. Without objects there would be nothing to study or analyze. Hence the word object must be defined first for the purposes of physics. Because, physics is the study of the physical, of objects. There must be some thing (i.e., an object) in order to do physics; and further, it must be something that exists. Summarily, physics is the study of objects that exist (i.e., physical objects). Physical objects exist and are present with a distance between them. For example, wave(s) is a concept; there is no physical object called 'wave'. Wave is not what something is, it is what something does: A wave of what? A "wave" is a process occurring to some medium. The concept "wave" describes the process occurring to that medium. Similarly, mass (weight) is a concept that cannot be moved around; instead, the object that has the attribute of a mass (weight) is that which is moved. In other words, rationality means that physics can only be done with objects, where concepts are possible descriptions of processes, and concepts cannot be moved around. What is rational is that concepts are not moved around.

INSIGHT: *A rational individual seeks an explanation.*

There is a criteria for defining irrationality:

1. An irrational explanation is treating concepts as objects - turning a concept into an object (i.e., reification or concretization). Communication becomes [essentially] impossible to clearly follow, because it is impossible to visualize concepts as objects (note: concepts can only be visualized in concept models).
   A. Hence, to be rational, concepts cannot be treated as objects.
2. An irrational definition includes circular reasoning - the definition begins with what is at the end.
3. An irrational definition does not identify axioms - not defining concepts (in a model format) down to their axioms.
4. Using inconsistent definitions or undefined words is irrational. Additionally, using two or more different definitions of a term used in the same theory/claim is irrational. Communication becomes [essentially] impossible to clearly follow when there are inconsistent definitions and undefined usages of words.
   A. Hence, to be rational, definitions must be consistent and all words must be defined down to their axioms, and therein, assumptions.
5. If the theory (model) is inconsistent with or doesn't follow from the assumptions. Communication becomes [essentially] impossible to clearly follow without clearly stated relationships between axiomatic elements, assumptions, and models.
   A. Hence, to be rational, the model must follow from (Read: interconnect coherently with) stated assumptions.
6. Describing (especially mathematically) and claiming to have visually explained. A description (conception) is not an explanation (visualization); they are different concepts. Communication becomes [essentially] impossible to clearly follow, because there is no visualization of objects, only mathematically calculated.
   A. Hence, to be rational, explanations cannot just be mathematical, they have to be visually explainable at the concept model as well as object model levels.
7. Mechanism proposed doesn't work or cannot be imagined/visualized. Models must be visualized (at the conceptual and/or object level) if they are to

be imagined/see by others (who may share in their evolution). Communication becomes [essentially] impossible to clearly follow, because there is no visualization of objects.
8. Hence, to be rational, [physical] mechanisms must use objects, all of which can be visualized.
9. An abstraction does not equal an object. Equating an abstraction to an object is commonly known as reification, as in, to make something that is not real, real as a shape in the physical world we experiences together.

For example, "money" is one of the most common reifications in the early 21st century:

1. Paper money = the 'paper' is the object, the "money" is a static concept.
2. Gold money = the coin, rock is the object, the "money" is a static concept.
3. Silver money = the coin, rock is the object, the "money" is the static concept.
4. Trade = dynamic concept.

For example, there are irrational definitions of temperature:

1. "Temperature is a physical quantity" is an irrational statement:
   A. Physical is the same thing as an object. Physical is that which has shape.
   B. Rational physics note: How can temperature be a physical quantity if that which is physical is that which has shape.
   C. Quantity doesn't have shape. Quantity is a concept. There is no quantity that has shape.
   D. Hence, physical quantity is an oxymoron.

Instead, a rational definition for temperature may be

1. Temperature expresses hot [heating, atomic motion] and cold [no motion]. Temperature is the manifestation of light, thermal energy. Energy = capacity. Capacity = release of thermal energy. Temperature is the release of thermal capacity [to do work] from an object. The source of the occurrence [of heat, light] is matter:
   A. Matter is any substance that has mass. Mass is a quantity of matter.
   B. Heat is the flow of [thermal] energy from matter in the form of "light" through a rope-like object. Temperature is a process, not a/the physical quantity of an object.

3.3.11 Reifying

A.k.a., Reification, concretization.

Reification reveals a problem in the noun structure of the English language. Most English speakers are taught that a noun is a person, place, or thing. But, that claim is not true if a "thing" is defined in a particular way. For something to be a thing, it has to be an object and have shape. There is no thing that can be pointed to and say, that's "humility". These concepts are about the relationships between things, and not, the things themselves. The problem is is that in English that distinction is lost. When this distinction is lost, discussions and decisions become are more likely to be challenged and conflicted, because there is no meaningful distinction about objects and concepts that relate objects. This means that there are thousands of English words that people argue over for which there is no way to solve the argument, because there is no thing to recourse to (i.e., no thing to point to, to course correct to, etc.). Through reification, the relationships between things are treated as things in themselves with their own properties, independent of an evaluation, and all the while missing the things which are actually in the relationship.

Without something to point to the word can mean whatever you want it to mean. And, people start to think they really know what these ideas mean, as though, something which is only a concept, only a relationship has a set of attributes like a physical object, a spoon, for example, has a set of attributes. The concept only has no attributes that the individual subject doesn't give it.

There are relationships between things, for instance, love, intelligence, happiness, democracy, economics. These words at most specify relationships between things. But, to make something that describes a relationship only into a thing itself is reification. The noun structure of English confuses these objects and relations between objects, and treats them the same. People then have arguments about all sorts of subjects that are not things that exist at all, and communication can be very confused.

A lot of things that people in early 21st century society treat as real spatial objects are not real spatial objects; instead, they are concepts that people have reified as spatial objects (i.e., physicalized, concretized, as in, they have made them [in their minds and decisioning] into something spatial/concrete, and they treat them as if they are a real spatial thing). People then start treating these abstract "objects" as real by moving them around in space, squashing and stretch them, performing spatial operations on them, yet fail to realize they are social constructions that hinder an understanding of what is actually occurring. Herein, for many people, money is the simplest of these examples. Money is a concept, an abstraction, but people walk around with paper (cash), metal (coin), or digital currency on them and call that money. People transfer money between each other, and financial institutions produce and sequence money. Money is an abstraction that humans give value to. A paper bill exists, a metal coin exists, but "money" does not exist; because, "money" is a concept in people's minds. The paper bill (the physical thing) is an object,

and money is the concept, in this case, the value and use anyone gives the dollar bill. "Money" is a concept, the dollar bill (or coin) is an object, and it exists if it has location. Money is something that people give value to, something they believe in and may affix socio-technical relations to. In this sense, money cannot be traded, because money is a concept and not a physical object. Similarly, the idea of trade (end exchange) are concepts that describe human social interaction.

A simple example may further illustrate the point. Assume that a factory receives an order for 50 units:

noun	=	noun	+	noun	+	noun	+	noun
robot	=	head	+	torso	+	2*arms	+	2*legs

Here, the production line can determine the number of parts it needs to fulfill the order, because every factor in this equation is a physical object (Read: noun). But, what would the factory build if it was sent the following equation:

verb	=	verb	*	verb	+	verb
jump	=	run	*	$walk^2$	+	lift

In the case of all verbs, what should the factory build; what parts should it order?

3.3.12 Language in the early 21st century and rational physics

In rational physics, the following concepts are verbs (note here that in the ordinary speech of the 21st century, they are considered dynamic nouns; i.e., in the early 21st century, the following verbs are confused with nouns):

1. Angle.
2. Change.
3. Charge.
4. Count (measurement).
5. Displacement.
6. Distance (travelled).
7. Circle.
8. Center.
9. Edge
10. Energy.
11. Field.
12. Force.
13. Geodesic.
14. Information.
15. Itinerary.
16. Line.
17. Location.
18. Manifold.
19. Mass.
20. Orbit.
21. Orbital.
22. Infinity.
23. Motion.
24. Movement.
25. Number.
26. Point.
27. Plasma.
28. Position.
29. Tesseract
30. Time.
31. Trajectory.
32. Universe.
33. Wave.

The issue of whether or not something is a noun is significant, in part, because it determines which adjective/adverb is to apply. If there is wrong axiomatic classification (mixing nouns and verbs), then wrong qualifiers will apply (adjective/adverb). Both objects and motion can be qualified:

Adjectives qualify nouns *(qualifying objects & concepts)*	**Adverbs qualify verbs** *(qualifying motion)*
Infinite	Incessant
Infinitesimal	Constant
Continuous	Perpetual
Straight	Rectilinear
Perpendicular	Parallel

There are not experiments in rational science; experiments are for technology development. Instead, rational science requires rational thinking on the part of the individual "scientist", the product of which is individual understanding. In actuality, a better visual understanding of the object[ive] mechanism.

In physics, there is no physical object called number. Number is a count of something. In rational science, the word number means "to count". In the language of a rational science, number is conceived of as a verb and not a noun. A specific number is an adverb on counting (e.g., 1 counted, 7 counted, 43 counted).

The language of technology is math. The language of physics is universal modeling (visualization). Math describes and physics explains. Rational physics does not involve the testing of anything. Rational physics involves cognitive understanding. Technology is not rational physics. Technology what tests, and is tested to work.

Mathematics is a language of quantitative adverbs. It only describes, qualifies, or modifies motion. Math allows for quantitative descriptiions about how something moves. Math is not needed to explain a mechanism. To explain is to visualize. Take any mathematical equation and the only thing the equation is doing is describing some kind of motion; it is providing the location of a point or a value. the Mathematics doesn't deal with objects (as in rational physics), even though it talks about mathematical objects (i.e., mathematical objects are not the same thing as objects that exist [in reality, physics,

etc.]. Additionally, mathematics can only describe, it cannot explain. There is no science of mathematics since mathematics is a language. Math is a language, math is not a science. Physics is the science, and math is a language. Math is not required to understand how the world works. An equation [mathematics] is a description. Here, there is no such thing as mathematical physics, instead math is a language used for describing, not a means of explaining a mechanism.

Geometry is the foundation of mathematical physics, wherein:

1. The point is the building block of geometry.
2. Geometry is the study of shape and size.
3. Geometry is the branch of mathematics whose primary subject is spatial relationships and shapes of bodies. Geometry studies spatial relationships and shapes, while ignoring other properties of real bodies (density, weight, color, etc.).

3.4 The two scientific methods combined into a single method

A combination of the rational and experimental methods of science might appear as follows:

1. **Step 1:** Identify a question, and present assumption(s) and initial visual model.
   A. Objects - shapes qualify as objects. All objects in the universe have shape; shape is the only universal property of all objects. Concepts do not have shape; only physical objects (as opposed to concept objects) have shape. Something is that which has shapes, and nothing is that which does not have shape.
   B. Definitions - objects qualify as definitions. Math goes here.
   C. Initial model of facts - models/explanations of existence qualify as facts. Math does not go here.
   D. Explanation (theory) of model - having sufficient understanding of mechanism (dynamics) of existence that it can be controlled. Mechanisms are the how, are that which is explained. The explanation needs to come from a physical mediator, otherwise it is not a physical theory. Note that to explain something to someone else, math is not required.
2. **Step 2:** Design and conduct test (controlled experiment), observe results, and analyze results and apply statistics to observations.
   A. Design and test object(s) to study control of existence given by initial model.
   B. Observe the results of the experiment (a.k.a., test).
   C. Apply statistics to the observed results of the experiment.
3. **Step 3:** Integrate and iterate.
   A. Integrate information in order to understand more.
   B. Integrate information in order to build predictably useful objects (i.e., technologies).
   C. Iterate definitions.
   D. Iterate model of facts.
   E. Iterate explanation (theory) of model.
   F. Iterate understanding to develop more understanding (in concern to the real-world and how "we" can best live together within it).

3.5 Science in the context of different types of society

APHORISM: *Contempt prior to investigation condemns you to permanent ignorance.*

Just because it hasn't been scientifically proven doesn't mean it has been dis-proven. Science is a description of the way the world works, and a shared explanation that we use to produce better material (and socially creative of fulfillment) conditions. No lifeform can behave independently of the way the world works. The more greatly we understand the technical principles of reality, the better we can design in the world. Politics sees science as a product that can be bought and sold. The method of science starts (relatively speaking) with the observation of something that conflicts with an assumption or belief. A scientist starts with a hypothesis about the way the universe works (an assumption and proposed explanation), then the scientist sees something that doesn't fit that hypothesis (assumption and proposed explanation), and then the scientist visualizes and tests in order to generate understanding, knowledge of the universe, and an orientation toward more fulfilling environments, and therein, a new set of assumptions and explanations. Scientists come up with visual (illustrated) objects and working conceptual hypotheses. Scientists look for dis-confirming observations and use visualization in order to test (falsify) control mechanisms. To establish beyond reasonable doubt (illustrated understanding)what the mechanism is.

In the market there is a business model to how science is done. In scientific papers produced under market-State conditions, the reported scientific method and resulting data mat be accurate, but the summary (abstract) and conclusions are often bought (and paid for) by financially [profit-driven] interested entities. In the market, science is for sale. Opinion stands in contrast to a scientifically deduced conclusion. Herein, self-integrating systems evolve by putting their ideas and biases to a test. In other words, scientists compensate for their biases by putting their ideas to the test. The scientific method, itself, attempts to minimize the influence of bias or prejudice in the experimenter. It provides an objective

and standardized approach to conducting experiments and in doing so, improves their results. Scientific learning comes from resolving the difference between someone's expectations [of reality] and [actual] reality. Conversely, what often happens under market-State conditions is that when something conflicts with what is believed, then it will be suppressed, and that suppression occurs at the socio-economic access level of the [believing] entity. For instance, corporations may suppress scientific results that conflict with profit-driven beliefs through orchestrated censorship and commercial interests. Similarly, for instance, governments may suppress scientific results that conflict with authority and -driven beliefs through orchestrated censorship and commercial interests. In the market-State, there is also science done intentionally in secret.

Curiosity allows us to direct our intentions and actions toward knowledge and understanding. Science presupposes that there is a regular order to nature and that there are technical principles underlying all natural phenomena. It assumes that these principles are, to a large degree, constant. The more we observe, the more we know, the more we can predict. Together, a population can see "what's so," and then do "what works" for their fulfillment.

Faith quickly eliminates the need for any object, evidence, fact, argument, or experimentation. Industry has a very dirty practice of hiding all of the outcomes that don't conform to their profit-oriented expectations. A funded science is not a free science. When scientists get a grant from industry they are essentially working for that [for-profit] industry. Research ends up in the favor of the funder.

In the early 21st century there is a "replication crisis" in science. The replication crisis refers to some unacceptably large (perhaps well more than half) of all scientific research is unreproducible. Either the study was poorly done, poorly interpreted, the scientists got the wrong answer, or there was bias that influenced what actions and reports. It could be called the funding crisis, because science is funded by monetary interests, and it is those profit-driven interests that directed the operation. In the early 21st century scientists have difficulty repeating the same experiments with slight alterations, to fill in gaps in knowledge and improve understanding. There is very little funding in repeating experiments with slight alterations.

Many major players in the market (i.e., major corporations and industries) know how to influence science to increase their profits, and have been effectively doing it for decades. The best way to influence science is to influence its source and every level therefrom. The corporation(s) fund the scientists, fund their conferences, and fund panels. Essentially, every level of the science is funded (or attempted to be funded) by corporations with a for-profit interest. By the time the "science" reaches the "experts" and "policy makers" who are there to make recommendations to the public and create policy, there has been money invested at every point. At the State level there is lobbying (i.e., market influence) that seeks to change State policies and recommendations. Then, after behaviors and products have been adapted to fit the "science" (i.e., not science), then there is [a lot] money to be made when people get sick and products need repair and continuous service. The money reduces the ability to produce good science and have that real science be heard in the world. A lot of diseases and products don't need to exist, and only exist to make a profit, while causing harm along the way.

In any scientific inquiry, including that into the conception and operation of a community-type society, it is essential to look at (i.e., to input and study) all of the available data. However, if the data is of low or terrible quality, and that fact is not considered, then looking at the totality of the data will likely lead someone to wrong conclusions.

> **APHORISM:** *Garbage data in, garbage results out.*

Peer review subjects scholarly work and research to the scrutiny of other experts in the same field as to check its validity and evaluate its suitability for publication. Yet, publication does not confer veracity.

Questions necessary whenever applying the peer review process include, but are not limited to:

1. Is peer review used as a filter for what is and isn't published? If so, that is called censorship, not science. Why not just publish everything that follows the scientific method?
2. Who gave the scrutinizers the authority to be considered experts, and to decide what is and isn't true, and what is and isn't published?
3. How do "you" know that the peer reviewers know what is and isn't true, sufficiently to scrutinize a piece of work?
4. From whom did the scrutinizer learn and/or memorize what is correct/true?
5. Is peer review just a means to maintain the status quo?

Further complicating issues is that scientific journals (Read: scientific knowledge publishers) do not like to take down articles that they have peer reviewed and published. This is the case even when later research has shown an article to be false. This is a problem, because for those who are not expertly (intimately) familiar with the research they may find a paper that the experts know is false, read it and accept them it as true. In the market, a mistake in the literature leads to the possibility of incessant repetition of mistakes and a reduction in corrective feedback. Many people who have based their careers on false ideas will fight to protect them, because their career is their means of survival in the market and their reputation is their means of psychological survival.

To some extent, the veracity of peer review is a fallacy. Just because something is peer reviewed doesn't mean it has veracity. It just means it has been peer reviewed, which means it has got past several people. That said, peer review is one quality assurance process, and even though it is not perfect, it is not worthless either. It is simply one way of reviewing, and to some extent, validating, scientific content.

In science there is a dichotomous decision taken about the acceptance or rejection of a hypothesis. In the societal conditions of the early 21st century, if a hypothesis is accepted, then getting the work published is relatively easy. However, if the hypothesis is rejected, it is much more difficult to have the work published professionally. This is a form of publication bias. In professional journals, most people are required to find that something is true in order to get their work published. Yet, the role of a scientist is to disprove him or herself. In this way, journals are biasing the scientific publications available, thus incentivizing 'H1' (acceptance valuable and publishable), but de-incentivizing 'H0' (not acceptance, not valuable, and not publishable).

In the early 21st century, competition, politics, bias, and other issues of concern often drive scientific reports, including their synthesis and subsequent news reporting. Bias often starts with the selection of authors, which is frequently the choice of corporations, governments, and other entities with inherent biases. Authors and other related employees may be chosen because of their specific views. Sometimes writers and researchers are present because of their intellectual curiosity, sometimes they are there because of a salary, and other times, because they are activists. In this later case, that of activism, such activists often have serious and inherent biases that flow easily into their writing. Some people prepare and author papers in a manner that disregards science in an effort to make a major news headline, which then becomes a huge benefit for their career advancement and future employment opportunities (i.e., their salary). There may also be group think within an organization that is producing a report. Effectively, in the early 21st century where the market-State produces "scientific" reports, there is often an unscientific filtering process that takes place during the research, aggregation, consolidation, synthesis, and reporting of information in "scientific" reports where bias is, or may be, present at many levels. This leads to reports that do not represent the real science, but are portrayed and reported widely as doing so.

In the early 21st century, there is a saying, "science progresses one funeral at a time". In other words, when someone commits to a particular profession in the market-State, they commit to that paradigm of thought, and will frequently defend it to their death. Once someone is committed to a market profession, they are effectively committed to being ignorant of solutions that don't prop-up their profession; they are committed to ideas that won't put their professional income and credibility in jeopardy. One of the biggest barriers to evolution in science is the egos of the "professionals" that have to admit they [previously] got the science wrong. In concern to subordinates, if they don't replicate the orthodoxy while the authority is still alive, then they likely won't have a career in the profession any more. In the market-State, "scientists" have built their careers based on specific theories and lines of thought. As soon as they are committed to that line of thought, the "scientist" is now required to defend that line of thought to their death. And, the "scientist" will defend it to the death, because it is their credibility and career (their livelihood) on that metaphorical line. That, and the fact that science is bought and paid for by industrial for-profit interests. Science costs a lot of money to do, and for-profit industry pays for it.

Fundamentally, the organization (and administration) of scientific knowledge requires an integrated and coordinated organization for databasing, searching, and reviewing. In a community-type society, technical "peer" reviews are carried out by teams and working groups, and by the public at large. These reviews are open and transparent to the population.

3.5.1 Journals and peer review

Scientific journals (i.e., publications) select what they want to publish. And in general, they are known for not publishing research that they are either uncomfortable with, outright disagree with, or that contradicts the ideas being put forward by their funders/sponsors. Yet, ‘publication bias’ shouldn’t cause one to reject science; it should cause one to be especially careful in their verification of all science done by industry, for competitive entities are likely to engage in gaming strategies, many of which mask propaganda with the moniker of science.

In the market, releasing content early can affect a scientists ability to publish in a journal. In the market, the process of getting knowledge to the public and into application is often slow and broken. Frequently scientists don’t want to share potential discoveries with the public until they are sufficiently vetted. Journals have historically reserved the right to vet discoveries and tell the world about discoveries. Some scientific journals will reject work if the author(s) have discussed, spoken of, or released snippets of the work prior to submitting it the journal. A tweet or podcast could upset the journals. In other words, journals can reject a scientists work simply on the basis that it is not novel anymore. Alternatively, some journals embrace pre communication and encourage pre-published releases of snippets in order to attract interest and facilitate their decision of what to decided publish based on public interest. Journals can change the direction of study for decades because of a few key decisions.

In the market, there is intellectual suppression. Throughout the history of science famous researchers who eventually created entire new fields of science initially found it nearly impossible to publish their

research. Some didn't succeed for years, even decades. The scientific community ignored them, but eventually they were heard; eventually they conquered the suppression, but only after a major fight. The journal editors rejected their papers because the new research results were in conflict with "common knowledge" (a.k.a., the scientific majority); they were too eccentric. Yet, the 'eccentric' ideas were right, and common knowledge was not. In many cases, nobody conspired to silence these revolutionary researchers. Editors and fellow scientists simply assumed that the eccentric papers were misguided.

It is wise to constantly ask ourselves, "Do I have the foundational understanding (i.e., expertise) to evaluate the claims that people around me are making?" In community we all have the opportunity to verify findings, which are discovered transparently and available for [re-]view by everyone. Yet, the market system [with its orientation toward competition, profit, and social status] "poisons the well" of its peer review contribution system. In the market there is a saying, "publish or perish". In other words, there is incentive for scientific misconduct in order to solidify professional careers and reputations, or further business pursuits. A "risk factor" is a condition that increases risk. Money is a risk factor for corruption, and it furthers the likelihood of corruption. In the market it is important to ask, who funds the "science"? Therein, the reason for altering data is simple: It's called job preservation. Yet, at another level, data might be changed to induce fear so that a dominating organization can assert more control (or, continue to exert control). Without transparency and informed verifiers data can be easily "processed" for monetary gain and social power. In community, instead of trying to falsify and influence, we just work with what we have.

The peer review process is designed as a check against fraud, poor quality research, and other issues that arise when journal editors are determining whether to publish a paper. In theory, the editor passes a paper to another researcher in the same field who can then check that the research is factual, relevant, and sufficient for publication. In practice, in a competitive market environment, this process is filled with bias and is not straightforward. The peer review system is rife with issues and abuse. (Bellus, 2016)

Sometimes the data is not false, but it is contextually misleading, because it pertains to population that is incorrectly presumed to be the whole population/the population in its natural environment. Such as studying cells in a 2d matrix versus their function in an organismal 3d dynamic space. The data about cloistered cells is not incorrect, but it would be misleading to apply it to cells in a symbiotic and dynamic 3d environment. Similarly, data about animals in a zoo is not incorrect, but to then apply such data to the behavior of animals in their natural environment would be misleading. Seeking to understand something by studying it in a separated environment, disconnected from its natural environment is not the best way to study something. Published peer reviewed literature often fails to flag studies with inaccurate conclusions because the data originate from findings with inaccurate contextual application. Hence, someone could be reading literature that is peer reviewed and appears solid, but would be invalid when applies to a different, possibly more natural context. When generating finding through the identification and analysis of the method context is essential.

> **NOTE:** *A lack of research does not mean there isn't an effect. In other words, a lack of data does not mean that there is no effect.*

3.5.2 Science is a self critical and productively skeptical method

> **APHORISM:** *Science cannot solve the ultimate mystery of nature. And that is because, in the last analysis, we ourselves are part of the mystery that we are trying to solve.*

In community, the users of science are the community population, especially, the InterSystem team of engineers who apply science to technological development of an information-based habitat service system network. Science doesn't operate on consensus. The so-called "scientific consensus" is a statement: a scientific majority opinion that is widely disseminated and publicized; the collective judgments, positions, and opinion of the "community" of scientists in a particular field of study. The idea of scientific consensus is somewhat misleading. Consensus implies general agreement, though not necessarily unanimity (i.e., it implies majority opinion and not universal agreement). It is a misnomer because the idea of "consensus" means "everyone agrees"; there is no dissent in consensus if it is consensus. It means the agreement of every participating individual upon a certain conclusion or claim. In the 21st century however, scientific "consensus" has come to mean a majority opinion or claim ("majority consensus"), where if a few people dissent it is still being called a consensus, changing the word consensus to mean "a majority". This creates a confusion in terminology (or trivium grammar). And yet, scientific majority consensus gives society a place to start. Unfortunately, in the market-State, most professionals are loyal to the majority consensus for obvious reasons (e.g., tenure, funding, promotion, etc.).

In 1847, Ignaz Semmelweis discovered that washing hands with an antiseptic solution prior to facilitating the delivery of a child-birth reduced mortality due to infection. Despite various publications of results where hand-washing significantly reduced mortality, his observations conflicted with the established scientific and medical opinions of the time and his ideas were rejected by the medical "community". The Semmelweis effect/reflex conflicted with established norms, beliefs and paradigms that were embraced by the consensus. Ignaz Semmelweis went to a mental institution and then the grave in the dissenting camp, even though he was eventually proven right under the environmental

conditions of his time.

> **APHORISM:** *Of course, "all scientists agree" when you censor the ones who don't.*

If there is a consensus that translates into a practice of disregarding new evidence and observations, then there is not science present. A lot of discussions which may be productive and educational are being stopped in their tracts because of this misunderstanding of an extremely powerful word, "consensus". In a community-type society, instead of consensus, all evidence is within the reference of different explanatory frameworks, until verified visually, either physically or by some visual model, and then, it is still within an experimental framework, but it is now in an integratable category called verified, or visually understood (i.e., truly understood, repeatable).

There are many instances throughout recorded human history where "scientists" have said something is impossible, and then later, science has shown that it is possible. The "institution" of science is laced with situations where those who "break the mold" and try and push the edges of that which is being normalized get threatened and attempted to be destroyed politically, socially, professionally, and economically by those within the scientific institution. Some common examples throughout history include: Ignaz Semmelweis; Michael Servetus; Galileo Galilei; Alfred Wegener; Albert Einstein; Nickola Tesla; Alan Turing; Pons and Fleischmann; John Mack; Helmuth Nyborg; and Peter Duesberg.

It is important for everyone (i.e., essential for every stakeholder) to see (or have available to see) the entire body of work around scientific research. The whole that you produce a study, you publish an abstract, and then, when people want to see the full text you say, not without payment, which implies that you are either lying or your research is flawed, or the research was conducted with the desire for profit or social status in mind, and thus, cannot be trusted and must be replicated. In a scientific environment, individuals do not necessarily have to trust one another, because there are processes that they can understand, and the processes are trustworthy. When scientific process are mixed with business processes, then the issue of trust becomes complicated.

> **INSIGHT:** *Science is more than a body of knowledge, it is a way of thinking; a way of skeptically interrogating the universe with a fine understanding of human fallibility.*

3.5.3 Science in the context of claims about reality

> **APHORISM:** *The greatest level of proof is direct proof through experience.*

Any claim to science must be examined with the societal paradigm that originated it. The scientific process can be biased or compound false results. The scientific process is corrupted by the profit incentive (i.e., it is corrupted by business). What information can be trusted when entities in participation are incentivized to withhold and obfuscate information that could be of used as a competitive advantage. Business has eroded our sense of trust in science while reducing the incentive to share growth oriented experiences that attune us more greatly to the nature of an emanating, iterating, and iterating reality. Fundamentally, just because something (e.g., an action) isn't proven by science, doesn't mean it isn't valid. It is useful to be skeptical, but to identify as a skeptic can be intellectually disabling. Skepticism can quickly become dismissal without discovery. Skepticism based on ignorance is unhelpful and possibly dangerous, but skepticism based on science may be appropriate.

> **INSIGHT:** *If individuals are not able to ask skeptical questions, to interrogate those who tell them something is true, to be skeptical of those in authority and in experts, then either, they are up for grabs to the next charlatan who comes by, or there is a structural power hierarchy for control of individuals.*

3.5.4 Scientific reductionism

> *A.k.a., Science without systems science.*

Historically, designers have used the scientific method in an attempt to explain, predict, and control social, economic, and environmental transformations in the real world. In general, the traditional scientific method uses analytical thinking to handle problems, and follows certain major steps:

1. Reduction of complexity through analysis.
2. Development of hypotheses (Read: reasoned guess).
3. Design and replication of experiments.
4. Deduction of results.
5. Rejection of hypotheses.

In the context of design, the use of the traditional scientific method often leads to the following problem-solving process:

1. Define a problem.
2. Reduce the problem into sub-problems.
3. Find solutions for each sub-problem (sub-solutions).
4. Aggregate all sub-solutions in an overall solution that addresses the problem as a whole.

Without the application of systems thinking, a design approach that only applies the scientific method leads easily to reductionism. Reductionism refers to the belief that describing phenomena on one level (i.e., fundamental parts) allows the deduction of explanations from a higher level (i.e., entire system). In other words, reductionism believes that by reducing (disassembling) everything to its fundamental and independent parts, that the whole system can be explained -- the property of the fundamental parts deduces the behavior of the

whole. Reductionism combines the description of the behavior of the fundamental parts to explain whole. For instance, it is highly unlikely that the traditional scientific method alone (i.e., without systems language) can solve for the future consequences of present actions (e.g., sustainability issues).

Historically, science without systems thinking leads to the ineffective handling of complex real-world problems, due the lack of understanding of the characteristics of the system currently in place and the inability to acquire sufficient knowledge (and certainty of knowledge) needed to address the real-world [root] problem. At worst, the unanticipated side effects of not perceiving a problem as systematic generates solutions that may create new problems, which confound and complexify the situation. For instance, a personal transportation solution intended to be environmentally friendly by offering technical improvements in energy efficiency may result in side effects, such as an increase in the number of vehicles, an increase in energy consumption, and an increase in miles travelled (Greening et al., 2000). To address such a scenario, the integration of systems thinking into design approaches is required.

Note that the reductionism critique of science as applied to social concern is not fully justified, because an honest and objective inquiry that starts from the analysis of the parts must still considers their interdependency to the whole through some principles and axioms. In order to reduce the likelihood of reductionism, systems sciences approaches human needs and social problems using methodologies, tools, and techniques that are associated with a systems language.

3.5.5 Science and service

We already expect science to inform the decisions we take in concern to the use of technology. For instance, we expect that science has been done when we use a bridge, interface [in a controlled manner] with an information space (i.e., smartphone / ayahuasca), and travel in a technological form of locomotion (i.e., car, train, plane). If you use these services, you expect that someone has figured out how to design those things so that they function as intended and are not dangerous to you.

Science may be applied to facilitate the resolution of an inquired decision space where discovery is necessary. By applying the methods of science to discover more efficient and more regenerative ways of aligning with our goals and standards (i.e., "values"), individually and collectively (i.e., together), we can produce more fulfillment (i.e., more of that which we intend). In community, we appreciate each other's evolving interests, even if they are not marketable.

Ultimately, for science and engineering to be useful, they must look at the entire body of evidence. When unadulterated by the need to gain some kind of market advantage over a competitor, or simply for the sake of profit, science works as a feedback mechanism for improving ones understanding of the surrounding world around by means of testing, observation, visualization, and the adjustment of what is known based on a resulting experience.

> **CLARIFICATION:** *Herein, technology is developing inventions through trial and error.*

3.6 Science is universal and self-correcting

> **INSIGHT:** *Most people act as if they had a private understanding, when in fact the verifiability of existence is common to all. Science, as an approach, facilitates orientation, navigation, and self-correction. Through the application of science we correct ourselves.*

The great virtue of the methods of science is that they are universal and the knowledge that they discover is universally applicable. When practiced in their purest and least bias form, one organization's or community's science is not different from that of another.

Traditional biases and erroneous loyalties in science generate skewed data and misinformation, and they must be overcome for science to actually be "science". The methods of science have at their very core the notion of asking questions and challenging assumptions. Even if they are the establishment's own assumptions. Importantly, the functional usefulness of science does not call for scientists to manage society. Instead, we as a community transparently apply the methods of science to the social system for the benefit of all in our community.

Status quo practices are qualified against our objective reality through the frame of reference we know as the methods of science. The core mechanism of which is self-correction. **Self-correction** involves a process of *testing*, *logical calculation*, *hypothesis generation*, and *theoretical integration*. The repetition of experiments under variable and controlled conditions facilitates the informing of self-correction. The self-correction attribute of science enables the evolution of our awareness. Life is a path of constant self-correction; anything that limits our ability to self-correct, such as beliefs, limits our self-evolution and our social-navigation.

In many ways the scientific method is simply a techno-cognitive tool for the testing of ideas with evidence. The expectations generated by a scientific idea and the actual observations relevant to those expectations form what may be known as the scientific argument. The elements of the argument are always related in the same logical way, but those elements may be assembled in different orders. The three elements of the scientific argument are: observation, idea, and expectation. If the expectations are observed, then the "argumentative idea" is more likely to be accurate. If the expectations are not observed, then we are less likely to accept the idea with a clearly identifiable rationale. A scientific theory then becomes more greatly informed.

The fact that the building you are in hasn't collapsed is

some kind of evidence that we have been able to come into harmony and understand some kind of natural physical law or rule that is described as a regulation of reality that exists beyond our control and is common to all of us in this shared experience. It appears that we can either be aligned and in harmony with nature (as we emergently come to understand it through the scientific method) or we can fight it to our personal and social disadvantage (we can deceive ourselves).

In science, highly understood and consistent regulations that are well verified become "fact". If a lot of assumptions are needed to prop it up then it isn't a fact. Almost any theory can fit if there are enough assumptions present. One in a billion is the functional standard for the applied scientific principles to our everyday technology. Your smart phone device wouldn't work if you had error rates of more than one in a billion. Technology is the transition between the edge of what is known and things that are known well enough so that society is able to make technological devices.

A 'technical principle' is a verified regularity in probabilistic reality, in nature - a simple scientific model [simple as elegant, not simple as simplistic]. Here, reality is understood as involving the concept of a discoverable and verifiable set of "technical relationships". In other words, reality is a system of "technical relationships". These relationships are synonymous with the term "scientific". Science allows for alignment and harmonization with nature, through integrated corrected feedback applied toward adaptation at an individual and social level. The scientific worldview is a neutral worldview. It is the application of an approach. It can be applied in the context of an useful purpose and identifiable set of needs at a systems level.

> **INSIGHT:** *The more we discover of existent systems the more informed our common creations will become.*

We continue to learn throughout our lives. There is no recognized phenomenon that isn't undergoing a constant change of definition as the evolution of knowledge continues. Thus, truth itself is an emergent distinction in its resemblance to reality. Science cannot show us what truth is, but it can show us what was true and might be true with a degree of probable accuracy.

Imagine everyone arriving at their own individual decisions based upon information that is accurate and equally shared (a type of social equality). The only consensus that has ever met global consensus is the scientifically verifiable; everything else is opinion or a personal model. Individuals may be "entitled" to their own opinions and beliefs, but they are not "entitled" to their own facts among a common pool of verifiable information used for orienting and fulfilling a community (Read: a common society). Scientific consensus is very different from the consensus in social, political, and other more general uses of the term. The scientific consensus is not an opinion reached by a group as a whole, but a sufficiency of corroborating evidence to structure the arrival at an verifiable position. Scientific consensus is evidence driven and it is "realized" or "arrives" when the evidence is strong enough. The scientific consensus is something that emerges once enough data and evidence are compiled to support a particular model or conclusion. In early 21st century society, the consensus is typically established through scientists convening together at conferences, the "literature" production & publication process, peer review, and sometimes surveys. Sometimes "position papers" are issued to communicate what the scientific consensus is. It is important to note, however, that it implies general agreement, and not necessarily unanimous agreement.

What is a 'scientific consensus' if it is not a form of formalized agreement framed upon a structure of re-verification and critique? Consensus in science is not an opinion poll. It is not equivalent to a political consensus or social consensus. A scientific consensus (or theoretical model of the data) is reached through a preponderance of evidence directed by a process of critical thought to yield insightful understanding that ever more greatly aligns our models with the "nature" of the real world. A critical perspective allows a mind (or cognition) to see the shades of grey; instead of viewing events as black and white; it allows for the maximization of error correction. Consensus will still have bias, and hence, each individual needs a strategy from which to derive more information and further overcome their biases. The questions each individual must ask themselves are: From what system [of thought] do I derive information from the natural world? What thinking practice do I use? Do I seek the integration of a better thinking process to more greatly understand what I observe or am I promoting an interest group (as many "publications" are known to do)? Because, if someone cannot derive evidence from the natural world as well as integrate and verify what they observe, then how could they possibly re-orient their life (and society) toward one of more natural fulfillment (if not through a more thoughtful practice).

> **INSIGHT:** *The results of science can be trusted [only] in a society with integrity.*

The only real way to eliminate biased research is to eliminate what causes people to conduct and publish it. In other words the way to eliminate biased research is to eliminate the incentive to produce biased research. Incentives lead to outcomes (i.e., aphoristically speaking, show me the incentives and I will show you the outcomes).

If scientific consensus is embedded within a competitive market system, then such consensus might directly challenge business interests; for example, as was the case when it was found that smoking industry cigarettes was a direct cause of lung cancer. In science, evidence is scrutinized and validity is demonstrated. Results are published and necessarily replicated, and position papers are put forward and criticized to explain the replicated findings and refine an ongoing model of

the evidence. Scientists identify experiments, perform them, replicate them (or refute), and discuss and publish their results.

The time to embrace new understandings is when they can be demonstrated and replicated, and not before (where there are not understandings, but beliefs and opinions). This is not to say that we should forfeit our critical thinking skills and automatically accept the scientific consensus or what "experts" say, but it is good starting point to come to an understanding of what is currently accepted before considering otherwise.

Scientific consensus is an "understood agreement" by the foremost individuals studying, performing research, and publishing in their field. They ought not to be casually dismissed because an alternative view sounds convincing or conforms to our beliefs. But, they ought to be criticized and questioned as we further experience [existence]. It could even be said that scientists have a duty to inform others, particularly those in [their] community of what the evidence says (or "points to"). There is no "true thing" from a scientific point of view. It's about being as accurate as possible.

We are evolutionarily programmed to be cognitive misers; we naturally desire cognitive efficiency. Such efficiency is one of the three basic biological drives (seeking pleasure, avoiding pain and conserving energy). As a species we are always looking for ways to conserve energy. In the real world it is of benefit to seek the [subconscious] auto-processing of information in order to produce a faster response time to an environmental circumstance [which might pose a threat to our survival]. But, if someone's thinking is poorly structured or the will behind cognition fades, then someone might in fact be responding with a greater efficiency of lazy thought. A rapid and lazy approach to conceptualization and characterization can deviate someone significantly from a healthy goal-oriented response. We need to stop, think, and navigate toward a higher state of potential fulfillment. We need to ask ourselves, what type of thinking are we optimizing?

Scientific studies into 'perception blindness' indicate that conscious experience maintains some form of subjectivity (as a conscious decisioning space). If our conscious experience of objective reality is subjective to some degree, then it is wise to use verified evidence to design and develop new socio-economic systems. If subjectivity were conceptualized at the social, and wherefore, political level, then a system of biases and agendas, of persuasively misleading information, might emerge; a system of politics. If human experience is partly subjective then when humans interact socially and with common resources, they ought to do so through an emergently common and verifiable organization (i.e., scientific knowledge).

Some people have trust issues with science, and rightly so. When this dislike is explored, then it is found that people do trust the scientific method, and they do not trust the existing science industry, which is clearly corrupted through the mechanism of profit incentive as well as other maladaptive incentives present in the socio-economic environment of early 21st century society. Herein, science must be distinguished from the market, from industry, and from otherwise authoritative applications of the concept of "science".

Science functions incrementally, adding [bits of] information to create a larger and more accurately modeled "picture" of the real world environment. Such incremental and small advances are often not conducive for "front page" media coverage. And so, the media often has to distort the studies, or highlight exception studies that are contrary to the general understanding of the field to sell their product. The mainstream media is an industry, which both sells a product and modifies memes. The media regularly and deliberately misrepresents science, and hence confuses the public, under the guise of providing "balance for the viewers". Further, researchers in the marketplace sometimes go for the big headline as opposed to being genuine with their research.

'Institutional science' is science embedded within an institution. It is important to make a distinction between science as a method and science as an institution, which leads to the corruption of its results and the incentivized manipulation of data to forward an agenda. Institutions are incentivized to rig their "science". Science cannot be trusted when it is applied by the hands of entities with an abstraction directive, such as that of profit, power, or control. Fundamentally, industries filter perception "to add more value" to theirs and their own - the very idea of an institution (as a unique producer of services) filters out the perception of wholeness, and hence, systems-oriented solutions. Institutional science might also be referred to as "authoritarian science", "corrupt science", and "science for profit", and it leads directly to the weaponization of science. Science can quickly become a tool for making weapons or products more profitable. Yet, the true value of science lies in its result, and the questions individuals ask when they are confronted with evidence; particularly, "How can we use this scientific knowledge to improve our value orientation, and ultimately, our lives."

In the market science becomes politicized, lobbied, and commodified, and there is a lot of emotion, bias, and life-need gets injected into it such that it starts to become quite unscientific -- science as "scientism" - not science. Studies are no longer designed to come to an ultimate "truth", but are applied as part of a marketing effort toward concern for the sale of a product or the furthering of an agenda or position. Marketing can quickly dilute science to the point of nonsense.

Wherein, fact revision and commercial distribution of inaccurate information can disable the critical faculties of a population. Similarly, when relevant information is dropped from the total information set (i.e., left out), such as when data from controlled trials is withheld by producers of goods and services in the economy, then society's evidence-base for its [shopping] decisions becomes less trustworthy, and the term 'evidence-

based', itself, becomes relatively meaningless. When competing organization have the incentive and ability to withhold scientific evidence, then trust is absent. If the evidence base cannot be trusted and evidence can be withheld, then nothing that follows from it is trustworthy either. The market is a competitive system. Competitive systems are untrustworthy due to their incentive structure.

The industrial weaponization of science comes in two forms. The first form involves the misleading of others through the claim of science to forward an agenda. Therein, "weaponized science" (or industry science) is that which is not science, but has the appearance of science. The product of such behavior is marketing, not science. Industry studies can show anything they want (and there is a hiding of science behavior prominent in all profit-oriented industry). Therein, true science is either entirely absent or obfuscated, and that which is called science is a wolf masquerading in sheep's clothing, it is a tool of manipulation and of lie telling. When the claim to science is being used as a weapon, then individual and social benefit come second to the manipulation of an audience (the public) for profit and power, or even just one's simple livelihood. The second form of weaponization involves the utilization of the results of true science to develop weapons [at the expense and cost of human fulfillment]. It is important to point out that the military--industrial-congressional complex does in fact conduct secrecy cloaked science to forward their own defense and clandestine agendas, which may or may not be for the benefit of all of humankind. Any technology can be applied to a "dual-use" where the first use is that of mutual benefit to our total selves and the other is to individually attack that which we have stopped perceiving as ourselves (i.e., life-serving vs. weaponization). A knife can be used to kill more efficiently or to cook more efficiently; a knife is just a useful tool. All technology is essentially morally neutral (with the possible exception of automated and artificially intelligent, self-replicating weapons systems). Technical advancement among humanity is inevitable, and every significant technological advancement can be weaponized in some form. Without equivalent social system advances, advances in technology might accelerate a population to-ward its own demise.

The manipulated weaponization of science (i.e., the first form) can be very subtle and extremely hard to detect. For instance, the medical industry wants the public to "believe in science". But, the "science" about their products appears to contradict itself; so, the industries want the public to believe in the "science" that they favor. There can exist the appearance of science to forward agendas - agendas masquerading as science. And, this is why "you" must use critical thinking skills when examining all "science" from an industry or an establishment [for they have overt and covert agendas]. If you are looking to the science to lead you down a path of excellent health and a long life of fulfillment, then you will likely be maligned by the "science" that industry and "professionals" purport to be science. Science cannot be bought; if it is bought, then there can be no trust that it is science.

There are many large and undiscussed problems with research in early 21st century society. Most notably is the fact that vested commercial interests are unlikely to publish negative results [about their business partner's products]. In general (if not nearly always), commercial entities pay "researchers" to find a particular [advantageous, pre-desired] result; they won't pay to find negative results and they won't do business again with a research company that breaks legal contract and publishes such results.

Science for profit cannot ever be science because trust in an interrelationship is unverifiable (i.e., there are deceit promoting incentives). Science is an objective method of inquiry. Objectivity does not involve agendas and ethical positions; it does not involve commercial or political interests, only the collection of emergent facts. Often what is passed for science today is not actual science, but a covert agenda being passed (or more accurately, pushed) as science.

Science was initially met with heretical condemnation and is still often rejected today; even though it is the natural means by which the human organism learns about the world and is a method of inquiry that comes perfectly naturally to all humans. The ability to think scientifically and follow the scientific method is innate to children. And, we understand that the scientific method has literally facilitated every single attribute of human technological progress in history. The Community has naturally chosen the scientific method of analysis and organization as a base from which to develop a common pool of knowledge that we may all use to better ourselves.

Science is also misunderstood by many "scientists" who do not yet fully comprehend that science is the methodical, conceptual product of a larger organization, that of the systems methodology (or, systems science).

Generally, herein is a broad distinction here between other forms of thinking and scientific thinking. In truly scientific thinking, which makes possible the synthesizing of functionally technical systems, we work with what the world has to offer versus what we are trying to force upon it. Let us start with nature and optimize within nature.

> **NOTE:** *The exercise of conscience arises from science (con [with] + science). Conscience involves*
> *the knowledge of how to generate and remain in a state of fulfillment - to understand behavior that is rightly aligned with fulfillment and behavior that is wrongly aligned with fulfillment.*

3.7 Societal material problems are significantly technical in nature

QUESTIONS: *Do you have technical problems? What do you base your technical solutions on?*

Do you desire an appropriate[ly defined and engineered] solution to your technical problems?

Nature maintains technically discoverable relationships embedded within systems and perceived as patterns. We can meet our common material needs with scientific investigation and systematic technological engineering. Therein, the methods of science are applied to social concern and social problem solving. We understand that most of the world's problems regarding the basic needs of humankind (e.g., shelter, food & clothing, energy & restoration, etc.) and the needs of our material community systems are technical in nature. Technical problems may be understood and resolved through the application of the most current science and technological systems engineering.

Although science gives us the most efficient way of solving problems, it should not be the reason to create a conformed world. Unity in diversity is the principle of the universe.

In the early 21st century, it is the abuse and misuse of science and technology that scares people, not science and technology itself.

"The time has come to realize that an interpretation of the universe–even a positivist one–remains unsatisfying unless it covers the interior as well as the exterior of things; mind as well as matter. The true physics is that which will, one day, achieve the inclusion of man in his wholeness in a coherent picture of the world."
- Pierre Teilhard de Chardin

3.8 Scientific thinking

NOTE: *Science is essentially similar to philosophy in that they are robust and self-correcting methodical searches for the truth. Yet, science is not philosophy. Science has the option of using technological instrumentation in its inquiry into existence, whereas philosophy is inquiry without technological instrumentation [through the intellect solely].*

Scientific inquiry is a conceptual framework that functions to collect more information from the existent world and structure it into theories and models, which are developed within rigorous and logical constraints defined by the scientific method. The core of scientific reasoning involves the techniques of inductive and deductive reasoning.

The scientific method is a process for creating models of the natural world that can be verified and falsified experimentally. The scientific method requires making observations, recording data, and analyzing data in a form that can be duplicated by other scientists. In addition, the scientific method uses inductive reasoning and deductive reasoning to produce useful and reliable models of nature and natural phenomena. Inductive reasoning is the examination of specific instances to develop a hypothesis or theory (to build up to a question or conclusion through the gathering of evidence), whereas deductive reasoning is the use of a theory to explain specific results. Abduction is just the generation of a hypothesis. Simply, moving from "hypothesis" towards "data" is always labelled "deduction." The other arrow begins at the tail of the previous, moving downward to the right from "data" to "hypothesis" and is always labelled "induction." Induction builds theories, deduction provides the structure.

Essentially, through reasoning, we are trying to prove intellectually to ourselves what exists, by means of our own observations.

1. The Rules of Deductive Reasoning - mentally taking ideas apart; analysis.
2. The Rules of Inductive Reasoning - mentally putting ideas together; synthesis.

Analysis and synthesis, like the grammar stage of the Trivium Method, depend upon definition. If not for definition it would not be possible to take things apart and reform them together, possibly differently. Herein, 'reason' takes items apart and analyzes them by identifying, comparing and contrasting that which makes an item unique as a differentiating factor.

Scientific reasoning involves induction and deduction. Induction uses data to generate new knowledge. Deduction uses knowledge to generate hypotheses that predict system behaviour (i.e., future data). The volitional consciousness is known to either put ideas together (induction) or takes ideas apart (deduction). Deduction is the observation of something, and then its explanation, wherein it is necessary to specify how an idea was taken apart into its components/particulars for understanding. Induction involves the confirmation, rejection, and possible modification of a previous hypothesis through experience by our senses. Our senses are the only known way to deduce. The test of a completed induction is the pointing out of an observed affect; wherein, sensation provides direct proof. The only way to prove something is to point to it - the processes of observing and then deducing. As thought is refined, we move forward; we move forward by testing our thoughts.

Inductive reasoning pertains to empirical reasoning based on experiential observation and uses the experimental method in which a hypothesis, which encompasses a particular problem [idea, concept], is formulated. This hypothesis is tested by gathering additional data to see if the hypothesis is false. A major misunderstanding lies in the fact that scientific hypothesis testing never ends up proving the hypothesis; instead, it either "rejects the hypothesis" or "fails to reject the hypothesis". If a hypothesis has been subjected to numerous rigorous attempts by scientists to its falsifiability, but it remains unrejected, then it becomes a theory. At no point, however, is any theory ever considered by scientists to have been "proven": in the scientific world, all truth is "relative" to further evidence and provisional to the emergence of more

accurate information.

The basic tenet of science is that nothing is ever "proven", a theory is accepted because scientists "fail to reject it". And, a well-substantiated explanation of facts is a "scientific theory". To a scientist, the idea of a "fact" can mean a repeatable observation that cognition can commonly and verifiably accept as perceptual input for further processing into potential knowledge; it can also refer to the "truth" or "falsity" of a proposition.

Facts are the world's data. Theories are structures of ideas that explain and interpret facts. Facts don't go away when scientists debate rival theories to explain them. Einstein's theory of gravitation replaced Newton's in the century, but apples didn't suspend themselves in mid-air, pending the outcome. Theories make use of facts. Theories are created to describe facts and relationships between facts. They are used to predict facts and explain facts.

Theories never become facts. If you drop something, it will tend to fall. That is the fact of gravity. Newton wrote one set of equations describing that relationship. That is the classical theory of gravity. Einstein wrote a different set of equations for the same purpose, meaning there's a different theory of gravity incorporated in the theory of General Relativity. Today there are people working on yet another entirely different set of equations to describe the quantum theory of gravity. Theories can change and grow. They can be discredited and supplanted. Sometimes they can stand up to centuries of investigation, and sometimes they can't bear any scrutiny at all. No theory -- right or wrong, accepted or rejected, remembered or forgotten -- none of them change the fact that dropped things tend to fall [with predictable certainty].

There are multiple inductive and deductive associations, including:

1. **Inference (a.k.a., inferential logic)** - finalization (conclusion), equalization.
   A. Axiomatic operators of an inference:
      1. Deductive inference:
         i. Premises (a.k.a., assumptions, facts; usually requires more than one).
         ii. Conclusion (a.k.a., principle, inference, infer-ence; only one conclusion).
         iii. Equals (i.e., set equal to; "==").
         iv. *For example, premise 1 with premise 2 equals conclusion A.*
      2. Inductive inference:
         i. Observation (e.g., dropped pen from elevation, falls to ground).
         ii. Inference (e.g., something, "gravity", may be the cause of the pen falling to the ground).
2. **Reasoning (a.k.a., argument).**
   A. Axiomatic operators of an reasoning:
      1. Visualization.
      2. Definitions.
      3. Explanations.
      4. Evidence (test).
      5. Certainty.
3. **Logic (a.k.a., operational logic).**
   A. Axiomatic operators of logic:
      1. Conjunction.
      2. Disjunction.
      3. Conditional.
      4. Negation.
4. **Analysis.**
   A. Axiomatic operators of analysis:
      1. Interconnectedness (wholeness).
      2. Causative (something that is causal must always associate).
      3. Associative (relatedness).
5. **Engineering (a.k.a., technology, synthesis).**
   A. Axiomatic operators of engineering:
      1. Projects (real-world goals).
      2. Coordination (teamwork).
      3. Intelligence.

In engineering, problem identification is deductive if it is thorough, and presenting a solution is inductive. In other words, induction is the engineering of a solution - the solution is obtained (or induced) from facts about the real world. An idea (or solution) that is inductive is not arbitrary because the same senses give everyone the ability to observe [with marginal degrees of variety] the same object in the same fashion, and perception blindness aside, it is only the paradigmatic or ideological interpretation of what we see or perceive where there is conflict.

In philosophic argumentation, deductive arguments attempt to draw conclusions from at least one premise, which as a generalization, must be the conclusion of an inductive inference. In other words, a deductive inference is a conclusion based on reasoning from at least one accepted premise. It is important remember that some premises are qualified approximations. For example the Earth is a spherical body, a sphere by definition has equal radius in all directions, and therefore the radius of the Earth is equal in all directions. There are two reasonable premises here and a conclusion is reached from them. However, the conclusion is slightly flawed because the first premise is only an approximation: the Earth is really a prolate spheroid (it bulges toward the equator because of its rotation).

Inductive inference is a conclusion based on repeated observation of fact. Drop a particular kind of ball on a particular floor from a particular height numerous (n) times, and you can, by induction from those examples, make an inference and a prediction about what will happen the next time you drop the ball. However, your prediction is not a fact, in that you won't know by actual observation the result of the n+1th drop until it has

happened.

Unlike deductive arguments, inductive reasoning allows for the possibility that the declaration is false, even if all of the premises (facts) are true. Alternatively, in a deductive argument if all premises are true, the terms are clear, and the rules of deductive logic are followed, then the conclusion reached is necessarily true. Instead of being valid or invalid, inductive arguments are either strong or weak, which describes how probable it is that the conclusion is true.

Deductive reasoning pertains to the usage and generation of logical language (the logical language of science). Deductive reasoning uses declaration [assertions of statements that are logically connected]; and procedurally, it does not account for whether the statements are true or false as long as they follow the logical argument (i.e., it identifies validity). Indeed deductive reasoning does not have to be based on evidence nor use statements of fact. Providing the logical form of statements is maintained (i.e. the rule non-contradiction is followed), then logical argument is a powerful tool in determining the validity and coherence of a statement. It is for this reason that logical argument (or syllogistic logic) is the basis of mathematics. An argument is valid if it is impossible for its premises to be true while its conclusion is false. However, if the truth of a statement is determined without any facts (and evidence), then the statement is removed from any usefulness in a real world context, for it is disconnected from that which is relevant and from which evidence originates, from the real world. When thinking abstractly, one should always ask oneself: how do these terms and statements relate to actual concretes, to reality? What do they really mean and what other concepts might their meaning rely on?

The process of always relating abstractions to concretes, in turn, exemplifies the essence of what is so unique about an objective approach to decision and action. An objective approach recognizes that all arguments and discussions, and all human knowledge, are expressed in terms of propositions, which are comprised of concepts. Someone who remains objective consistently and intentionally asks what the concepts mean, how they are formed, what they refer to in reality - especially the key concepts that are crucial to philosophical, social and economic arguments. S/he asks what makes each concept possible, what it depends on and presupposes. S/he identifies, as a fundamental logical fallacy, any argument that uses a key concept while denying part, or the entire, essential context that makes that concept possible. This critical error in thinking and integration is known as the fallacy of the "stolen concept".

In "A letter to a philosopher", Ayn Rand (1997:511) wrote that this method ought to be one's "constant [and exclusive] approach to all thinking and all problems.... [She asked:] Do you think that the main tenets of modern philosophy could withstand the test, if you examined them by this epistemological method, with the same rigorous precision, with the same observance of the full context, the genetic roots and the exact definition of every concept involved?" In another work, she observed that some children (the most rational ones) learn new words "by treating words as concepts, by requiring a clear first-hand understanding (within the context of their knowledge) of the exact meaning of every word they learn, never allowing a break in the chain linking their concepts to the facts of reality." (Rand, 1990:20-21.) In other words, never allowing a break in their integration and model formation, they follow both inductive reasoning and deductive reasoning. Therein, deductive reasoning is subsumed under inductive reasoning. Inductive reasoning build the information structure, deductive reasoning is used to maintain the structure. In this sense, induction is the path to knowledge, deduction allows cognition to categorize a new observations within the existing knowledge that was previously induced [into four categories: data, information, knowledge, and values].

If deduction exhaustively demonstrates that an observation cannot be subsumed or integrated into the existing knowledge structure, in a loose sense, you may have deductively reached the conclusion that you have discovered something new, (i.e. not previously induced). By and far, induction is the integration of observations - such as Newton with his prisms refracting the light into different colors, merging them with the prisms back into white, inductively concluded that white light was actually comprised of all various colors.

> **NOTE:** *The classical definition of reality is the claim that "reality" is every substance (or entity), action, attribute and relationship that ever was and ever will be. Existence is all the real things that actually exist in it.*

3.9 Neutral knowledge

> **INSIGHT:** *Scientific facts reduce the entropy of a decision space, thus allowing for better decisions, and consequentially, better outcomes.*

Take information dispassionately on the basis of its credibility and veracity, its verifiability, and not whether it fits with an ideology or belief system. As long as "you" have a rigid belief "you" are not developing toward a fulfilling higher potential. The mixture of an identity with a belief system is a form of egotism (or subjectivism). Those who follow science and its pursuit of open inquiry cannot have investments in fixed beliefs.

If you are skeptical but not open minded then you might catch yourself in a trap. That trap may be known as a belief in self-omniscience that says, "If I have not experienced it then it cannot exist". To be skeptical but not open minded is to essentially believe that you know everything. This is a trap. There is another equal trap, that of being open minded and not skeptical. Then, you fall in the trap that says, "I believe whatever I am told". There exist very real illusions and mirages, that we "see"

and are convinced that they are real, but are not. Science submits itself to the evidence.

It is the discovery of knowledge, which is the ultimate cause of human technological and scientific change, and such change is at the roots of all fundamentally useful social change.

While human beings have certain needs, those needs can only be met to the extent allowed by the knowledge available in a particular society (i.e., culture). There are two ways to derive knowledge. Scientific knowledge is acquired through the methods of science. The second is that of logical reasoning from scientific knowledge (i.e., scientific reasoning). This form of reasoning provides useful analyses and maps [processes of change] of the universe. Modern inventions such as the internal combustion engine, television, radio, and electrical power arose partially or wholly from reasoning through scientific knowledge.

By the mid-20th century, mathematician and philosopher Bertrand Russell would write, "Almost everything that distinguishes the modern world from earlier centuries is attributable to science." As scientific knowledge was combined in unpredictable ways, humans learned how to manipulate the natural world for human benefit to an extent previously unimaginable. The impact of scientists on society has expanded proportionate to society's increasing reliance on, and ability to use, scientific knowledge. But, many people in early 21st century society still fail to recognize that their "success" now requires them to take on a set of new, broader responsibilities — both in their own geographic areas and around the world. What if 'success' weren't a destination, what if success was defined as a process, a journey (i.e., you never "arrive"). Science and scientists have the potential to play a critical role as a compass, guiding society in responsible and beneficial directions.

We also know that the application of science and technology can be used to produce harm. A lot of the fear ascribed to technology in early 21st century society reflects commercial pressures and power-driven agendas, and in a less commercial environment the technology would act differently. Science produces information; information has a neutral charge; information is acted upon by consciousness to produce rippling variations in the potential of all experience, and technology represents one of those potentials. Some patterns [of potential] are harmful and others beneficial to fulfillment.

> *"As we come to understand how human beings can best collaborate and thrive in this world, science can help us find a path leading away from the lowest depths of misery and toward the heights of happiness for the greatest number of people."*
> *- Sam Harris*

3.10 Science ought inform rules

MAXIM: *There are not exceptions to a rule of nature.*

A rule is the description of an interrelationship with an objective. Rules can be applied to the abstract as is done in legal systems, they can be applied to human social behavior without any abstraction as they are done in the restorative justice system in community, and they can be applied to the design of [real world] technical systems as is done in engineering. Also, society may operate through a rule set that defines its culture. Human beings are a social animal with a socio-technical life that requires rules (restrictions on behaviors and operations). The direction, orientation, and approach to the construction of these rules is highly dependent upon the societal system in question.

> **INSIGHT:** Power over the rule creation and administration is real power [to dramatically affect the lives and fulfilment of others]. In the early 21st century, the rule creation and administration system/service is the State.

In the real world, the universe, rules are formulaic regulations in probabilistically patterned phenomenological existence. Patterns can be discovered and engineering can be improved. Therein, the essence of a scientific principle is a scientific, formulaic rational for the why and how of a phenomena. This formula contains regulated statements (or technical arguments) about interrelationships in existence. Rules are technical constraints (as discoverable and universally regulatory principles) provide the opportunity for the expression of conscious choice within a material decision space.

Models are characterized by rules that capture how aspects of the world change. Through the application of a model, rules can be used to understand and to control state changes. The combining of rules into usable models facilitates the accurate alignment of a probabilistic decision space with an intended direction, in a commonly discoverable, dynamic world space. In reality, every decision space involves probability and there exists a pattern between the selection of decisions. The formula informs the pattern, but it is not the pattern. These probability patterned rule sets form the boundary conditions of reality, which are ideal for the acceleration of consciousness' evolutionary development … once they are recognized. Boundary conditions are binding and continuously operative, whether someone acknowledges them or even knows about them. It doesn't matter how much someone believes or dis-believes in them, they still represent boundaries to the movement and expression of consciousness in reality. They were not initiated by man and they cannot be changed by man. They are not a prison, nor are they prison conditions. They are the consequential technical conditions of the reality system that allow for complex decisions and alternative choices. They are impersonal forces and personification of them is invalid for they are part of a larger system that cannot be personified and individualized (i.e., removed from

itself).

Constraints provide structure for conscious experience. Imagine four people sitting at a table in front of a deck of cards, an object none of them had ever seen before. An observer then starts a timer and says, "Go!", without conveying any additional information. Only the concept "initiate" was conveyed, but void of any additional information [within which to alternatives are present]. So the question then becomes, "Go do what?" The people sitting in front of the deck of cards require a common ruled information set to use the cards in such a manner that they may actually play a "card game". The individuals at the table could in fact make up a complex set of rules for what to do with these cards, from which appears strategies, choices, feedback, plans, and assessed evaluations -- all of this choice pops out of the rules.

In systems science, a ruleset is all the rules by which elements in a system can interact. To that ruleset, initial/situational conditions are added, as well as power, to computer, simulate, or otherwise extrapolate useful data. In computer science, a ruleset is a set of rules that provides a way of telling a computer what operations to perform is called a programming language. A programming language's rules are it syntax. In computer programming, syntax is the concept of giving specific information (word) sets in specific orders to computers so that they do (compute) what is intended (expected). Different languages uses different word sets in different orders, which means that each programming language uses its own syntax.

The concept of a rule can have multiple applications. Rules exist to define a structure within which interaction may occur. If there are no rules then there is no structure and nothing to interact with, and nothing to do. Rules of language and rules of nature offer constraints that allow for higher-order and more complex decisions. The constraints offer the potential for choice in the iteration of a system.

The evaluation of feedback from a decision maintains the possibility of a differently adapted next (or iterated) decision space. All feedback in a system involves the formulaic composition of the system. The more information available to the user of the system, the more accurate a decision will be in its alignment with the users next intended state iteration of the system. Let's say for example that some event we can label "X" occurs, this could be any event, any event whatsoever. From this event we understand that 10 choice alternatives exist, and those 10 choices represent a decisions space relative to that thing that happened. Within those 10 choices, however, is a formula for [at least] why there are 10 apparent choices. The formula comes from the structure of rules about the nature of the structured environment. Knowledge of the formulas allows the user to create and select future choices aligned with a desired state of the system in a given environment.

A decision space is an information space, which can reduce and increase in entropy depending upon the focused intent of inquiry, integration, and retrieval [of information].

In the reality of this physical, material system there are discoverable rules to the system; they originate from a supra-system. It is important to recall here the principles of systems to understand the relationships between subsystems and their supra-systems and how one comes to knows another.

Biological cells have a very small decision space. An increase in the number of cells increases the decision space. Cells become cellular systems, and then become organisms. Cells might be given as a metaphor for individuals coming together under constraints (Read: technical reality) to produce something that is bigger than their individual selves (i.e., a community). In doing so they reflect an information system that is in the process of lowering entropy. In the process of lowering entropy the community of individuals discovers more of the nature of reality within which they exist. A larger decision space allows a user (consciousness) more freedom in interacting with its environment.

For the community to remain directionally stable [and progress], it must maintain an emergent awareness and focused intent toward a deeper inquiry into of the system of which it is a part. Similarly, for a community to remain orientationally stable it must maintain the understanding that a system involves differentiated functions that go together (i.e., cooperate) to make a whole. In the wild, species differentiate and evolve to fill different niches in their environment. Differentiation leads to the evolution of species into a biome, the ecology of cooperative interdependence that supports all the life in the biome - groups of species evolving together to become an adaptive ecosystem.

Are we not here to evolve the quality of our interaction and ourselves (i.e., our consciousness) within and through a discoverable rule-set? Let us all lower our entropy and create a coherent transformation through cooperative grouping.

Cooperative grouping means moving away from being self-centered in focused to being systems-focused; it means moving away from fear, deficit-ego, and belief into a state of appreciatively inquiring and cooperatively creating for the fulfillment of the evolving whole. This "all-focus" orientation is the defining characteristic of the emotional expression of love, of compassion, and of an "optimally efficient entanglement".

Love is every vector (unified interconnection), all those that flow out as well as all vectors of information flowing inward. Fear erodes all vectors through the erosion of trust in any vector. Without trust, cooperation is impossible. Without cooperation we all stand alone in fear. When biological cells stop cooperating and working together effectively or are invaded from the outside or invade others, we call it disease. When cells get greedy or begin building their own little non-cooperative empires within the cooperative body they often begin to consume an increasing quanta of resources, and this is called cancer - self-annihilation. Cells, another metaphor.

INSIGHT: *A community-type society takes choices based upon the ruleset of this [f]actual technical reality. Regardless of what anyone may believe, everyone can only make choices within the ruleset that defines this reality. The ruleset gives the definition. Therein, "natural law" determines the consequence of action. Rules have naturally systemic consequences.*

4 The critical method

A.k.a., The trivium method of critical thinking, critical thinking, the critical approach, the systems thinking method, the analytical thinking method.

The method described herein is known by multiple names; the two most common of which are "the trivium method" and "critical thinking". Herein, both terms are used, and they are used synonymously. The usage of one or the other of the terms is based upon its context of usage; quite often one term may be more appropriate than another. The term "clear reasoning" may also be used describe this approach. It is, effectively, an approach that clarifies our reasoning through the precision of our thought so that we may communicate more fully, and in doing so, generate a greater dynamic of synergistic fulfillment. Critical thinking involves, at the very least, fact checking, situational awareness development, methods for detecting logical errors, etc. A critical thinking space is an environment where you don't feel pressured or imposed upon when someone holds a differing opinion or disagrees with you. Herein, uncertainty, analysis, and debate are not negative; here, there is initially the state of not having knowing, and then, there is the discussing and integrating and arguing and visualizing (alone and together) to come to knowledge about what is desired and needed. The usage of this general method of thought makes someone an independent and individual thinker rather than a dependant thinker. In not relying on one's own self-organized and self-regulated thoughts a dependent thinker (usually one marked by low self-esteem) has his or her mental content filled by various other so called "authorities" without discernment and filtration for one's own highest and best interests.

THE CRITICAL METHOD PRINCIPLE: *Because of the nature of information (a standard for), "we" ("you" and "I") might come from totally different backgrounds, cultures and continents, but because "we" are both human, "we" possess something in common. "I" can speak to "you" on the basis of reason -- "I" can show "you" things visually as text, images, and movies, and "you" can understand. "I" can show you the documented results of tests and analyses. "I" can show "you" the steps I followed, and if "you" follow them too, then "you" will likely come to the same conclusions and results. But, if "you" don't "we" can argue about it, integrate new information, and improve the whole system.*

The method described herein is a skill, a basic skill, that an individual must to learn (or acquire) in order to effectively integrate further information. It is a rudimentary skill necessary to progress intellectually. The trivium method of critical thinking and creative problem solving by its very nature is preparation for further learning and the self-validation of one's own systematic thought. Critical thinking forms critical

ideas and sharpens an analysis down to a critical path (i.e., forming critically useful information). Conceptual integration is one of the first processes a consciousness needs to know in order to know more. Unfortunately, most people in early 21st century society are unaware of the critical importance of having such a method at their disposal. Most people do not have this method as a skill to use for themselves; instead, they rely on others who they believe are following a similar process accurately and in their best interests.

Many people in early 21st century society approach critical thinking with the general attitude that they already have the ability to critically think. Most people realize that without the ability to critically think they would be unable to accurately orient themselves in the world, they could easily become victims. Without critical thinking the world cannot be understood in its totality and navigated accurately. People can easily delude themselves into believing that they have critical thinking, when there is no critical method present in their thinking.

Critical thinking is the bridge between knowledge [produced by analytical thought] and systems design [produced by synthetic thought]. And, like analytic thinking it too is a form of systematic thinking. In other words, it is a "repetitive-use tool" for discovering and processing information in the systematically mechanized manner of input > process > output.

1. **Input** = grammar - basic components; answers who, what, when, where?
2. **Processing** = logic - relation of the parts to each other; answers why?
3. **Output** = rhetoric - practical application and communication; answers how?

The trivium method is a systematic process based upon how the mind actually works. It is a mental feedback error-checking and correcting tool for new information. It facilitates consciousness in "coming to know" that the information it is working with can [with some degree of probability] be used to orient [intentionally].

This is critical thinking in non-technical jargon:

1. The foundation of all critical thinking is critical questioning (i.e., intentionally focused and actively open inquiry) by consciousness.
2. To find or otherwise discover that which is relevant through non-judgmental observation with a note to which sense did the observing.
3. To work with observations to form something that is consistent and coherent. In other words, to figure out how the discovered information works together (or doesn't work together, as the case may be).
4. To acquire a total [visual & conceptual] picture to reveal understanding and functional complexity.
5. To communicate that integrated information to other people and use it for a purpose. In other words, translate the understanding(s) into effective and efficient [interpersonal] communication.

The following are some of the characteristic components of critical thinking:

1. Critical thinking is the ability to analyze facts, generate and organize ideas, make comparisons and identify contrasts, to draw inferences, to remove contradiction and identify opinion from facts, to evaluate arguments, and to solve problems.
2. Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analysing, synthesizing, and/or evaluating information gathered from, or generated by observation, experience, reflection, reasoning, or communication, as a guide to decisioning and action.
3. It is the mark of a critical thinking mind to entertain an idea without accepting it and re-evaluate thinking in the context of new information.

"It is the test of a first-rate intelligence is the ability to hold to opposed ideas in mind at the same time and still retain the ability to function."
- F. Scott Fitzgerald

The trivium method is the application of critical thinking by a consciousness to methodically gather raw, factual data into a coherent body of knowledge (grammar); then to gain understanding of that body by systematically eliminating all identifiable contradictions and noise within it (dialectic or logic); and finally, to wisely express and utilize that valid knowledge and understanding in the objective, real world (rhetoric).

Once someone is conversant with this three-fold procedural pattern, s/he is now capable of thinking "maturely", learning progressively, approaching systematically, and self-orienting (through value exchange from axiomatic thought). In other words, through the process of learning how to learn, the tool user learns how to critically and creatively think for himself or herself, and in doing so, becomes a self-directed (or, -actualized) and efficacious human being.

The ancients, post Aristotle, understood that one could not study philosophy if one did not have a foundation in the trivium. The word "trivium" comes from the same in Latin, in which it means "where three roads meet" or "the three ways". Etymologically, the term trivium is classical Latin for, "a place where three roads meet; a frequented place; public street, highway," from tri- "three" + via "road".The "roads" being a metaphor to describe: grammar; logic; and rhetoric. Evidence finds that a form of the trivium was understood by ancient Greek philosophers and practiced during Greco-Roman times. As a method the trivium is thought to have been formalized in ancient Greece. The trivium as a curriculum

was formalized in the European medieval period and nearly universally embraced by teachers in the English-speaking world until the early 20th century when it was replaced by State and corporate sponsored schooling. The trivium together with four other subjects (known as the quadrivium) form the seven liberal arts. The term 'liberal' herein means "free". The seven liberal arts were intended to facilitate the development of a free thinking individual - someone free in thought and action. In today's early 21st century society the term "liberal" has taken on an entirely different definition and it should not be confused with the concept with the same name as used herein.

The trivium, the first three of the Seven Classical Liberal Arts and Sciences (the liberating arts (or "the techne"), is both a method and a selection of content used to support the mind in learning (continuous integration), and thinking systematically, without contradiction. Science is similar to the trivium in that it too is a body of knowledge and a process. The trivium was always learned first as preparation for all further learning. Once fluent in the trivium method someone is now capable of teaching themselves with minimal guidance from an instructor or facilitator how to learn an established subject or fully grasping any propositional topic. Through the process of learning how to learn one also learns how to critically and creatively think for himself. Besides learning, the trivium method facilitates individuals in determining the reality of the real world versus that which is not of the real world, unreality. It facilitates the discernment of reality as objective existence from that which is only a creation of our minds (or someone else's mind) and not in resonance with real world reality.

To pull one thread of a paradigmatic tapestry could de-secure and potentially unravel all other threads. Remember, clarity in the integration of mental concepts and understandings is principal in systems thinking. When integration is incomplete, or worse, conflicting, then pulling one thread of a dishevelled mental paradigm could lead to the unravelling of understandings that are painful and to which their further integration necessitates the processing of fear. Fear blocks the intelligent understanding of life. Fear is the path to the anger, anger leads to anger, anger leads to hate, and hate leads to suffering.

The trivium method consists of three components that form an ordered, procedural information set: **general grammar, logic** (Aristotelian), and classical **rhetoric** [in this order], which constitutes the "integrated", Classical Trivium method - the first three of the Seven Liberal Arts and Sciences; the last four constituents are called the Quadrivium. Each of these components is also a content area of the trivium's knowledge base. When each element of the trivium method is placed in its correct order (grammar <–> logic <–> rhetoric), then the method acts as a functioning cognitive information processing system. This information processing system involves three components: 1) the procedure; 2) the contents previously integrated into the three stages; and its 3rd component, the new information - space for conscious evaluation, a decision space. Together, this three-fold procedural pattern is applied toward a functional purpose, that of systematic and valid thinking. When visualized the method's application causes it to take the geometric from of a spiralling and emergent process that yields greater degrees of certainty and approximations of truth about the universe and ourselves as it spirals through and integrates new information. Hence, the evolution of information takes the form of a spiral structure. The emergent integration of information by consciousness takes the form of a spiral. When new data is found each component of the trivium must be rechecked for accuracy: Is the logic still correct? Is there a better way to communicate this? This is the method for critical thinking - the art of non-contradictory identification and logical integration.

This processes is essentially summed up in the definition of the term 'critical thinking'. Critical thinking is the [art of] non-contradictory identification and logical integration of information toward complex communication and creative design.

Therein, some thing's existence must first be identified prior to it being dealt with in any useful way. Critical thinking is not a functional cognitive tool unless consciousness has data to begin with; for without data one is just offering an opinion - there is no "sense" [information] in the relationship. As consciousness collects and integrates data it begins to form into patterns. And, those patterns are recorded and tested to see that they hold true. Eventually there has been sufficient testing to suggest a theoretical technical regulation. Critical thinking involves the state of being comfortable with a pattern of thinking by which consciousness may by degree dispel confusion in reality.

Any attempt to verify information via the trivium method will lead to one of three outcomes:

1. Its logically reasoned verification.
2. More information needed.
3. Its partial or full dismissal.

The application of the method ensures a critical approach that questions assumptions based upon the currently layout of an issue's grammar and logic.

When power exists in questioning then motivation exists in doubting. Someone who seeks a higher potential state of information and doubts has the motivation to remove the contradictory paradox in the information's integration, in the experience of dissonance. Philosophy begins when one learns to doubt and question; and, there is no real philosophy until the mind turns around and examines itself. What is humankind, what can it become? What is the self, where has it come from? What am I experiencing?

The 4 philosophical questions are:

1. What is?
2. How do we know what is?
3. What do we do?
4. How do we communicate it?

In the real world, "What's" have a context; they have relationships and are related. They have a record, sometimes known as metadata (discussed further in the Decision System specification). If that record is not entirely known, then the "what" may not be fully known.

Herein, critical thinking is a philosophic skill. It is a cognitive procedural tool for reducing contradiction during the integration process by which new information becomes part of the information tapestry that is the emergent and accessible truth [that informs our decision space]. When we have critical reasoning we can disagree and still share a common ground as inquiry toward greater approximations of truth through evidence and logic. Therein, when we disagree we do not suddenly become "enemies". In fact, disagreement can lead to further understanding for both.

Truth is a proposition in correspondence with objective, factual reality (i.e., a conceptual statement with no innate disagreements). Therein, facts are an objective standard of truth. If someone is being rational, then everything is a refinement to the truth; but one could still be wrong if the logical paradigm that one is using is refining information to something other than the truth (e.g., garbage in, garbage out).

The critical method is an orientation mechanism. The more accurate information someone has the more accurately they can align their decisions with a desirable and fulfilling direction. It is a tool among intelligent beings who desire to communicate in a clear and cogent manner. Wherein, it reduces the likelihood of becoming infected with falsehoods and arriving at decisions based on inaccurate information. The method involves a form of information verification (i.e., logical reasoning) prior to communication and decision making, which limits the infection of those downstream with paradoxical and polarized thinking.

It is wise to take care to know exactly what is being stored and processed in mind. To be mindful about just what memories we're encoding and how they were encoded. Everything in the mind has the potential to influence how thought occurs and is processed. The encoding of memories has a profound effect upon one's thinking and behavior. When they are encoded they are encoded with a resonant [emotional] structure, which is reflective in some manner of the structure of its environmental trigger. Hence, mindfulness is the presence of mind to resist distractions and understand whatever is going on at any particular point in time. Fundamentally, ideas have consequences [behavioral and at a systems level] when put into practice, when "encoded".

To use a computer analogy, the dissemination of false information is akin to the spreading of a virus, a mental virus (a "meme"), which is unhelpful in a community. A meme is the idea of the transference of cultural information [packets] which are not opened and critically examined (i.e., a mental virus). These abstracted mental programs (or mental viruses) disrupt the clear transfer of inputs. The lack of antivirus software on someone's computer leads to a greater likelihood of infection downstream, particularly when passing through more "conflicted" networks. Viruses clog the ability of a processing system to function at its most brilliant potential. Mental viruses integrate themselves into someone's perceptual awareness and create an increasingly fragmented and otherwise distorted artificial overlay on top of a truthful [source] reality. The method acts as a mental anti-virus, wherein the user looks for truth regardless of prior beliefs, opinions, and understandings. Truth becomes the ultimate search. Critical thinking reduces susceptibility to irrational attempts at persuasion. Yet, when intellectual self-defense is turned down and emotion and fear are turned up then ideas are more easily inserted into someone's cognition. In other words, without tools individuals may be easily turned into fools. We should all know how to recognize lies if we are all to become self-reliant, together.

Lies are like viruses. They can spread quickly and far, even without awareness of the individuals infected by them. Everyone can spread disinformation and lies unconsciously if they do not make the effort to question, engage their critical thinking abilities, and network with others to gain greater objectivity. And, deprogramming oneself from the conditioning and lies of official culture (that most people aren't even aware of being lies) is challenging, but rewarding work.

As a whole the trivium method can be habituated such that it is continuously running in the background, like a systems integrated antivirus program. Therein it would reduce the contradictions that one personally holds in their mental model ("defragging" ones mind) or that are presented in a communicated statement itself. Its continuous application builds discerned, active inquiry as well as mental acuity.

There are two general categories of bad information:

1. **Dis-information** - is an active lie or deception.
2. **Mis-information** - is when an interlocutor is sincere, but is passing on information that is wrong, though not necessarily a lie.

There are three general categories of error:

1. **Relevancy** - is the error relevant? Does it have relevance to the argument?
2. **Presumption** and **presupposition** - is the error presumptuous? People add things to an argument that are not necessarily true or verifiable?
3. **Ambiguity** - is the error ambiguous? Does it leave the person who is the recipient of the argument

> with questions about what is actually said, or is there maybe a deliberate strategy of being unclear ongoing? And, is there honest integrity in the relationship so that uncertainties are transparent?

When individuals in mass are forced into a [schooling] system that disconnects their intellectual immune system (their intellectual self-defense), then the community naturally becomes incoherent. Volition, someone's decision making process, someone's choice, someone's free will is dependent upon a method to dispel confusion, a "mental immune system" or "ironic monitoring system". When the system is active and accurately informed their exists the potential for genuine self-esteem and self-reliance; the creation of a state of true self-direction. Therein, one can be reliant on oneself and others in the community to facilitate in the fulfillment of all common needs.

It can be unhealthy when people don't have a method to fill holes in their cognition. It can lead to some malicious person coming along with a pre-packaged explanation and saying, "here, rest easy, I am your leader and shall fill your hole with this knowledge ... but don't open it." Outsourcing your thoughts will not lead to your alignment with a higher potential. To really understand and think and move forward confidently with a better understanding and a bigger picture requires self-directed effort. It is unwise to accept pre-packaged grammar (or prescribed grammar) without investigation. The package is highly like to contain false and misleading grammar. Knowledge is not acquired by individuals through the acceptance of pre-packaged "gifts" given by an authority (i.e., knowledge is not acquired through schooling). Always question authority -- that means both the institutions and individuals that set themselves up to provide dictation and advice. It is unwise to be overly impressed by the status of any institution. Fundamentally, "your" self-confidence doesn't have to come from a group or from authority, it can come from having a method to handle uncertainty for oneself, which takes self-reflection on one's own beliefs, values, and knowings. Herein, reflection turns experience into insight and wisdom.

When corrective, philosophic thinking is absent then individuals are more likely to be "taken advantage of" by stimulus and response. Its absence can quite easily and subtly turn an otherwise free individual into an intellectual servant. And, there may be some unlearning (dissonance processing) necessary to recover ones individual self. There is competence and respect in being able to appropriately validate one's own thinking as well as the thinking and ideologies of others. There exists the experience of empowerment in being capable of orienting one's own body and mind in the world through rational thought applied in a systematic manner.

For the individual the trivium represents a methodical pattern-of-thought (a thought process) for thinking effectively. It does not direct the thinker "what" to think. Instead, it represent a system organization that creates an ever-improving map, which corresponds to the terrain, and is always improving itself; for the purposes of survival and life fulfillment.

The critical method has been obfuscated, suppressed, and taken out of most of modern education systems, where people are not taught "how" to think but "what" to think - they are programmatically conditioned.

Removing and withholding this tool leads to the ability of the few to control a collective [of their followers]. Taking critical thinking away leads to the removal of a very important connection, the idea that the language we use and the concepts we think about relate in a very real way to the natural world with a discoverable organization - that there exists a real world reality. It takes the meaning out of words and how words relate to these categories, these signature referents that exist in reality. It is a very simple idea that the nouns and words we use actually relate to tangible, physical reality; whereupon, a critical path can be navigated around obstacles as we emerge into a greater knowing and greater fulfillment. Inquiries become less about how our lives align with a tangible and dynamic reality, and more about how "you" mold tangible reality to get what "you" want out of it entirely de-contextualized. Therein, authorities come in and begin to guide someone's experience and direct the path of their attention. They prescribe your rights; they say what reality should or should not be; and they begin setting up bureaucracies to obfuscate the abstractions that feed their collective.

The mind has a limit on processing power; it can readily be overwhelmed, confused and distracted if a method for dispelling confusion and finding reality is not continuously applied. The absence of such a method opens the door for external control and influence over the individual making social engineering easier. Moreover by curtailing the individual's ability to comprehend, integrate, and actively communicate what they have learned we are being cut off from reality (as knowledge of ourselves and our environment).

The truth doesn't change only because authority wants a different "truth" to be told. The truth can be observed and sensed and verified. Nouns relate to the substances of experience, adjectives relate to aspects or qualities, and prepositions [in part] involve types of relationships. Categories relate to real things that we experience, or have the potential to experience. Yet, thinking categorically (i.e., thinking from the perspective of a divided or divisional category) is not sufficient for understanding and for the design of fulfilling creation. One must also integrate the whole information space (i.e., think systematically). In community, it is necessary to think through the emergence of a system as well as think through the categorization of the elements of a system. Herein, critical thinking involves the challenging of categorizations, assumptions, and abstractions. Aristotle facilitated humanity's understanding that it is possible can create conceptual categories, "syllogisms", of things in reality. And in community, we add the design question, "What is possible?"

It is not necessarily so, that because "you" have been thinking for years, that just naturally over time "your" thinking has improved - it is not necessarily so. The fact that "you" are thinking alone will not make "you" better at thinking systematically. It only may makes you better at the type of thinking you are doing. The Two finger typist will over time become more refined at two finger typing, but that will not make the typist a structurally more efficient (or better) typist. So, if "you" are a poor thinker and "you" practice poor thinking a lot "you" will likely become an excellent poor thinker.

An example of poor thinking might be the failure to accept and appreciate criticism, In community it is important for us to admit that we may have made an error; herein, criticism becomes the antidote to error. And, if a society wants to become good at anything then criticism is valued. Today, science has become reasonably good at the reciprocal approach to criticism. In science, we do not kill or maim those who criticise. The ultimate critic is objective reality who says, "no, it sounds really good, but you are wrong." If we fear criticism or interpret criticism as "negative", transposing self-criticism for the notion of "can't afford a negative thought," then we lose out on the opportunity to grow by identifying and learning from our mistakes, which is the "theme" in a fulfillment-oriented society.

When we realize that we can know things and that we can install better thinking tools to know things more accurately, then our confidence has truly begun to rebuild itself. Learning to think is like learning to walk, and once you are proficient at it then you can "hike through" a conversation with another proficient learner.

4.1 The three stages of the trivium method

> **INSIGHT:** *If we choose to ignore principles that are based upon truth, and therefore, ultimately ignore truth, then we are likely to enter a chaotic existence (a higher entropic state) where self-inflicted suffering becomes our perpetual manifestation.*

The Trivium method (or process) contains three stages (or steps). Those three stages in order are:

1. **Grammar** (knowledge of that which exists) - Answers the question of Who, What, Where and When of a subject. Defining what is to be modelled and stating knowledge.
2. **Logic** (understanding of the interrelationships of that which exists) - Answers the Why of a subject. Logic is the language of coherent connection and clarified relationships.
3. **Rhetoric** (communication of grammar and logic) - Provides the How of a subject.

The trivium is the identification of a method to reduce contradiction that may also reduce fear.

4.1.1 The grammar stage

There are two separate concepts that compose the grammar stage of the trivium: special grammar and general grammar. The purpose of the grammar stage is to move from perceptual information to conceptual information without introducing or integrating contradiction. Herein, grammar refers to a ledger of knowledge (i.e., a database of knowledge).

4.1.1.1 Special grammar

Special grammar refers to the rules developed and applied to the ordering of words/concepts for verbal expression and communication in the form of a sentence; it refers to linguistics and the rules of a particular language. To connect conceptual points, or words, there must exist rules. Those rules are called special grammar. And, when both words and grammar exist, then language exists. In other words, special grammar is the grammar of languages - English and Russian grammar being two examples. Special grammar is grammar in the commonly discussed sense, as conceived of by Steen (2007), and encompasses all components that are needed for a full description of a language, such as its lexicon, phonology, morphology, syntax, semantics, and pragmatics (i.e. coded pragmatic functions such as elocutionary potential, honorifics, etc.). Special grammar is not a stage of the trivium method per say. Instead, it is a component of the body of content that makes up the grammar domain.

4.1.1.2 General grammar

> **INSIGHT:** *It is unwise to accept and discontinuously integrate erroneous definitions.*

General grammar is the first stage of the trivium method and it concerns the facts of objective reality, regardless of language, which apply to all systems of their kind as the first set of building blocks to an integrated, fully interrelated, and objective body of knowledge (e.g., nouns). To understand nature it is important to first inquire into nature. The grammar stage of the trivium method involves the discovery as well as relational, discursive and sequential organization of factual data into a coherent and systematic body of knowledge. The grammar stage is limited by the information available to our common senses and technological instruments. Essentially, the product of science and the scientific method is 'general grammar'. General grammar is the equivalent of data and may not be in-formation.

The philosophical art of general grammar lies in definition. Things that exist in reality have specific differentiating factors. These factors can be defined and grouped by their unique attributes (i.e., their characteristics and structures) into a universal concept, which carries a definition. In other words, things that exist in reality have unique characteristics that can be differentiated from other information by grouping and universal conceptualization (like "tree" or "molecule").

Simply, through universal conceptualization of information contained in perception, consciousness can come to understand the existence in which it is enmeshed.

The English verb "define" comes from the Latin word "dēfīnīre", which means "to put a limit on, determine, explain" (from *de-* ["completely"] and *finis* ["boundary, end"]). Essentially, the process of defining is the process of delineation. Hence, for us to discuss something or have a philosophical argument, then we have to put a limit or place boundaries around a concept so that we aren't getting lost in what we are trying to describe and communicate and integrate.

Voltaire once said, "If you wish to converse with me define your terms." How many a debate would have been deflated into a paragraph if the disputants had dared to define their terms. Philosophy provides a way of defining. In philosophy, the 'essence' of something is that which makes it unique, and the 'universals' are the commonalities. Once universals are discovered/created, then statements, arguments, and questions can be generated. Through questions, scientific tests can be run, and then, stated conclusions can be drawn [through logical argument].

As embodied consciousness, we can use our senses to take in experience and abstract from it. The etymological root of the word "abstract" means to "take apart". So, for example, we can observe a color to grass. Abstracting the essence (or, one of the [structural] properties) of the thing we are observing and putting them together in uniquely meaningful ways is the foundation of art and creativity. We have an almost infinite ability to abstract, to take things apart, and put them together in different ways. This is where our creative freedom lies.

Here, Korzybski's theory of "general semantics" has several important things to say on the topic of abstraction:

1. Mathematics should be used to describe physical events where possible.
2. Avoid identification of word with a thing. Experiencing the things behind the name (will help us more greatly come to understand the world we live in.
3. Higher order abstractions should be used cautiously and consciously, and it is important to know what level of abstraction they are on.
4. Use visualization to show structural similarity and clear up what level of abstraction someone is on.
5. General semantics adds two additional points:
   A. Education is about experience and self-verification; and
   B. Delay conclusions until all the facts and experiences possible to arrive at a conclusion.

But, in order to put things together in useful ways we must first have accurate data.

General grammar answers the question of Who, What, Where, and the When of a subject. It consists of discovering and ordering the facts of reality that comprise basic, systematic knowledge of the total real world information system. In other words, the purpose of general grammar is to identify, gather, and systematically arrange raw, factual data of a similar nature into a specific body of knowledge. Thus, this stage works through primary first-order knowledge of a subject. Knowledge represents the first stage of conscious understanding after contradictions and fallacies have been processed out of incoming [sensory] information.

When individuals look out at the world they observe things that are identifiable, they observe "nouns"; no two of which in the existent world are in a state of contradiction. There are no contradictions in nature, only in the minds of individuals. A recognized contradiction is either a lie or an error. A thing cannot be itself and something else at the same time and space.

Existence is every substance, action, attribute, and relationship that is, was, and ever will be expressed grammatically. In other words, existence is every noun, verb, adjective, adverb and prepositional phrase that ever is, was, or ever will be (three dimensions of a temporal system: past; present - now; future). These are the categorematic words of consciousness (i.e. words that are capable of standing alone as the subject or predicate of a logical proposition) .

Essentially, general grammar consists of objective reality organized into the parts of speech [of a language]. The parts of speech may be divided into:

1. **Concepts of existence** (categories and categorematic concepts that stand by themselves; they have a referent in reality; they are "parts of speech"):
   A. **Noun** - a substance, object, "thing"; objects have different *forms*, *attributes*, and *states; the "things" that make up reality*.
   B. **Verb** - an action, process or state of being of an object.
   C. **Adjective** - a noun modifier provides an attribute of a noun.
   D. **Adverb** - a verb modifier that provides an attribute of an action or state or being.
   E. **Preposition** (full expression of a relationship).
   F. **Symbolic measurement** - numbers; the identification of differences between things that exist, usually placed along a spectrum.
2. **Syncategorematic concepts** -conceptual words that facilitate, streamline, and economize thought:
   A. **Conjunctions** - usually coordinate independent clauses (e.g., and, for, so, yet).
   B. **Articles** - usually a special case introduction to a noun, introducing whether the noun is particular (definite) or general (indefinite); in order to clarify what is in our mind we look at

general signatures (or pictures) and special pictures, we look at universals and particulars (e.g., the .. , a .. , an ..).

C. **Exclamatory interjections** - a word that extends a complete thought; followed by an exclamation point; the only words that stand by themselves as a complete thought or sentence.

To an inquiring consciousness, there are:

1. Things that consciousness can experience the existence of (e.g., objects).
2. Things that describe what exist (e.g., words).
3. Things that relate what exist (e.g., concepts).

There must exist agreement on grammar (both special and general) between communicating individuals otherwise it is impossible for there to exist any form of logic between individuals. Communication about the existence of objects comes after individuated consciousness has identified and verified an existent relationship for itself. A coherent communication system involves a much larger system that seeks to facilitate individuated consciousness in experientially verifying the truth of existence for itself, and in so doing it generates resonant realities. Some resonant realities are more "in-tune" with existence than others, and hence, involve more coherent communication between individuated forms of consciousness ... for they are "realizing" (resolving or rendering) greater unity.

Discussions that involve logic and understanding cannot move forward until both special and general grammar are defined and clarified between all participating parties, otherwise inherent (or intrinsic) confusion will exist as a property of the relationship. It is important to note that agreement on grammar need only exist during actual communication and that after its conclusion the communicating parties may revert back to their own individual grammar if that is their choice.

It is not "absolutist" to define your terms of language or general linguistic premises, it is a necessity for clear thought and communication. Engineers do not design lasting and safe structures out of confusion and contradiction, and critical thinkers do not develop accurate thinking skills, rational mental models, and coherent behavioral patterns out of confusion and contradiction. Definitions must be stated in advance of any communication, or accurate communication is unlikely to result - consciousness must synchronize and acknowledge communication (Read: SYN-ACK) between individuals to remain in information coherence [in a dynamic, material environment]. This is particularly important when morality is being asserted.

> **INSIGHT:** *The beginning of wisdom is the definition of terms. Definition - from all of the possible "you" are explaining what something actually is de-finiting, and not in-finiting.*

4.1.2 The logic stage

> **NOTE:** *Logic derives greater understanding by removing inconsistencies and contradictions.*

Logic is the process of thinking correctly and without contradiction, the art of logical integration and interaction. Logic answers the "why" of a subject through the reasoning of existence of non-contradictory relationships, which reveals a more systematic understanding of the subject under examination and in question. Whereas science depends on logic, and logic depends upon non-contradiction. Logic is essentially a tool used in many disciplines including philosophy, mathematics, and science. Therein, logic may be defined as the science of non-contradictory reasoning [by itself]. Science uses logic as a tool and is unable to function without it. In science, logic involves the discovery of order - a natural ordering function. And, logic is empty without science to check its premises. Logic is a part of science, of mathematics, and of philosophy, and it is ineffective and counterproductive to separate them (i.e., to separate logic from inquiry into that which is). The purpose of the logic stage is to more coherently relate identified conceptions, to self-check [for errors].

After a body-of-knowledge is gathered (through scientific inquiry) and properly arranged through general grammar, a truthful understanding of the topic or proposition is sought. When all of the stated contradictions have been removed from the proposition by subjecting it to logic (this work is called "a proof"), the proposition is said to be understood. When all of the relationships within the proposition are in concurrence and there remain no contradictions, then all of the statements within the proposition are related critical facts.

The methodical application of logic facilitates the alignment of subjective perception and personal understanding with objective reality.

The use of logic shifts the focus from mere facts to the understanding of relationships, which are discoverable and probabilistically assessable. Wherein, reason takes precedence in identifying critical assumptions, contradictions, logical fallacies and other inconsistencies. Logic facilitates consciousness in checking the accuracy of its grammar and minimizing the misinterpretation of incoming data [in its integration of sensory experience].

An individual consciousness makes contact with reality through its senses (i.e., bodily sense organs) - its "instruments of knowledge". Senses do not necessarily provide false information, it is instead consciousness' [mis]interpretation of the data that generates misleading and false information. The human mind can be affected by illness, by injury, and by illusions and belief to name just a few compounding factors. Sometimes sense data becomes distorted, and hence, consciousness requires a systematic way of looking at its own distortions (Read: contradictions) - logic in particular, and the trivium method in general provides for that.

Another word for the process of logic described herein is that of "dialectic". A dialectic is a method of argument or exposition that systematically weighs contradictory facts or ideas with a view to the resolution of their real or apparent contradictions - in order to ensure that one follows from the other - in order to generate a mental state of lower entropy (less confusion and chaos). It is the process of conducting an internal or external dialogue to reduce contradictions. It is the process of removing contradiction so that one thing follows from the other, which doesn't mean that it was necessarily caused by the other (Read: post hoc, ergo, proctor hoc).

The three critical laws of logic are:

1. **The law of identity** - that which occurs or has occurred can be individually identified to exist. It is possible to identify one object of many objects with a unique identity.
2. **The law of non-contradiction** - There exists discoverable information about the real world, such that contradictory statement about the real-world cannot both be true (accurate, factual) and false (inaccurate, unverified). A statement cannot be both true and false at the same time and in the same context; there are not contradictions or paradoxes in the real world. This principle forms the basis of logical consistency and coherence.
3. **The law of excluded middle (the bivalence principle)** - There exists discoverable information about the real world, such that a statement about the real world is either true (accurate, factual) or its negation is true (accurate, factual). A proposition must be either true or false, with no middle or third option. This principle is a fundamental principle in classical logic. This principle forms the basis of objective logic.
4. **The law of causality** - For all motion, there is some real-world cause. Every effect has a preceding cause or set of causes that brought it into existence.

A **fallacy** (i.e., logical fallacy) is an unreasonable argument or a mistake in argument involving incorrect or illogical reasoning, which are often employed for purposes of manipulation. A fallacy is an error (or manipulation) in reasoning in which the premises given for the conclusion do not provide the needed degree of support. Arguments are subject to a variety of fallacies. Having explicit knowledge of logic and the fallacies enables the identification of the exact type contradiction or falsehood in a circulating argument. There currently exist a known collection of logical fallacies and the number of logical fallacies may never be complete because there may always be more ways knowable to propagate falsehood and to generate contradiction. Fallacies are, in part, incorrect methods of logically thinking. Fallacies are seen as negative in logic because they represent errors or flaws in reasoning.

Possible failures of argumentative thinking include, but are not limited to:

1. Argument from tradition - "etymology shows the truth" (i.e., assuming ancestors knew more than they did).
2. Argument from democracy - if 50% + 1 person in a population thinks it is true, then it is true.
3. Argument from authority - an "expert" said, a "study" said (while assuming "expert" conveys perfect knowledge and assuming "studying" conveys capability).

Fallacious information can be intentional and unintentional. Notice that the root cause of unintentional fallacies is not starting from a recognized axiom and structuring factual data into greater knowledge, understanding, and wisdom. Additionally, it is unwise to assume that all possible ways of erring in reasoning have already been discovered, identified and understood. It seems that such an assumption would itself constitute a fallacy.

Fallacies are a red flag, but they are not necessarily the whole picture. Understanding the fallacies provides us with a nice warning or alarm system. The notification of a fallacy means that there is more investigation required in order to come to a valid and true conclusion. If the statement is in the form of a fallacy it doesn't mean that the statement is false. Perceptions develop into concepts, which are formed into propositions, which are then tested for validity. Herein, the definition of a thing is ultimately where truth resides, for a proposition is either true or false - what something is and not otherwise.

Language can be used to manipulate and plunder the self-worth and fulfillment of individuals. Language can be used to reveal and it can be used to conceal. Language contains logic if it is there to educate and it contains fallacies if applied to deceive.

The presentation of a contradiction to a discerning consciousness will likely generate an uneasy emotion in that consciousness, which must be "processed through". When contradictory information is integrated without coherent processing it will generate a static "traumatic / dramatic" emotion in the continuous rendering of consciousness. When contradictions are "given" to anyone (i.e., accepted and integrated without question), then they can significantly inhibit further critical thinking and potentially create a semi-permanent state of cognitive dissonance. It is essential for a consciousness that desires fulfillment to remove the contradiction from that which it is presented prior to integration into a working (Read: decisioning) information space.

When someone knows how the manipulation works it reduces or eliminates its effectiveness. In other words,

if someone can identify the specific fallacies being conveyed in manipulative statements, then they are less likely to succumb to the agenda of the manipulator. This is particularly true of those who have to some extent or another "inoculated" themselves against advertising and marketing, which in principle involves the fallacious manipulation of information to turn an "audience" into "consumers" of a desired business' product. It is important for one's very mental health to question declarative statements. Note here that there can be a double manipulation occurring. In other words, when someone experiences and notices manipulated information, that person may become more hardened in their original view because of the noticing of the manipulated information, which could be the manipulators original intent. In other words, the manipulator manipulates the information, the receiver notices the manipulation, the receiver then becomes more hardened in their view because of the noticing the manipulated information, which all along was the original intent of the manipulator (i.e., to harden the bias/view of the manipulated by putting out information that the manipulated would notice as being manipulated).

> *"The first principle [of effective reasoning] is that you must not fool yourself and you are the easiest person to fool."*
> *- Richard Feynman*

When you can look at an advertisement and see how the advertisement is attempting to manipulate you, it is helpful; it helps to reduce the effectiveness [of the manipulation tactic from pre-programmatically structuring the next iteration of your conscious state]. It is like watching a magician and knowing how the trick works. It just doesn't have the same effect anymore. But, some magicians are so good that when you are watching them, and even though you know what they are doing, it is still convincing (i.e., the advertisement is still insidiously influential). For instance, some advertisements are conducted like an informative and friendly interview. They are designed to appeal to someone's sense of "being informed", and therein, the sponsor's agenda slips into the observers mind through their fabricated feelings of self-development and resonance with the situation. And, make no mistake with years of scientific research into human manipulation behind them some advertisements are that good. We realize that all ads are all a form of propaganda. The purpose of advertising is to increase product sales. Advertising is paid propaganda no matter how it appears in its final form. It is possible to have contrived associations in "our" minds that are put there by competing entities entirely for their own benefit and for profit. Fundamentally, through advertising and marketing, people are looked upon as prey for a sale and salary.

Advertisements are paid for, in order to:

1. Cause people to remember a product (and think about it in future purchases).
2. Cause people to feel good about a product (engineering positive psychological responses to the products).
3. Familiarize and/or make people more comfortable with a product, idea or attitude.

Even when you are aware that you are being advertised to there may still be pervasive effects that slip in. And, if you ever catch yourself subconsciously repeating a marketing phrase or vision / image, then stop for a moment and realize that what you are experiencing is the effect of: experiencing advertising. The subconscious repetition of a market entity's message reinforces the message. Repetition can do incredibly useful and malignant things.

Marketing can be masked as news, scientific research, and it can be so subtle that it feels like "entertainment". Advertising doesn't just reflect a culture (as industry purports), it affects and normalizes attitudes, values, and behaviors (including unconscious behaviors).

From retail surveillance (gaining intelligence on "the customer") to scientific studies into addiction and human manipulation, there is an entire industry dedicated to making goods and services, foods in particular, more and more addictive and flavourful so that you will want more and more and buy more and more. That is the business of advertising and marketing. Chocolate chip intelligence is the level of intelligence in most of early 21st century society. The food industry is wrapping its crap in increasingly "green" and "soylent" looking packaging. Their business is to sell their products, never forget that. Advertising can build in false associations from early childhood, shifting and shaping perceptions, which then become maintained at the socio-economic, cultural-level. The business statements you see around you are a highly orchestrated and choreographed marketing extravaganza designed to encourage you to make purchasing choices that are most profitable for the store and their vendors - that's the business. When you see the wizard behind the curtain you are able to make different choices. And, it is also important to realize that we are hardwired to be vulnerable to some tactics, even when we are aware of them.

Common fallacies are categorized by their type, such as Ad Hominem (personal attack), and appeals to authority, belief, fear, ridicule, tradition, etc.

The word fallacy comes from Latin, wherein it means a trick, deceit, or lie. Yet, contradictions are either errors or lies. The ability to identify logical fallacies in the statements and arguments of others, and to avoid them in one's own is both valuable and assists in the discovery of truth, a reduction in error, and the inhibited spread of lies. If one can identify the fallacies one can start to identify the manipulation (intentional or otherwise). Here, we need to understand deception and historical biases so that we may come to understand some of those things that are limiting us.

The logical fallacies are a means of evaluating

information for contradiction. Fallacies are sometimes known as "conclusion loops" in that there is no basis for proof of the argument because the premise and conclusion of the argument loop into each other (i.e., represent a contradiction). Knowing the logical fallacies is like taking the red pill in the matrix and revealing the relationships that are known up to now to compose reality in a non-contradictory, and hence, non-paradoxical manner.

Logic is a way of tracing an argument or opinion or belief or relationship. It is a tool used by a critical mind in discerning where the argument begins (inputs), where it goes (processes), and where it concludes (outputs), how reliable or valid it is (feedback), and how it is applied to other incoming information for new creation (engineering). Logic is a system of reasoning, which in a virtual information system involves the encoding and decoding of the virtual information experience. Reason does more than go from premise to conclusion, it provides the potential for synchronization with some aspect of the real [world reality].

Logic is a [conceptually constructed] tool, a "construction". Logic is applied relative to a paradigmatic system of thought. In a social environment logic becomes the agreement among people to have a common denominator in the integration of new information and new relationships. It is the way to objective truth in our shared world. Yet, the internal logic of some structures is quite unhelpful in producing understanding. And still, it can ground objectivity reality in the inquiry into understanding and valid knowledge. It does not, however, give a person knowledge of absolute or divine truth, or give any satisfactory meaning and purpose to one's life. Logic is only a tool for discerning a closer approximation of truth.

The process of integration [by consciousness] cannot be feasibly deferred to someone else, to an "authority" -- if so, then it is not true integration, it is not learning.

Having knowledge and understanding of the world around us through the removal of the contradictions in our thoughts so that they're "not dissonant", focusable, "intellectually pure", reasonable, and rational is at the very least going to lead to less conflict in a community. Without logic applied systematically unreasonable, irrational, illogical, and contradiction-driven ideas may be the very things that give us the problems we face: greed, war, usury, slavery, injustice, etc., – all based in the irrational and illogical thoughts of those who wish to dominate others in the sole observance of the achievement of their needs over those common to all. Behaving in this manner is an indication that they do not recognize personal fulfillment reciprocally connected to social fulfillment as a logically existent relationship.

Someone who places logic before grammar might say, "Don't confuse me with facts, I have already made up my mind." False conclusions are reached when individuals go straight to why without first collecting data and asking who, what, when, and where. When someone puts their logic before their grammar they shut off the totality of their thinking process.

Individuals need the ability to connect to information (e.g., the senses; science), but we also need mechanics. Mechanics allows for intellectual integration and intellectual self-defense through the method of information processing known as critical thinking. The process (or mechanics) involves the identification and sorting of new information, the accurate integrate the new information, and then the new information model's optimal application and communication. This functional process may be metaphorically referred to as a "navigation tool", similar in function to a compass and gyroscope; mechanics are things that may help to keep one balanced and focused and adaptive to one's material and conceptual surroundings. To have this method is to have the freedom to continue the learning process [without or with reduced deceitful interference].

Thinking is the act of processing perceptions and applying logic to ensure one's conscious awareness remains in sync with that which exists. The inability to process our perceptions of reality into knowledge, understanding, and wisdom continues to cause many of the problems present in early 21st century society.

All humans have common sensory abilities (unless someone has a some severe disability). These senses are how we interface our mind with matter. We use language to connect through and between matter. The question then becomes, is your mind in synchronization with reality? If you bump into someone who is irrational, they might be dangerous to your mental health. If you bump into someone who is physically violent, they might be dangerous to your physical health. People who do not use logic, or further, those who deny that they use logic -- they can be irrational and dangerous. They carry mental viruses that it is wise to protect oneself from.

> **NOTE:** *Dissonance (conflict) in perception can lead to greater understanding if thinking is fluid (not stuck, static, or stagnantly skeptical).*

4.1.3 The rhetoric stage

> **INSIGHT:** *Observation, identification, organization, communication, and feedback are the individual steps through which individuals may come to learn, to decide, and to make useful tools.*

Grammar and logic are now integrated into *explanation*, *communication*, and *application*. This is also the stage in which new questions are asked of phenomena. Rhetoric is the *How* of a subject. A rhetor will ask, "How is the grammar and understanding of a subject best communicated and applied?" Holistic concepts, such as "best" and "optimal", are a critical component of coherency. They represent the most holistic form of consistency.

Inherent in the rhetoric stage is the proper choice of means and methods for cogently expressing the conclusions of the grammar and logic of a subject. Once

a body of knowledge has been grammatically arranged and a logical conclusion has been made from that arrangement, the choice of how best to communicate the conclusion to others must be considered, and in the process, the subject being examined usually comes into an even sharper focus to the rhetor. In part, rhetoric is the art of selecting the best means of communication from a set of known principles about coherent communication - wisdom in the communication of logical findings - context in communication (communication as a full-dimensional thought structure). After a body of knowledge has been grammatically arranged and a logical conclusion has been arrived at from that arrangement we come to a point where we have to make choices about the best way to communicate the integrated understandings to other individuals. In this process the presenter, the thinker, can gain an even better understanding of the subject matter through a thoughtful presentation, while reinforcing desired neural pathways. A comprehensive perspective is achieved during this stage - thus the truism, "you don't know it until you can explain it".

In the rhetoric stage conclusions that had been derived into *statements of rationale* [in the logic stage] become a set of instructions deduced from the rationale for the purpose of application and encoding (of those conclusions) in the real world. These formalized instructions are sometimes known as *statements of protocol*.

It can be all too easy to forget in one's communication with another being that there exists an essential sameness in the experience. Hence, for rhetoric (i.e., communication and action) to remain in valid alignment with existence it cannot become abstracted from compassion. In all communities there exists usefulness in 'compassionate communication', whose absence prevents constructive action. It is interesting that the global schooling system does not teach individuals the essence of communicating and how to really share themselves, clarify truth, and get their needs met, when it has much more to do with all forms of success in life on all levels than anything else that could be taught. This approach involves the fulfillment of needs for reasons that one won't regret later.

Rhetoric is another word for wisdom, it is systematically usable knowledge and understanding together, and it allows for value re-orientation. The trivium method is an open systems process, it is continuously repeated for purposes of clarity in orientation over time. If it is knowledge and understanding that someone cannot use in the real world, then it is not wisdom.

Humankind can apply the concept of ratio, which is the root of rational thought. By perceiving ratios in nature an individual can design an item in mind, and if it is valid and true, in accordance with that which is, s/he can produce that in material form (reification), s/he can create the ratio in material structure.

The art of rhetoric originates in ancient Greece where it was generally defined as the art of persuasion. There was an early Greek emphasis on rhetoric, and a misconception that a good speaker essentially had to be a good person. At the time few people asked, "How could someone who was so convincing and so persuasive, so eloquent, possibly be less than forthright in other ways?" Certainly, that misconception carries right up to the present day, where it still matters little what a "professional public speaker" is, as long as it sounds and looks good to the audience. As long as they build this crescendo that leads to people erupting into applause. People without the ability to respond with deep thought may potentially react in applause without deep thought.

The Greek word for wisdom is "sophía"; from which the term "sophistry" and "the sophists" originate. Sophistry is persuasively sophisticated rhetoric through plausible, but fallacious argumentation, not wisdom nor the idea of rhetoric conveyed herein. The sophists were a group of traveling teachers who would go around supposedly instilling wisdom (they were professional public speakers), but all they were really good at was sophisticated rhetoric - winning the argument through the confused contortion of logic, or the application of logic for which the audience is already attached and comfortable. And, if "you" paid them enough, they would reach any conclusions "you" like; kind of like lawyers and politicians in early 21st century society. Logic might have been complementary to the process and discipline of sophisticated rhetoric, but it wasn't until Plato and Aristotle that logic and rhetoric became intertwined in an important way.

One of the first thinkers that tried to provide some distinction between philosophy and sophism was a man named Isocrates. Isocrates wrote a piece called, "Against the Sophists" where he elaborated upon several criticisms that he had of what the sophists were doing. In "against the sophists" Isocrates claims that these people are essentially charlatans who were making promises upon which they could not deliver -- they claim to be much wiser than they actually were. Isocrates questions why they would demand payment up front if they were so wise and confident in their ability to teach virtue and justice. He asks why they would not simply take payment in one sum at the end. Isocrates points out that it is far easier to teach a person a few strategies of rhetorical trickery than it is teach the real, solid rules for filtering through to a greater approximation of truth and the communication of that truth through clear visual language.

Plato lived at approximately the same time as Isocrates, and he introduces the idea that if the goal of such teachings were truth and not just trickery, then rhetoric cannot exist independent of logic. It is also Plato who says that the sophists are just people who are telling others what they want to hear or saying to others things that sound impressive, but are not advancing knowledge in students or audiences, and in many cases, may be working against real knowledge, understanding, and wisdom - at worst providing a kind of counterfeit wisdom. Later, Aristotle reinforces Plato's idea essentially saying that true rhetoric is the counterpart of dialectic (i.e., logic)

-- the two must go together. Aristotle communicates this through what he referred to as the three appeals, as foundational requirements for persuasion: logos (rational); pathos (emotional); and ethos (ethical). If rhetoric is to have any practical use in life, then it must result from logical conclusions. The emotional and the ethical are the other two appeals to persuasion. Aristotle acknowledged that part of persuasion was being able to reach people on an emotional level where-after ethics becomes salient.

Instead of Plato's conception of persuasion as a form of uplifting communication, persuasion can be viewed as the desire to spread bias and belief through. Therein, the idea of persuasion is uni-dimensional (i.e., biased), and the idea of truthful inquiry is omni-dimensional (i.e., holistic). In other words, in the negative, persuasion is the manipulation of another for one's own self-centered gain, whereas truthful inquiry does not involve persuasion on anyone's part, but is instead the process of open inquiry and active integration on everyone's part (Read: everyone participating or otherwise communicating).

A connection is a communications conduit (or channel). Whether the communication is experienced either as a resonant symphony, or, as a disordered cacophony, depends on the ability of the participants to synchronize their information systems. Individuals in a community might choose to synchronize their information systems to an objective and common reality for their mutual fulfillment.

> *"The greatest obstacle to communication is the illusion that it has occurred."*
> *- Harri Kallio*

4.2 Conception

> **NOTE:** *The process of schema changing [to another pre-defined schema] is known as 'assimilation'; which, in and of itself, is a morally neutral concept.*

The first unit of information is the "concept". This is basically a category that groups together items with similar characteristics or properties. These are the building blocks that are used to create structured knowledge. Concepts can represent anything identifiable, such as objects, events, abstract ideas, relationships, or activities. A concept is a fundamental category of existence. To consciousness, a concept is a meaningful connection within awarenesses. When speaking of the idea of conception it is essential to provide a definition for the word, 'definition'. A definition is a limitation placed on the extent of usage of a word.

> *"What probably defines a thought more than anything else, and distinguishes it from other mental processes is that it is a construct made of concepts. For example, a small child comes across a door handle several times, until the pattern of it – its shape, its utility, its operation – is identified and the concept of a door knob is ingrained in her consciousness. The power of a concept, a mental pattern, to persist in physical reality accumulates with each iteration, each imprint of that concept. A thought is then an assembly of existing concepts, a mental model of a specific fraction of reality – what is commonly referred to as a thought-form." (Zoudros, 2013)*

In contemporary philosophy, there are at least three prevailing ways to understand what a concept is:

1. Mental representations: entities that exist in the mind (mental objects).
2. Abilities peculiar to cognitive agents (mental states).
3. Abstract objects, as opposed to mental objects and states (e.g., numbers, sets and propositions).

Concepts are [identifiable] building blocks, and the mind uses them to relate and to build. Concepts are put together to create propositions, which are units of meaning expressing a single idea. Come up with a sentence, any sentence -- this is a proposition. Truthful propositions that are related and linked create a network of knowledge and information that makes up a schema (or model). A schema is basically a mental model of what a mind expects from a particular encounter. Mental models are the inner representation [that embodied consciousness maintains] about how things work in the outer world. And, they affect how individuals and societies work with information and determine decisions.

Concepts are formed and/or constructed (i.e., conceptualization occurs) when consciousness isolates two or more similar identities from the rest of one's perceptual field, and integrates them into a single mental unit (an "identity"), symbolized by a word (or other symbol), by language. Concept formation is also sometimes known as "universal abstraction" (i.e., abstracting to a universal), the most fundamental [systems-] level of which might be referred to as an 'axiom'. To consciousness, concepts serve mental [processing] needs by maximizing cognitive economy.

A concept subsumes an unlimited number of instances (past, present, and future) which are similar to it. It is an identified, universal property of a system. Useful conceptualization requires thought on the part of consciousness. Conceptualizing the different aspects of self and of reality [by consciousness] can facilitate the integration of experience into wiser decisions.

Concepts organize perceptual material and are a mental representation that share a set of signature similarities, or characteristics, with objects and experiences in reality. That is, concepts refer, and what they refer to are perceptively identifiable categories in existence. Concepts can and cannot relate to things in reality. Conceptual similarity provides the foundation from which individuals might work together in common.

The objective theory of concepts states that definition is the final step of concept-formation. We do not begin forming concepts by first defining them and then looking for units which satisfy their definitions. This would be a

reversal: what would we be defining in such a case? It would be a concept without units, which is a contradiction in terms. And what gave rise to a concept without units?

The task of a concept is to "unite things that share an essential similarity". We form concepts for a purpose – to group like things into a mental unit which is open-ended in its scope of reference and distinguished by a definition for the purpose of identifying and integrating the objects we perceive. The process begins with perceptual awareness, and through the process of 'abstraction' we advance to a new level of awareness, conceptual awareness - the level which expands our awareness beyond the perceptual level. But, we do not begin the process of forming concepts with the process of supplying definitions. This step only comes after we have isolated and integrated units to inform the concept. Only then do we have something to define. Rand (1990:40) explains:

> *"A definition is a statement that identifies the nature of the units subsumed under a concept.*
>
> *It is often said that definitions state the meaning of words. This is true, but it is not exact. A word is merely a visual-auditory symbol used to represent a concept; a word has no meaning other than that of the concept it symbolizes, and the meaning of a concept consists of its units. It is not words, but concepts that man defines—by specifying their referents.*
>
> *The purpose of a definition is to distinguish a concept from all other concepts and thus to keep its units differentiated from all other existents.*
>
> *Since the definition of a concept is formulated in terms of other concepts, it enables man, not only to identify and retain a concept, but also to establish the relationships, the hierarchy, the integration of all his concepts and thus the integration of his knowledge. Definitions preserve, not the chronological order in which a given man may have learned concepts, but the logical order of their hierarchical interdependence.*
>
> *With certain significant exceptions, every concept can be defined and communicated in terms of other concepts. The exceptions are concepts referring to sensations, and metaphysical axioms."*

Here, Bahnsen Burner explains:

> *"Clearly then, before we can define a concept, we need the units which that concept subsumes, and we need to have formed the concept itself. Just as we do not "interpret" concrete objects like rocks or chairs (we interpret symbols, statements, facial expressions, etc.), we do not define the units which a concept subsumes, but rather the concept which subsumes a distinguished class of objects. Definitions make it possible to differentiate one concept from another. And since definitions of concepts consist of other concepts, definitions help us map out the hierarchical relationships in which concepts are contextually embedded." (Burner, 2013)*

Peikoff explains:

> *"If a concept is to be a device of cognition, it must be tied to reality. It must denote units that one has methodically isolated from all others… A definition cannot list all the characteristics of the units; such a catalogue would be too large to retain. Instead, a definition identifies a concept's units by specifying their essential characteristics. The "essential" characteristic(s) is the fundamental characteristic(s) which makes the units the kind of existents they are and differentiates them from all other known existents." (Peikoff, 1993:96-97)*
>
> *"The process by which concepts are formed involves isolating objects that are essentially similar and uniting them into a mental unit by means of measurement-omission. Measurement-omission is the principle that "omitted measurements must exist in some quantity, but may exist in any quantity." (Rand, 1990:18).*

It is clear from her writings that Rand (1990:28) recognized the implications her theory had for induction and deduction:

> *"Thus the process of forming and applying concepts contains the essential pattern of two fundamental methods of cognition: induction and deduction. The process of observing the facts of reality and of integrating them into concepts is, in essence a process of induction. The process of subsuming new instances under a known concept is, in essence, a process of deduction."*

Porter (1999:93) adds the following points:

> *"Induction produces universal knowledge from other knowledge, especially from particular knowledge. Concepts are universal knowledge. We do have some knowledge about people we don't know, about their ranges of shapes, heights and weights (but not about unknown and unconceptualized existents). We couldn't have this knowledge if we didn't distinguish those attributes from their measurements, within human ranges. Or if we didn't know there are human ranges. We couldn't do this without forming the concept "man", and we'd have this universal knowledge once we'd formed it. Forming concepts must somehow produce universal knowledge. It must be induction."*

Bahnsen Burner explains:

> *"The general point here is that just by forming a concept – since its reference is open-ended*

> *and inclusive of all units of a class of objects regardless of when or where they exist or how many there might ultimately be – is in essence an inductive process. We form concepts on the basis of only two or more units which we have observed, and yet the concept so formed includes all units of the same class even though we have not observed nearly all of them. This is an unprecedented power, an ability we should not take for granted [or give over to some authority]. To understand induction, we need to understand how the mind forms concepts." (Burner, 2013)*

Given these points, it would not be the case that all deductive arguments would consequently lose their strength given the supposition that all inductive inferences are necessarily less than certain. Inductive inferences which draw on information already included in a concept may in fact, given the nature of the particulars involved, lead to conclusions which are unassailably true.

We perceive the world, and thus, have awareness of objects as 'entities'. Thus, we can differentiate some objects from others. We can observe general similarities shared between some entities by differentiating them from everything else we perceive and integrate them into open-ended mental units using the process of measurement-omission. Thus, through the process of abstraction, we have universal knowledge based on perception of just a few objects. There is no need for this to be "revealed" to us, as though our minds did not have an ability that they clearly do have.

Fundamentally, it is experience, not faith, which is required to transform data and information found among society into knowledge and a more fulfilling value orientation - the objective evaluation of a subjective experience. If you think the previous sentence contains an oxymoron (that an objective evaluation of subjective experience is impossible), you probably have too narrow a definition of the word "objective". Results can be objectively measured even if the motivations, understanding, and intent (i.e., the underlying dynamics) that created those results are entirely subjective.

There are two primary conceptual categories by which consciousness interfaces with existent reality: objects in reality (i.e., objectively) and experiences in reality (i.e., subjectively). Objects in a common reality (i.e., in objective reality) may be commonly interfaced with, identified and explored. Objects are commonly identifiable and verifiable through common functional tools (i.e., the human senses and scientific measuring instruments). Experiences are individuated; they are subjectively experienced states of reality by individuated units of consciousness that may or may not represent that which has actually occurred in objective reality, in truth. Hence, it is important for us as individuals and as a community to attaching the right concepts to the objects and relationships in our environment so that we can apply (or "leverage") a truthful understanding of the world in our design decisions.

Experiences may, in fact, convey useful information about objective reality. When information gathered in an experience is openly inquired of and sought verification to objectively, then it may lead to deeper levels of knowledge and understanding of the real, common world.

In a real world information system, knowledge consists of concepts in some patterned (i.e., mirrored) relationship to objective existence, to data, and to that which has occurred (i.e., to truth). Knowledge is not composed of subjective experiences that have not undergone further inquiry to determine their validity and rational alignment with real world occurrences.

Subjective experiences must be themselves be "subject" to common and objective verification prior to their conceptual integration into a community's information structure about the real world. In other words, objective data must be collected on claimed conceptions from subjective experiences prior to the conceptions becoming claims to information.

Once we begin forming concepts on the basis of object-oriented perceptual input, we are identifying the evidences of the senses in conceptual form, which means: we now have a process by which we can categorize specific entities and features (i.e., concrete objects), which we observe, in the form of stable, open-ended classifications. These classifications (or concepts) are formed ultimately on the basis of what we perceive, but include a potential infinity (quantity-wise) of units that we have not perceived (and may never perceive). The concept 'human', for example, includes not only those men and women whom we have actually observed first-hand, but every human who exists now, who existed in the past, and who will exist in the future, however many that sum total may be.

If a claim to knowledge is to be accepted and integrated into the knowledge structure of an individual or community, then logic requires the presentation of evidence that is objective in its nature. Objective evidence is rationally distinguishable from something one may merely be imagining. For a claim to be objective it must have a commonly perceivable referring object in natural existence. Rational inquiry and investigation is required to support a claim to knowledge.

To say that there is "no objective truth" is to say there is no way with verifiable certainty to know of that which has occurred, to know of truth. The fact[ual] reality is that we have knowledge of our world, which has formed a global telecommunications system - this is some pretty good indication that truth exists, and that we can come to know it, and through knowing it we can design more fulfilling systems.

Many concepts correspond to lexical or encyclopedic entries, such as the English word "flashlight". Concepts are centrally involved in communication. Language is the exclusive domain and tool of concepts. Fundamentally, an individual's ability to abstract and to precisely communicate those abstractions is reduced without a

concise and coherently shared conceptual language. Consequently, the confusion and deterioration of a language leads to the degradation of the intellectual reasoning capability in those who use the language, for their conceptual structures will have entered into higher states information entropy (i.e., greater disorder and alignment with objective reality). Language shapes the way we think, and this has been well demonstrated. Semantic and syntactical confusion leads to confusion in ones thinking and behavior. There are many excellent works on this topic, including one of the most well known, "The Tyranny of Words" by Stuart Chase.

The systematic process of behavioral adaptation to environmental change is based on two complementary mental processes: assimilation and accommodation. First, the new experience is interpreted and integrated (or assimilated) in terms of the current model of understanding things (i.e. the 'cognitive level'); and second, thinking is modified to 'accommodate' those features of the experience which cannot be explained by the same cognitive level. Assimilation and accommodation are complementary aspects of all psychological activity involved in understanding the changing environment. As a result of this continuous dynamic "equilibration", behaviour is modified in a process of adaptation which involves greater balance between the individual and the environment through the updating of its knowledge systems. Each new situation (context) causes imbalance, which is corrected in the overall process of adaptation. Accommodation depends on meaningful learning being encoded into some long-term storage or memory for future assimilation and accommodation.

The idea of a "concept" maintains two broad functions: categorization (+ degree) and ordered (+ degree). Categorization is the process by which mental representations (concepts) determine whether some entity is a member of a category. Categorization enables a wide variety of subordinate functions because classifying something as a category member allows for the informing of a new instance. The categorization of novel entities has the potential to lead to knowledge that may be used for understanding and prediction in objective reality. Recognizing a cylindrical object as a flashlight allows you to understand its parts, trace its functions, and predict its behavior, which is useful under conditions of darkness. Not only do people categorize in order to understand new entities, but they also use the new entities to modify and update their concepts. In other words, categorization facilitates integration.

When Aristotle used the word 'concept' he intended it to solely mean abstraction. By abstraction, he meant a special focus on the similarities among things (i.e., categorization), while ignoring or not specifying the magnitudes of their differences. With humankind's greater understanding of the methods of science and our technological tools we can continue to recognize similarities while we measure and calculate their relationships and the magnitudes of their probable difference. This is particularly possible with instrument sense data coming in from our scientific and technical measuring tools, which Aristotle wasn't privy to. Scientific evidence allows us to refine our conceptions of reality so that they are more aligned with reality. Measurements between concepts that concern the functioning of our society no longer have to be omitted. In fact, scientists have become so adept at measuring the referents to their conceptual variables that concept and measurement are isomorphic in the physical sciences -- an electron is not a theoretical construct, but a very real thing.

However, the inception of a concept initially requires measurement omission. Simply, a concept is a mental integration of two or more units or two or more identical groups of units possessing the same distinguishing characteristic. Concept formation involves the omission of some (and, in the case of highly abstract concepts like consciousness, the vast majority) of information about the units it refers to. In that sense, concepts are clearly different from the physical units subsumed under them (which tend to have all their characteristics intact and in perfect condition, at all times, irrespective of whether they are deemed "essential" or not).

It is important to understand how humans have the potential of going through a process of encountering something new, distilling it down to its premises and perceptual signatures, synthesizing the identities and integrating them in a non-contradictory manner into an emergent information structure.

In a community where individuals are fully versed in the understandings presented here, then an individual would never have to engage in a wholesale clarification of his or her knowledge, for s/he would be performing the processes of logical analysis and synthesis continuously. The process of integration would not integrate information in a fractured manner. Any serious interruption in integration must eventually result in a wholesale re-clarification of one's model of reality. This is particularly the case if the individual seeks to once again orient toward truthful fulfillment. In such a community everyone would be facilitated in their acquisition and usage of this methodical framework of thought gradually from childhood as they were developing. They would not have to face years of remedial work in order to undo years of conceptual chaos. And, metaphorically speaking, the deeper the conceptual rut (belief) the harder it becomes openly decide to step out of it. When all these random chaotic things are rambling around it someone's head it makes it more difficult for them to solve problems.

Removing prejudice is seeing things as they are. When individuals have the tools [to see and integrate reality as it is] habituated at a young age, then they wouldn't have to identify then they wouldn't have to go through a whole-scale re-clarification of their thinking process, which can be a significant self-challenge.

Consciousness is in charge of the conceptual level of thought, and it can be used effectively to reflect on what nature is giving [expressed] awareness, from which consciousness can generate its own fulfillment. Herein,

concepts become abstractions, as separate from the existent to which they are intended to reference. Once "you" begin forming concepts, you can create more concepts (i.e., we can abstract way from the existent, to the point that the conceptual idea being reference has no possible, actual referential existence). Yet, we are still learning and doing through concepts.

Here, the power of our "abstract mind" is the building of abstraction from other abstractions. New concepts from already devised concepts. An individual then takes a number of concepts and integrates them into a model. Then, individuated consciousness tests itself (and its models) in reality. In order to verify one's orientation one must always test that which has been identified and perceived; while repeating the process of forming new concepts from previously established concepts. The formation of concepts represents the potential of bringing us into, or out of, greater alignment with reality. To "abstract" is to create a concept. Accurate abstractions are formed from the evidence we perceive of a tangible reality. The concepts in mind must "match up" with the real world if they are to have any use in orienting toward ever more fulfilling states of reality.

By asking a question, a concept is formed. Then, consciousness relates concepts to one another in a proposition form. Propositions become more coherent through argument and scientific testing, building into reasoning itself. To "reason" is to compare and contrast, pattern match things in reality. Abstractions can be analyzed, synthesized, and patterned (i.e., matched in a spectral matrix of patterns).

4.3 Reason

> **NOTE:** *When individuals want to discuss things rationally, then they bring themselves into the commons. All individual, rational beings have the potential for seeing and processing the commons in common. This is only rational.*

In objectivism, that which is known as 'reason' is defined as the means by which individuated consciousness learns about the world, about one self, and one's needs. Thus, human knowledge - all human knowledge - is a result of a process that extends from perceptual observation through logical inference. Reason is one of humanity's survival tools, and the process of logic is not the "cold, calculating dead hand of reason", but instead enables one to live a life aligned with the real world, some might say, part of the virtue of integrity and honesty in a community. So, if humans reject reason, if they reject non-contradictory identification and logical integration (i.e., critical systems thinking), then what are they left with other than feelings (subjective affective states), political statements (subjective opinions), and prophets (subjective authorities). Things like these cannot be logically integrated into a conceptual and logical model of the real world – they are "disconnects". When societies are structured upon these disconnected concepts they are likely to lead to social and economic systems that thwart real world fulfillment. In other words, their encoding into the social and economic structures of a society (into markets, politics, and leaders) has the consequence of creating an environment where inherently insufficient fulfillment leads to the generation of corrosive behaviors that even further inhibit or degrade fulfillment.

Humankind gains knowledge [at least] by perceiving reality with its five senses, forming concepts and principles on the basis of what is perceived, checking ideas for consistency with reality, and correcting any contradictions discovered in the thinking processes (i.e., cognitive adaptation to lower states of entropy). Reason is how those in humankind who follow the scientific method and its ancillary processes discover facts about the world, from the principles of biomimicry to the existence of probability waves to the structure of biological life, DNA; it is how inventors and engineers design life-enhancing machines and devices, from automobiles (locomotion that provides a larger decision space to a community) to heart pumps (extension of the quality of life) to mp3 players (extension of the quality of communication); it is the potential for collaboratively creating a socio-economic system to fulfill all known human needs in a community while sustaining a regenerative environment and reducing the presence of environments that generate personally and socially corrosive states of being, doing and having.

Reason gets you from premises to conclusions. It doesn't tell you which premises are accurate and it only works in deductive arguments. Inductive arguments always have a degree of uncertainty to them.

> **INSIGHT:** *Reality includes human experience, but human experience may not align with reality (as in, the commonly objective and existent real world reality). Neither experience nor existence is illusory. What we call a map is actually the territory relating to itself recursively -- there is only territory. Even if the map is incorrect, it is still part of the territory at some level. To accurately orient, maps must be changed to match the territory. Yet, even if people have concepts in their minds utterly disconnected from reality, then those disconnected concepts are still part of the territory and part of existence - their structure is accountable for by the whole system. And, there is a correct map for human fulfillment somewhere in the territory.*

4.4 Critical thinking and philosophy

A.k.a., Cognitics.

Practically speaking, critical thinking is thinking through what "you" accept and what "you" do. Critical thinking requires a sufficiently open mind (i.e., a mind that is sufficiently unattached to currently accepted information sets that is able, in a timely manner, to accept new information and modify existing information. More simply, critical thinking is a process (or set of processes) used to determine whether or not what "you" are

thinking about is true or not.

To make a truth claim while simultaneously denying that truth exists.

1. If, there is no acceptance of the existent usefulness of the concept of:
   A. Either, the concept of truth.
   B. Or, the concept of degrees of truth (i.e., probability).
2. Then, there is a truth claim while simultaneously existing a denial (or negation of) truth claim -- there is the negation of logic itself, or more precisely, a negation of a commonly logical relationship to the real world. More colloquially, there is intellectual dishonesty.
3. And thus, there is no ability to accurately orient [socially] in an optimally objective direction.

NOTE: *Other common words (i.e., synonyms) for 'truth' are: Real, fact, objective, "is the case", "commonly experienced/-able".*

Some social configurations hide the "light of truth" by substituting the absolute conditions of human need with the aspirations of power and profit, triggering possessive [survival] instincts. In this way, human wants became human needs, and as they were unique to him/her they also became one's identity. Society then progressed with humans fight over possession in absence of necessity.

Philosophy is the integration of information toward an ever increasingly accurate understanding and action in the [real] world, and it requires the usage of the concept of 'truth'. It could be said that philosophy is the search for a global optimum modeling function:

1. What exists?
2. What can be known about what exists (a discovery/search function)?
3. What is the nature of truth about what exists (an order/sort function)?
4. What is the nature of creation using what exists (a construction function using what exists)?
   A. **Rational cognitics** - an explanatory system for a world with meanings.
      1. **Ontology (concept visualization structure science)** - the logic (and study) of the structure of what exists. Ontology is the logic about (i.e., figuring out what concepts and associations) are important, and mapping them out, in order to explore a particular direction. Can "I" visualize and explain what I know?
      2. **Epistemology (knowledge confidence structure science)** - the logic (and study) of knowing what exists. How do "I" know what I know? How confident am "I" about what I know?
         i. A significant epistemological question is: What is the [strength of the] confidence in the statement (claim, belief, etc.) as related to the evidence in support of it, applied recursively.
   B. **Rational physics (object visualization science)** - an explanatory visual and conceptually descriptive system for a world with objects.
   C. **Experimental physics (test evidence science)** - a testable, statistical system for a world with quantities and qualities.
   D. **Ethics/morality (socio-technical science)** - a proscriptive socio-technical system for what is most likely to lead individuals and the social toward greats fulfillment, well-being, and ecological restoration. What should "I" do, what should "we" do? Ethics/morality refers to orienting the resolution of a state decisioning (possibly with conflicting interest) under conditions of shared purpose. To share a purpose with others in society for the betterment of all.

There is an existence beyond that subjective that can be commonly known and operated within by individual consciousness - there exists and objective (common) and subjective (individual consciousness) world; a 'real world'. This real world can be known, and is known with some degree of accuracy (i.e., probability). An individual and social population can share information on how it operates, and how we (the individuals among a social) can best operate within it.

If there are no facts, then there is no truth, no real-world, and no objects. If there are no facts, then there is no history and no science. And, there is no real news, only interpretations about news. And if there are no facts, then how do we explain the truth of conditional (i.e., contingent) true sentences, such as, "The dog is on the mat."?

STATEMENT: *It makes "your" ability to determine what is optimal for your fulfillment in any given situation difficult.*

"The book is against the wall", is a 'true' contingent sentence. Thus,

1. How does someone know that it is 'true', except by seeing (or otherwise sense perceiving, observing, experiencing) that the book is against the wall?
2. What is this seeing (experiencing, feeling) if not the seeing of a 'fact', where a 'fact' is not a 'true' proposition, but the truth-maker (i.e., subjective claim) of a true proposition?

This seeing of a fact is not the seeing of a book (by itself), nor of a wall (by itself), nor of the pair of these two [physical] objects, nor of a relation (by itself). The seeing

of a fact is the *seeing* of a book's standing (existing) in the [geometric] relationship of being against (Read: a type of logical relationship) a wall. Some people say, that the seeing of a fact is the "seeing/sensing of a [truth-making] fact". If facts/truth exist, then there is a category of information (i.e., categorical inventory) that composes information with some knowable relationship to a commonly experienceable (i.e., experienceable with everyone with the sense to experience) existence, a real, factual, objective [at least] world. The relation, however, is not visible, as are the table and the wall. So how can the fact be visible, as it apparently must be if I am to be able to see (literally, with my eyes) that the table is against the wall? That is our problem.

Let "023" symbolize a contingent relational truth about observables, such as, "The table is against the wall". It is then possible to setup a problem:

1. If one knows that "023", then one knows this by seeing that "023". The table against the wall can be pointed to.
2. To see that "023" is to see a fact.
3. To see a fact is to see all its constituents (i.e., all that it is composed of). A table object against a wall object.

Facts are claims about observable, experiential things. At a higher level, facts are an information category useful for decisioning within a feedback system (in a real, commonly experiential world). If there are no facts about observable things, then it is reasonable to hold that there are no facts at all. The real world is conceivable as objects and relationships in a situational environment.

4.4.1 Assuming facts and results

Logic and set theory can be used to "prove" facts. Logic set theory start with:

1. $\neg(A \cap B) \equiv \neg A \cup \neg B$
2. 2. $\neg(A \cup B) \equiv \neg A \cap \neg B$
3. $A \Longrightarrow B, \neg A \Longrightarrow \neg B$

If there is a desired result (an outcome), then there must be facts.

1. If *facts*, then *result*.
   - facts ⟹ result
2. It is impossible that there are *facts* and no *result*.
   - ¬(facts∧¬result)
3. There are no *facts* or there is *result*.
   - ¬facts∨result

Thus,

1. Ultimate facts ⟹ result
   - Ultimate facts ⊂ result

If there is no result (no set outcome), then there are no facts.

1. If there are no *facts*, then there is no *result*.
   - ¬facts⟹¬result
2. It is impossible that there are not *facts* but *result*.
   - ¬(¬ facts∧result)
3. There are *facts* or there is no *result*.
   - facts∨ ¬ result

Thus,

1. If there are *facts* and only then there is *result*.
   - facts⇔result

All engineered systems have a result (or, are a result), and therefore, there must be facts to inform the result. Solutions to real world problems are based on real world knowledge (facts). It is from this knowledge ("facts") database that technical (engineering, InterSystem Team) solutions are developed and applied at the level of the local habitat service [city] system.

4.4.2 Assuming no facts

If there are no facts, then everything is subjective-interpretation (opinion), upon which no thing can be safely engineered. If there are no facts, then there is no possibility of accounting for real world events. If there are no facts, then what anybody says is as valuable/useful as what anybody else says. If there are no facts, then when organizing society, humans are likely to fall back on "might makes right".

4.4.3 Assuming truth

What is truth?

1. In community, that which is truth is:
   A. That which best matches the objective reality. In other words, what is true is that which best matches external reality.
      1. People's experience of the same reality, wherein, only their interpretation is it different.
2. For local rational conversation, that which is truth is
   A. People creating words and defining their meaning.
3. In an authoritarian environment, that which is truth is:
   A. The opinions and beliefs of people, particularly people with authority.
4. In the market, that which is truth is:
   A. A strong belief.
5. In the public sphere, that which is truth is:
   A. That which everyone agrees to it.

4.5 Contradiction in integration

> *"For if you [the rulers] suffer your people to be ill-educated, and their manners to be corrupted from their infancy, and then punish them for those crimes to which their first education disposed them, what else is to be concluded from this, but that you first make thieves [criminals] and then punish them."*
> *-Sir Thomas Moore (1478-1535), Utopia, Book 1*

When conceptual understandings are adopted and integrate without conscious thought then there is a high likelihood that undesirable concepts will slip into someone's habitual thinking processes and pollute their entire information system, causing them to act in some higher degree of dis-alignment with the fulfillment of their needs. To reach higher states of fulfillment it is necessary to question new concepts, to re-evaluate concepts, to update them, and to inquire into the contradictions between them. People are often willing and do integrate a whole litany of things that have nothing to do with an alignment with existent reality. These "disconnects" (or disconnected things) take root in their mind and warp their perceptual and conceptual alignment with reality, and hence, their behaviors to others in reality.

As a community, we do not integrate into our knowledge structures ideas that are contradictory and opposed to the facts of reality, or have not been sufficiently verified, for if we ever do then our community would begin a path opposing our well-being and our lives on a planet that functions in a particular, fact[ual] manner. We would essentially be put on a path that risks our very survival; for we will no longer be tracking the reality we exist within and which maintains our existence. In other words, we would no longer perceive the truth of reality with great frequency, frequently - we would have a "lower vibrational" alignment with the existent reality in which we have real needs.

Humans appear to have a natural propensity to seek the removal of contradictory understandings from their minds. Long practicing thinkers will tell you how in deep states of meditation, contradictions that one unknowingly held, were revealed for their true and identifiable and relatable nature – maybe the mind naturally performs some form of logical defragmenting and clean up when experiencing a conducive "mentation" state. Some of us need to rearranging things in our mind so we can think more coherently, more simply and effectively. And, there are tools effective for this process: meditation; systems thinking; critical thinking; and analytic thinking; ayahuasca.

If someone is having difficulty arriving at solutions to problems with a cause, then it might be wise of them to re-evaluate their knowledge map of the world for they may have integrated concepts in a conflicting (incoherent) manner and generated claimed "knowledge" that conflicts with the factual, technical principles of the real world. They may have accepted traumatic programming. Arbitrary concepts and knowledge are highly likely to corrupt someone's information model of the world, reducing their decision space for fulfillment to a subset of the space needed to understand and solve the problem.

How is someone to know if s/he is contradicting herself at a given time and in any given moment? Since human awareness is finite and limited, how is s/he to know whether some proposal or idea, which may sound plausible, is consistent with what s/he already accepts, since her mind cannot compare old contents and new in a flash of synaptic incite. Since it cannot hold in a single frame of awareness all of her relevant former ideas and a new item being considered. There is only one apparent alternative. Humans must work to integrate new ideas. A conceptual consciousness as an integrating mechanism demands the integration of all its contents. One movement at a time she must relate a new item to her previously accepted items and ideas. To the extent of her knowledge s/he must search for aspects, presuppositions, patterns, implications and applications of the new idea that bear on her previous understandings. And s/he must identify explicitly the logical relationships s/he discovers. If s/he finds a contradiction anywhere s/he must elucidate it on the basis of available evidence. And, if evidence isn't sufficient then she might activate a 'perceptual inquiry protocol' to gather or discover more data. On this basis, s/he must amend her former views, defer, or reject the new claim. As a community, we must do the same with our information systems. Concepts must be integrated at a community level through common semantics, syntactics, symbols, and systems.

In the social information system of the Community, when contradiction appears or ideas present the necessary discovery of new information, the Data Domain is activated to acquire more data to fill in the knowledge gap in the Knowledge Domain for the community in common.

The opposite of the process of integration is exemplified by the "concrete bound mentality", which is a label for someone who establishes no relationships among his mental concepts. To him or her a new issue is a new concrete, unrelated to that which came before, to principles, or to any systematic context. To him, the context that would reveal the absurdity of the new idea is itself unreal. He does not integrate his mental contents, or only integrates within an arbitrary space or compartment. Herein lies the realm of what is known as 'mental compartmentalization', which is induced [by at least "schooling"] and is highly prevalent in early 21st century society. The compartmentalization of concepts and knowledge prevents optimal movements toward the fulfillment of a unifying set of needs in the real world. Early 21st century society is composed of so-called "sovereign" entities who desire acquisition from others, and who believe and work in the cult of the corporate-nation-states, the business.

Some thrifty people even invent contexts that don't

actually exist in reality to give the illusion of rightness to their behaviors and claims. Instead of using their imagination to envision a better world, they use their imagination to fill in gaps in between beliefs.

The type of non-integration being discussed here is known as "compartmentalization". A mind that compartmentalizes does not examine the total implications for the integration of an idea. It is a form of mind that does not question the ramifications of an economic system to all the domains of a society. It is a type of mind that does not perceive the existence of behaviors in a human society as connected to the social organization of a society. It is a "mental system" out of unified and integral alignment with reality. Such a mind often relegates the thinking about these things the domain of another, regularly called an "authority".

Compartmentalization [in part] involves a dis-orienting form of specialization. It consists not merely of specialization, but in regarding a specialty as a dissociated fiefdom unrelated to the rest of knowledge. Therein, integration is not the systematic specialization of emergent functions in structural organization for the overall benefit of the whole. Compartmentalization disregards the fact[ual] idea that all knowledge about a common interconnected system, which exists and is experienced, is itself interconnected. To cut off a single field, any field from the rest of cognition and from reality is to drop the vast [systems] context, which makes that field possible and anchors it to reality. One might perceive the anchors as our belief systems, the ultimate product of which become articles (constitutions and other declarations) of faith and dogma that reduce the progression of independent thought. And there, the ultimate result, as with any failure of integration, because ultimately some concepts cannot be integrated, is "floating abstractions", self-contradiction, cognitive dissonance, discontinuous thinking, and systemic social problems: a world out of context. A world where collective concepts that do not originate from the real world, filter our experience and become encoded in the systems that we "hope" and have "faith" will make us "peaceful" and "happy" people.

When logical errors (i.e., fallacies) go unrecognized they disrupt the ability to integrate and logically infer in an optimal and coherent manner. The "confirmation bias fallacy" is a 'cognitive bias' and it occurs when someone does not accept new factual information for the reason that it conflicts with old, pre-existing information. If integration, introspection, and unlearning skills are not possessed by someone, then this cognitive bias is not likely to be recognized when it occurs. To understand reality consciousness must "override" cognitive biases, something that can be exceptionally challenging to do. And, for someone to have the opportunity to do so there cannot be punishment for failure in learning, ever.

When we are more coherent in mind we are more likely to be coherent in our communication, and vice versa. We have mind and matter. We have things that exist, and then we have knowledge about things that exist, and it seems that we need a process to integrate mind and matter. This is known as logic. Logic is a process by which a human being synchronizes its mind with reality [without integrating information into isolation (in isolated ways) so that self-realities don't interfere with the common-self-reality, or what is in the real world].

Objectivity and subjectivity only make sense as concepts in their relationship to one another. They are in essence, polar ends of a contextual spectrum. Objective thinking takes place in reality, and involves existence, consciousness, and identity. At the other end of the spectrum lies the pure subjective experience as all of reality. At the pure subjective end, consciousness experiences itself AND the separation of identity does not exist IN existence. In other words, there is no commonly identifiable existence, there is no individuated consciousness. Objectivity may be defined as the minds ability to relate to an identifiable, collectively shared, reality. The subjective experiences of consciousness about a common reality can be objectively made known through logic, language, and verification. In objective reality humans are cooperatively creating structures known as technologies within a shared material experience. Herein, 'objective concepts' are concepts that correlate with reality, synchronizing with the real world.

Identifications must be made explicit in order to step back and comprehend systematic relationships. There is a complexity of information that must be understood individually to "get the big picture" and to resolve the "big issues". Complex systems must be approached with complexity.

The very idea of knowledge relates to the existence of a common reality and to identity in that common reality. Knowledge presupposes identities - that there is a foundation to that which we are trying to describe through language. Knowledge and truth are based on the fact that existence does exist; that things cannot be in the same space, at the same time, and in the same respect. A cup isn't a lizard. If things in reality didn't have an identifiably separable nature (or existent signature), then there would be no such thing as car accidents because all cars and people could occupy the same space at the same time. In some discoverable sense, nature doesn't have contradiction.

And, our knowledge of what is true changes and becomes updated and optimized as we go through time (Δt, state change), and gather more facts that we didn't previously have access to. Herein, our knowledge of truth itself is always evolving, which does not mean that what was the old truth is now the new truth; it just means that we have an updated and more whole grasp of what is true (if we were accurately integrating the whole time). A "contradiction" would be an apparent break in the signature identity in existence. The following would be an example of such a break: when a wooden object formed into the structure of a functional table could be a biological lizard at the same time and in the same respect.

There is a critical thinking method known as the Dialectic Method. In process, it "argues" all sides of a philosophic argument while discovering and introducing evidence to the point that there is no longer any "argument" [between those who are openly inquiring]. The method applies logical reasoning to the generation of a semantic and syntactic unification of the argument. And yet, a philosophic argument doesn't just involve argumentation with others, but it involves argumentation within one's own mind (i.e., dialectic or omnilectic [all sides] - internal, external, and all perspectives; spectral thought). We all have the potential of thinking systematically.

In a very general sense, the dialectic method involves:

1. Identify all known information about the matter to be considered.
2. Identify and define abstract or ambiguous terminology and concepts.
3. Acknowledge the existence of apparent contradiction, paradox, and nuance.
4. Acquire new information.
5. Repeat steps 1, 2, 3, 4 while also moving to step 6.
6. Determine commonalities and points of connection.
7. Generate the most coherent model of the matter in light of information gleaned through elucidation of both paradox and connection.

The idea of "debating" is a futile effort, and it may be contrasted with directed inquiry and philosophic discovery. A debate is a game with gaming strategies that have been renamed in their lexicon as "debating strategies and tactics". Debating tactics involve the application of sophisticated fallacious arguments and logically de-contextualized statements in order to win the debate. Debating is a characteristic of a political system, not a philosophic one.

Those with intelligence do not reduce themselves to a Cartesian point on a graph, at a single moment in time. When reduced to an anonymous point, singular nothing-of-sorts, a mind can be easily manipulated to suit the needs of whatever corrupt regime is in power at the moment. It is a mind calculating the experience of selective consciousness limitation.

In a topological version of mind the mind is modeled in-time. The mind-in-time models the complexity and ordered-coursing of a mind over time. So, over time it occupies a greater mind space (or "dimension") through a finer, ordered integration of thought. A reduced mind-space occurs when some distortion or disruption reduces the mind's progressively ordered connectedness, its larger context. Over time, such disruptions can be seen as shrinking the dimensions of a mind during the given period. By consequence, a less connected mental space generates a smaller decision space. A well-integrated mind suffers fewer disruptions; herein, a well-adjusted mind seeks greater refinement--a finer, larger coursing of information over time. It retraces the development of its thought and re-analyzes. It integrates observations with as much of its past and future context as it can reference. It either picks up key strands of earlier thought to further correct and develop them, or it suffers a loss of mind space [and decision space] over time.

4.6 Philosophy

> **APHORISM:** *Through philosophy we can come to de-mystify the truth. Philosophers see no authority beyond the open inquiry for greater states of truth.*

The nominal definition (i.e., definition in name only) of the term 'philosophy' comes from two Greek concepts, philos (the love of) + sofia (wisdom); so the "love of wisdom" is essentially what philosophy concerns. It involves studying and coming to know the aspects of our mind and of reality for the love of doing so for oneself. As a field of study, philosophy is the general study of real world problems, such as those connected with existence, knowledge, values, reason, the mind, fulfillment, and language. It is distinguished from other ways of addressing such problems by its critical, generally systematic approach and its reliance on 'rational argument', and in more modern times, visualization. As a process, philosophy starts with the habit of asking questions about declarative sentences; for declarative sentences are conclusions, are potential beliefs and judgments, and are decisions. They are encoded within human systems, they can affect behaviors and they are capable of being spread. Instead of just passively accepting the claims of others, philosophy engages a framework of conceptual activities that are designed to break down, synthesize and communicate matters under inquiry in greater alignment with the truth and the real world. Hence, a "philosopher" desires to know how a conclusion (a why explanation) was arrived at; otherwise knowledge is just a case of "because I say so" or "because the authority said so". As a conceptual framework, philosophy activates the ability to recognize patterns and to communicate those patterns for more accurate action. Some even go so far as to say that "the only true philosophy is that of self-exploration and inquiry, which need not even be called a philosophy". Philosophy could also be said to be the continuous inquiry into that which is "universal".

If philosophy were said to have a goal, then it might be to align perception with that which is already there, that which has occurred (i.e., truth). Wherein, conflicts in perception present a potential opportunity for greater philosophical understanding. Yet, information and its integration can quite easily become "truncated".

Practically speaking, philosophy is the search for truth through integration, which becomes a thoughtfully constructed and explained set of perceptions, beliefs, values, conclusions, and practices that are (1) directed toward understanding the nature of reality and

existence, and (2) offer a set perspectives and guidelines regarding how individuals make sense of existence, determine what gives meaning and direction to life, what goals to strive for, how best to act and operate, and how best to navigate through the conditions of existence they encounter. Notice here that no institution exists regarding implementation.

Let us all start on our way toward developing an autonomously inquisitive philosophy, which is something we refine and use every day of our lives. As individuals, we can share knowledge, but we cannot share the task of thinking for ourselves. And, it is due to the three axioms of a non-contradictory philosophy that we can all communicate, share our observations, think for ourselves, and slowly embody the change we want to be in the world.

In an objective philosophy a common reality really exists (metaphysical realism) and individual consciousness can come to know and identify with reality through perceptual sensation. This is an inherent principle in philosophy. Reality is experienced through perception, which contains descriptive information. Reality doesn't exist "beyond" perception; it interfaces with the perception of consciousness. Some interfaces are more "clear" and less "attached" to mental constructions than others. In order to perceive, there must be some interface or connection, some relationship between the subjective experience of consciousness and the objective experience of an existent common reality. If there was no interface then what would anyone be perceiving?

Reality is not dependent upon humankind for its existence. It exists in nature independently from humanity. Existence has a basis in reality, and is a component of truth. It is inherent to the system we exist within and are conscious of. Existence is not caused by humanity or any one individual. There is a real world and we can at least know it with some sort of probabilistic, statistical certainty.

Reality involves [at least] a system of discoverable technical principles, as conditions that exists, that are both binding (they have an effect, not dependent upon belief), and immutable no matter what someone does, that effect cannot be changed, that condition is there and it is there because "creation" or some larger system put it there. And, humankind is not in a position to change their effects. They are existing conditions that are both binding and immutable.

These principles are sometimes referred to as [natural] laws, though more accurately they are principles that govern and act as the governing dynamics for consciousness in reality. Their existence brings a decision space and consequences; with which comes the possibility for inquiry and integration, which leads to higher states of potential.

Philosophic epistemology depends upon two crucial concepts: that of the nature and the validity of concepts in aligning with nature. If concepts refer to things existing in reality, then knowledge is real and reliable. If they do not, however—if instead they are imaginary constructs adopted from authority or by social convention without reference to existence, then knowledge is baseless and inherently undependable (i.e., it cannot be depended upon to facilitate moral decisions). The validity of humankind's knowledge depends on the validity of concepts.

Some schools of "modern philosophy" counter the idea of knowing reality with the idea that humans cannot know anything for certain and that there are no absolutes in reality. This singular idea has the effect of drawing people away from its opposite, idea that things can be known, that fact and truth exist. It leaves everything open to interpretation and flexibility, to the rightness of opinion. There exist a wide variety of expressions related to this idea, such as, "it may be true for you, but it is not true for me". This expression indicates that somehow objective knowledge is impossible. Other examples of such an expression are, "everyone is entitled to their own opinion" and "every opinion is valid", as if all opinions are equal because everyone having one is a person. When all opinions are equal, all philosophical arguments end in a "draw" and not a deeper understanding of reality and the truth. Such thinking, of course, finds that which is behind a statement or opinion to be irrelevant, disregarding the validity of the knowledge base and methods from which the statement or opinion appeared. Ideas must be left in the form of working hypotheses open to critical inquiry and the approximation of truth found by the process of exploration and experimentation. Herein, nonsense takes the place of learning and effort. Instead of taking responsibility for testing the veracity of ideas, affective preference obviates knowledge. For the very stability of a society, individuals must be free to experience and experiment for themselves, unhampered by the mere conventions of culture. Unfortunately, this line of thinking, this ideology (not a philosophy), invites people to dismiss logic entirely. A stable society-scale community cannot exist on these subjective grounds where all opinions are equal and the substance behind every opinion is not critically and factually examined.

Philosophic arguments to knowledge are valid, invalid, or unknown. Newton didn't just "get his way", Einstein didn't just "get his way", Darwin didn't just "get his way". They synthesized novel information that was later verified and has become part of humanity's common and emergent pool of knowledge.

If the problems are based on mass psychoses, then real and rational solutions will be of no avail until the psychoses themselves are addressed.

For a community, to accept declarative statements on faith without critical thought (or rational discernment) is a recipe for disaster. If logic is a means of objectivity, then a logical conclusion must be derived from reality, it must be warranted by antecedent knowledge. Logical conclusions are systematically contextual, must relate to prior knowledge, and cannot simply be arbitrary, they must rest on earlier knowledge and so on back until one reaches the perceptual truth, the data of sense.

Reason is the process by which individuals identify and integrate the material of their senses, their percepts. This kind of chain, and nothing less, is what is required for philosophic proof of an idea prior to the arrival of a decision that impacts a community. Philosophic proof is the process of establishing truth and reducing conceptual propositions to axioms (and ultimately to sensory evidence). Such analytical reduction is the primary means by which humankind has of discovering the relationship between non-axiomatic propositions and the facts of reality. An in general, in a society that was taught logical integration from a young age and performed it habitually, then social conversations would not require large scale analytical reduction with each social discussion (as they often do now, which leads [sometimes falsely and sometimes truly] to claims of reductionism).

Ideas must be subject to scrutiny. If they are not, then illusion is bound to begin, masking an individual's perception of true reality. Individuals in regressive social information systems (i.e., high entropic societies) are highly likely to cease conscious discovery of reality and begin creating structures that further lead them out of alignment with reality, and hence, out of states of higher fulfillment. If an individual ignores the principles that govern the reality that s/he exists in, then how could it possibly be said that s/he will create formations that serve needs or meet root desires? Without realization a society's creations might take on disconnected and erroneous forms, "[social] belief constructs", that are adverse to our individual's reality-based needs.

It does not follow that if a claim is not axiomatically true, that it is therefore false or even self-refuting. If a claim which is not self-evidently true can be logically reduced to the axioms of existence, consciousness and identity as well as to the facts that inform them without breaching the methodological principles of systems dynamics, then it has a basis for being true. After all, that is the purpose of logic: to tie conceptual cognition to the perceptual level of awareness. Through systematic and philosophic methods we are more greatly able to explain and understand the why and how of various natural phenomena, which exist interdependently and must therefore be understood systematically. If any interdependent factor is missing, then the phenomena will be incompletely comprehended.

If a communicator doesn't identify truth before communicating to another human being there is a high likelihood that s/he is going to spread a whole host of non-truths. The world today is substantially based on things that do not exist, non-truths, illusions, frauds and deceptions.

Philosophy involves the unocculted keys of learning that provide a potential for people to set themselves free. Early 21st century society does not teach people how to discover the truth for themselves, how to think systematically, and to experience critically; it does not facilitate any meaningful adoption of the actually methods and methodology. Instead, the "authorities" just get the populace to accept what they say. Acceptance leads to order following, and to order following without question, in particular. An order follower is someone who acts upon an order stimulus, which has been artificially programmed into an individual's stimulus-response mechanism. Order following involves a programmatic response to a stimulus with identifying the contents within and behind both the stimulus and the action that is being ordered to be carried out. Therein, conscious inquiry and intention are absent - that is the definition of order following. Order following is a mental abdication that accompanies not wanting to own one's own personal responsibility, which is a very dangerous path to go down for it quickly leads to a totalitarian culture. Order following involves a stimulus and response, and a squeezing out of conscious thought. Freedom and choice come from that space in consciousness, and anything less is a possible form of slavery.

Hence, a few useful reasons for philosophy are:

1. Some people lie.
2. Some people can't discern fact versus fiction.
3. Some people don't discern facts consistently.

Correct thinking is the most reliable guide to action we humans have. Thinking is a conscious mental process performed to solve a problem, make a decision, or gain an understanding. Thinking is the most reasonable way to test emotions and insights. What would the term "critical thinking" mean if there is no truth. We assume it means learning to discern truth, but if truth does not exist, then instead it becomes a tool for shaping thought. Critical thinking is not as many school teacher's guides would have one believe, "Thinking that is focused on deciding what to believe and what to do" ... with a predetermined (or preselected) outcome set by those in authority.

Have you been dissuaded from looking into philosophy, from looking into nature, from looking into the truth of that which exists? A governing and controlling class, an "elite", would not have an interest in facilitating individuals' understanding of reality for it could easily lead to the systematic questioning of their power structure. Many people can look at the who, what, when, where, and maybe even the how, but when you ask them to explain why, to explain the causal and root factors; why is it like this, and more importantly, why does it continue to persist, most people do not have an answer - hence an indication that the causal factors are not actually understood. If you do not understand causal factors you cannot get to a diagnosis regarding the root or causal problem so that you can then work to change the causal factors and therefore set the problem "right" and fulfill real needs. If you don't have access to the causal factor, then there is no possibility for solving the problem.

The greatest social messages are promoted through movies and drama, through the fixation of

emotive sequences, not logical and factual sequences. Emotively desensitizing content implants experiences and affective reactionary states into the psyche of a consciousness, lessening rational thought. Emotional content is "absorbed", rather than going through a conscious and logical integration process. There are few philosophic dialogues in mass media and mass amusing entertainment; it is mostly propagandistic messages and other Aristotelian box memes (i.e., the placement of people into Aristotelian boxes). When someone is "being downloaded" through fiction their guard is down. The sensory filtration part of the brain is not in engaged. It isn't saying "yes I agree with this" or "no, I disagree with that", and asking, "is this contradictory?" as must be done in a philosophic discussion or conscious integration. Instead, the observer is in an alpha state being "downloaded" and "programmed" with new ideas and reaction patterns, and having prior programming reinforced.

When reason is bypassed then contradictory and agenda-based information ends up creating a chaos of the psyche and the individual may become dependent upon the authority of the day as the primary source of information.

The objective philosophic understanding of existence:

1. There is a physical reality which exists independent of humans.
2. Human consciousness perceives reality.
3. The primary material of a human's consciousness is the information received from its senses, its sense interfaces.
4. Sensations allow humans to become aware of existent entities (i.e. perceived as identifications of sensations).
5. Isolating particular entities according to their differences from other entities is the process of identification.
6. Understanding the relationships (similarities and differences) between identities transforms entities into cognitive "units" of information.
7. Measurement is the language of describing quantitative relationships between units.
8. Measurement's purpose is to relate an unlimited scale of knowledge to man's limited perceptual experience.
9. The facts established by measurements are the same regardless of the particular measurement standard that is used.

4.6.1 Solipsism and philosophy

Solipsism is a form of relativism that makes the claim that there is no such thing as objective truth and that everything is only subjective opinion - nothing can actually be known, everyone's definition and/or explanation is valid. To a solipsist, thought cannot achieve ever greater approximations of the truth through the action of non-contradictory identification and logical integration, for there is no truth or existence in mind - there is only ones own egoic mind. The philosophical concept of solipsism asserts that the only certainty is that one's own egoically projected mind is sure to exist. It is the negation of the idea of objective truth, and often, existence in a commonly interrelated and interrelatable environment. By its own postulate, solipsism is both irrefutable and yet indefensible in the same manner. Solipsism is a preoccupation with oneself, focusing strictly on the "me" to a socially dysfunctional degree. The extreme form of solipsism denies the possibility of any knowledge other than of one's own existence. The less extreme form claims that there is no such thing as objective knowledge of factual reality, but that knowledge is the social construction of multiple minds. Solipsism is a radical preoccupation with the indulgence of one's feelings, desires, and egoistic self-absorptions. It is a preoccupation with oneself or one's own affairs. In short, "it's all about me!" Solipsism is disconnect and detachment from truthful reality, rendering the solipsist clueless about the real world, yet giving them the false notion that they are aware of the world around them. Solipsism mistakes the perception of an object for the object itself, which inhibits the thoughtful processing of illusion and the arrival at solutions that might otherwise become evident.

If one accepts on its faith the notion that there is no such thing as objective truth, then essentially, there is no such thing as knowledge. Nothing can ever be truly known. If nothing can be truly known then ask yourself what would someone be willing to believe? You could get someone who is a solipsist to believe anything. Or it could be looked it another way; you could never truly get a solipsist to accept anything. Soren Kierkegaard states, "There are only two ways that humanity is ever fooled. The first is to believe that which is not true. And the second to is to refuse to accept that which is true." There is objective truth and it is a natural goal of any conscience being to discern that which is. Once someone does not accept the concept of logic, then it's over, then anyone can get that person to believe anything given time and manipulative intelligence.

1. **The grammar of solipsism:** Latin [sol-us = alone] + [ipse = self]; the self is alone.
2. **The logic of solipsism:** Self is the object of real knowledge, no other existent.
3. **The rhetoric of solipsism:** Egoism = no proof of existence other than his or her own mind.

The solipsistic approach is a non-relational approach and does not optimize the human condition. If someone thinks that there is no true, existent common reality and that s/he is simply creating reality on their own (i.e., alone), right now, then how is s/he to come to know that which a community of humans might call the common

'human conditions' for fulfillment. Common fulfillment does not exist in the solipsist's world; it isn't discoverable and can't be inquired into. Because the [believed-in] thinking framework that is "solipsism" generates a decision space that lacks a common reference among individuals it is a structure that is incapable of adaptively evolving the socialized individual who identifies only with their egoic selves and nothing broader - someone who has placed a border around their existence is no longer learning of their broader and larger selves..

Many contradictory and disconnected ideologies (solipsism being one of these) have the resonance that they do because of the methodical way in which they are fed to people, often inculcated through some form of fear or passive amusement.

Solipsism is the ideology that no one can know anything, and are thus, continuously held in a subtle state of fear [of the unknown]. Solipsism comes from the Latin sol-us = alone + ipse = self, all by oneself, all alone. It is the ideology that there is no truth because there is no objective reality. The only thing that exists is the contents of ones perceptions. Only ones perceptions are assured to exist and anything outside of ones perceptions is completely unknowable, unsure. Therefore there is no truth and the universe revolves around our perceptions at any given time. If that is ones ideology then the individual can never truly come to know anything. Nothing about the external reality can really be known. There is no objective reality so you can't know anything. How could someone possibly dispel fear when s/he holds to such an ideology. This is what knowledge is ultimately about,

Aligning ones value system in the direction of a higher state of fulfillment (i.e., wisdom) is what a community does with what individuals in the community have come to understand through knowledge. If we do not develop that knowledge and understanding and put it into practice in our lives, then we are always going to be in a state of fear, we are always going to lack the understanding that dispels fear and our behaviors are ultimately going to be chaotic and are not going to align with what actually is, a real environment and real human needs. When knowledge is not available or not employed, then a community is going to get things that is says it doesn't want.

The idea that there is no truth to arrive at, that there is no map in the territory, that it's just all perception, feeds into other ideologies, in particular, moral relativism. If there is no truth, then there can't be any morality; there can't be objective right or wrong if there is no objective truth. From moral relativism it is a short step to totalitarian thinking, because if there is no moral right and wrong alignment with real world fulfillment then every human gets to decide what is right and optimal for him or herself, and this becomes a dangerous state when combined with the belief in authority. Truth is no longer something that requires discovery; instead, everyone can "make it up" according to their likes and dislikes or preferences or whims or perceptions in the moment. See the relationship between the belief that truth is a dirty word and the idea there is no such thing as objective truth. It is an ideology that will invariably lead to moral relativism and moral relativism is [in part] a movement toward a totalitarian society.

Belief takes precedence when meaning becomes obscured. How can there be coherent communication between individuals if they can't grasp how one another are using the words they are using. Solipsism is a perpetual "memory hole".

Imagine a world where individuals could have conversations and all parties unifiably had the goal of achieving a higher understanding. The opponent in the conversation becomes the wrong answer, not the other person, not the other persons look or clothing, not the other persons size or skin color. The conversation becomes one of "lets together exchange our information and come to a better understanding, for that is ultimately what is better for both of us.

4.7 Solipsism and systems thinking

> **NOTE***: Among community, individuals understand the danger of delegating their own understanding to others.*

The very concept of proof presupposes the conceptual axioms of existence, consciousness, and identity. You cannot prove that other people exist (or that anything exists in a common system), only validate it. It is the material of proof, which is presupposed by any process of proof. Systems are an interconnected relation of existent identities composing a whole. Systems thinking is not a component of a solipsist's ideology. The idea of systems thinking makes no sense in solipsism, and it is not a possible part of its paradigmatic expression. When the paradigm is flawed, the paradigm's logic is consequentially flawed.

There is a world of objective reality that exists independent of human beings and that has a determinate nature that is knowable. Principles that supply a systematic level of understanding must be based on the facts of reality. To survive and flourish humankind must come to grips with the fact that it exists in a common reality. Everyone is constrained by what is metaphysically real. And yet, many people live the majority of their physical lives in a fluid unreality.

If, however, nothing exists, then there can be no consciousness: a consciousness with nothing to be conscious of is a contradiction in conceptual terms. A consciousness conscious of nothing but itself is also a contradiction in terms: before it could identify itself as consciousness, it had to be conscious of something. If that which you claim to perceive does not exist, what you possess is not intentional consciousness, but is instead programmed consciousness.

By virtue of solipsists' attempts to convince others of solipsism, solipsists reveal an implicit acceptance of the existence of other minds and an external objective

reality. When a solipsist makes any attempt to convince or confront a "critic" they marshal facts, employ logic, and use reason in the explanation / debate. Each of these actions reveals an implicit affirmation of a common frame of reference to an external objective reality and the existence of other minds, which are to make use of it (their mind) in understanding the argument. In the very act of arguing for solipsism, the solipsist affirms and upholds the very principle he seeks to dismiss.

The ability to defend oneself from sophistic[ated] ideologies (e.g., solipsism) has gradually been lost to those who are considered by society to be "informed" and "well educated". Without being able to detect lies, their freedom of choice slowly slips away.

Solipsism, like other "flights from understanding", blocks the insights that the creation and sustainment of fulfilling socio-economic situations demand. Wherefore, solipsists follow unfulfilling policies and inept courses of action as situations deteriorate and demand even keener insights, and as they are blocked, policies become more unintelligible and action more inept (i.e., the mind space becomes confused). What is worse, the deteriorating situation seems to provide the uncritical, biased mind with factual evidence in which the bias is claimed to be verified. So, in ever increasing measure intelligence comes to be regarded as irrelevant to practical living. Human activity settles down to a decadent routine, and initiative becomes the privilege of violence. This is exactly what Zbigniew Brzezinski talked about in his book "Between Two Ages" (published 1976). He said, "Shortly, the public will be unable to reason or think for themselves. They'll only be able to parrot the information they've been given on the previous night's news."

A "flight from understanding" blocks the occurrence of synthesized knowledge that would upset an otherwise emotionally "comfortable equilibrium". A human's mind must grasp the relationship between the facts of existence and his/her life if there is to exist true emotional equilibrium, equanimity. Clearly, a person can be mistaken with respect to their value decisions. Consciousness can be wrong regarding what a human's authentic needs really are, the actual relative importance of his needs, and the goods or services that truly fulfill needs.

The human mind is regularly contrived in early 21st century society by the pushing of non-rational buttons and by the putting of maladaptive ideas into consciousness to keep people from thinking clearly. If people were thinking clearly and emotionally stable, would they spend vast a amounts of money on things like disease causing (patho-) fizzy sugar water? No, they would not. But, the economy depends upon having people consume a lot of things they don't really want, certainly don't need, and would be better off without. The perpetuation of early 21st century society relies on the manipulation of consciousness to contract its ability to think and to make it fixate on something that someone else wants it to fixate on ... often for profit (in the Market). Advertising is [in part] there to manipulate emotional buttons and to make it hard for individuals to thinks such that the next time they see a bottle of fizzy brown sugar water they have a craving for it, or they can't think about anything but consuming it. The market itself is a competitive system where players are incentivized to generate cravings (and misunderstandings) because it is profitable.

Modern consumer States and market institutions are run on manipulation of the public, of the consumer, and of the voter. These institutions rely on manipulating these entities to do things that are not in their best interests, by compressing and contracting their sphere of conscious thought by way pushing individuals emotional buttons and implanting self-destructive concepts in their psyches (e.g., "authority"). Early 21st century society promotes gut level, unthinking irrationality, which is generally prompted by people at a distance pushing emotional and physiological buttons. Primal biological drives are hammered on over and over again until they swamp the capacity for [rational] thought including fear, lust, greed and a handful of other primal biological drives - over time the egoic mind comes to believe that it is the only mind in existence. Images of food and of being accepted or rejected are flashed over and over again in front of consciousness to keep people in a state of unconscious consumption and production -- to impulsively act on their self-concept instead of reflecting upon and integrating every self-concept. Scary images and soothing images are scientifically studied by governmental agencies and businesses and are sequentially replayed in front of the unthinking public to promote overtly expressed profit agendas and covertly thought out power agendas. These aberrant structures degrade the expanded potential of human consciousness to that of a programmable machine. Those who use such manipulation tactics are not your friends; yet, they too are here to learn and to grow from experience. Do not let them fill your mind with garbage. Wherever there is profit and social power there is also deficit. And, the deficit more often than not is one of consciousness.

Fundamentally, solipsism is an anti-philosophy that occults knowledge and counterfeits wisdom. It is the philosophic corruption of the conscious integration of reality through the absence of reason and the destruction of identity, wherein reality becomes something that either doesn't exist, cannot be known/identified, or cannot be known of commonly (i.e., existence does not exist, is not identifiable, or cannot be coherently communicated; everything is just subjective interpretation - common creation becomes challenging here, for engineering requires objectivity, and we are all creators in reality). Like every belief, solipsism holds learning for those who have temporarily chosen to partake in its limitation.

When we begin to doubt and question, then we begin to explore, then we won't buy the social narrative that keeps our consciousness trapped in a state of perpetual suffering for the pseudo-fulfillment of the few and the ultimate suffering of all.

NOTE: *The truth is always harsh to the fearful. One must realize that one is not the center of everyone else's universe - this is known as de-centering. A fulfilled society would facilitate in the de-centering of the young of their species. To de-center is to both realize that consciousness can take many forms and that one's egoic self-conception is not the center of the universe. And further, to de-center is to realize that there is an objective reality outside of everyone's subjective experience of reality.*

5 The linguistic method

A.k.a., Linguistic logic, grammatical classes, word classes, the parts of speech, the parts of language.

Language touches every aspect of human behavior. Language is a type of thinking and communication tool. As a tool with a function, there is a logic to its construction (design) and application (usage). Language is a rule-based system that enables an organism to think, as well as communicate with other organisms. Language is a tool that provides organisms with a way to frame their thoughts and decisions. Language is the basis of communication. Language conveys the ability to approach problems and decisions from a constructive perspective. Importantly, for optimal thinking and communication, language must be defined first; otherwise, "we" don't understand ourselves, or what anyone is saying. Individuals and teams in society are unlikely to have meaningfully productive discussions if the words they use do not have precise meanings. Language is used to communicate, to understand, and to program.

APHORISM: *Language matters. Words program minds to think certain ways.*

In a different [percepted] environment there exists a need for a different language. If we are to live regeneratively in a fulfilling environment versus unsustainably in a commercial environment, then we need a new, more up-to-date language. Language determines the concepts (or conceptual understandings) that are available to consciousness, which filters perception. Language can become a trapping that accompanies the programming and social engineering of the mind, and it is the principal tool for the inculcation of a [limiting] belief system, which may occur through any (or every) form of media and social interaction. Language can always be redesigned to optimize clarity, logic, and precision. Language is a referencing technology. As such, it is a tool for programming our perceptual cognition. Language must be recognized as the determinant organizer of cognition. Human language is far more than communication. Considering the effect of language on society is just as important as considering the effect of society on language.

APHORISM: *Language becomes seriously important when you do serious thinking.*

Of the many entrenched barriers to positive change, communications is one of the most intractable. Language has evolved over centuries through ages of scarcity, superstition, and social inefficiency, it is how we make sense of the world around us, and it is continuing to evolve. Entire socio-economic systems are built around the application of language and the discourse of semantics. Language that is continuously influencing

and creating the culture and society that individuals see around them.

Language is an invention, a construct, and what "we" call something has no bearing on what it is. Pluto exists, and its properties are unaffected by whether or not we decide to call Pluto a planet. Individually and together we can represent reality with language, our natural sensory linguistic nature provides for organized understanding and cooperation. With language we categorize, distinguish, and create thoughts and material constructions.

5.1 [The tool of] Language

Language is a necessary tool for all forms of communication and all forms of understanding. Languages are necessary for understanding anything as well as doing anything together. The linguistic method is composed of a system that integrates the production and reception of understanding via a set of physical-medium interfaces:

1. Sight.
2. Hear and touch.
3. Vocalization.

It is a method of collecting and integrating information so that its meanings are understandable and capable of being understood by another receiver. This process requires precision in the design of the language itself as it is expressed over the three sensory mediums:

1. Spoken (spoken concepting; speech).
2. Written (textualized concepting; document).
3. Visual (diagramming; diagram).
4. Count (numeralized numbering; quantity).
5. Math (formula/operation done to numbers; measurement).

Language may also be viewed as a set of models (they are models because they systems):

1. Verbal model (written and spoken).
2. Image-scheme model (pictures for objects and concept models for concepts).
3. Animation-timeline model (object animation and timeline for events).
4. Mathematical model (numerical formula).

Language forms understanding, which can then be communicated and updated:

1. There are objects with shape that can be pointed to.
   A. Point to object to identify.
   B. Draw object in image to confirm understanding [single object; single unit].
2. There are motions that occur to shapes that can be explained:
   A. Show motion of objects in animation to explain relationships [one or more objects in motion].
   B. Explain relationship(s) with written-spoken-formulaic language.

There are three elementary forms of communicating and understanding via language (a.k.a., communication languages, self-/social-understanding languages):

1. **Text[ual]** and **Spoke[n]** *(a.k.a., textual language, written language, spoken language, written-spoken language, text-spoken language, written/spoken language, symbolic-spoken)* - is made up of words that create sentences that are intended to communicate coherent/articulated/clear thought.
   A. **Spoken** - A spoken language is based on an evolved human capacity. Spoken languages are passed on effortlessly from generation to generation, from parents and grandparents to children and grandchildren. They need not be taught in school: children arrive in school already knowing how to speak. All spoken human languages consist of words, which consist of syllables, which consist of phonemes—vowel and consonant sounds. Distinctions between phonemes signal differences in meaning.
      1. **Phonetics** is the reception and production of a vocalized language; it has three elements:
         i. Acoustics (mechanistic physics).
         ii. Auditory perception (by a sensing organ or device).
         iii. Physical articulation (of speaker or voice box).
   B. **Written/Text** (orthographics, orthography is the whole writing system of a language) - A writing system is a way of writing down a given spoken language. It is completely artificial, and there can be any number of ways of writing down the same spoken language: using symbols or pictures that represent phonemes, syllables, parts of words, entire words or, as in the case of English, nothing in particular. The best and most popular way to write down languages around the world is phonetic—based on an alphabet, where a letter or a combination of letters invariably represents a certain phoneme. Orthographics refers to:
      1. Orthographic mapping: The mapping of phonemes (sounds) to text.
      2. Orthographic processing: The understandings of rules by individuals.
2. **Visual[ual]** (visualization language) - is made up of illustrations (drawings and models) and/or simulations, and possibly therein, text.

   A. The language of diagrams (all diagrams have the following):
      1. Symbols (signifier).
      2. Words (signified).
      3. Numbers (quantity).
      4. Lines (relationship).
      5. Text (not all diagrams have text).
3. **Math** (mathematical language) - is made up of symbols and formula.
   A. Software programming (computational languages).

NOTE: *If someone only communicates in one of these language forms, then the receiver of the communication ought lower their confidence that what is being communicated has a very high certainty. It may in fact have a high certainty, but the receiver must still put up a strong critical thinking gate, because anything less than using all three language forms to communicate means the sender is less than an "expert". An "expert" is someone who can communicate a system using all three languages. Essentially, communication in all three languages is necessary for a high-level ("expertise" level) of understanding.*

In relation to a language's ability to express precision, there is:

1. **Informal** - more imprecise language that can be written and/or spoken.
   A. **Natural language** - a language that developed culturally and wasn't significantly designed by intention. This language can be used to describe and explain, but is considered imprecise.
      1. Common language [terms].
      2. Chat language [terms].
2. **Semi-formal** - more precise language that can be written/drawn and spoken.
   A. **Technical language** (this language can be used to both describe and explain, so that there is understanding):
      1. **Scientific language** [terms] - an intentionally evolving language the changes as more information is discovered and integrated. Scientists have to write up documents in language so that other scientists can say, I see understand the procedure, materials, and results; let me try that.
   B. **Visual language** [visualizations] (this language can be used to both describe and explain, so that there is understanding):
      1. 2D graphical languages, such as illustrations, flow charts, and concept models.
      2. 3D animation languages, such as movies and sliding picture frames.
3. **Formal** (formularization language, universal language) - is the most precise language for description.
   A. **Mathematics** - a language that can only describe, it is a language of quantitative adverbs only (i.e., math has nothing other than quantitative adverbs). Mathematics has no adjectives. Adjectives qualify objects. Math cannot explain anything to anyone, it only describes.
      1. Mathematics is the domain of all languages, not just the natural languages, because all languages and real-world phenomena have patterns.
      2. Math is the language that physicists use to describe processes that they observe in nature. A set of math or set of equations describes the entire universe (no matter what context or perspective).

In relation to a language's construction, there are three elements:

1. **Phonemes (sounds)** - sounds made by human mouths and speakers; these are vowel and consonant sounds. Phonemes are mental representations of speech sounds made by the mouth. For example, the |p| sound in |spoon|.
   A. Can be:
      1. Heard.
      2. Spoken.
   B. Cannot be:
      1. Seen.
2. **Graphemes (mapping)** - letters (or combinations of letters) which are mapped to phonemes. Graphemes are individual letters and groups of letters that represent single phonemes, like the "s" and the "oo" in "spoon".
      1. Heard.
      2. Spoken.
      3. Seen.
3. **Letters (written symbols)** - are the cardinal alphabet in the form of symbols (visual building blocks) that makeup written words.
   A. Can be:
      1. Seen.
   B. Cannot be:
      1. Heard.
      2. Spoken.
4. **Morpheme** - is the smallest meaningful unit in language.
   A. Base morphenes:
      1. Lexical (free).
      2. Functional (free).
      3. Derivational.
      4. Inflextional.

B. Affix morphenes
   1. Of the type: prefix-.
   2. Of the type: -suffix.

C. Morphene procedures include:
   1. Prefixing and suffixing - attaching a bound morpheme at the head or foot of a word:
   2. Compounding free morphenes - the process of forming compound words by combining free morphemes.
   3. Blends - are created by joining two or more words, at least one of which must be clipped.

NOTE: *Words are constructed hierarchically. The word inconceivability is broken down using a morphology tree (taxonomy).*

Languages are composed of words (bounded meanings) for which there are two rule-sets:

1. **A rule-set for the spelling of words** *(rules for arranging letters to make words)* - there are rules for spelling. A precise language should have no exceptions.
   A. Morphology types:
      1. Compounding.
      2. Prefixes and suffixes.
      3. Blends.
2. **A rule-set for the usage of words in sentences** *(rules for arranging words to make complex meaning)* - there are rules for grammar. There are rules for the structuring (placement) of words in a sentence, which account for word classes, their conjugation, functions and relation.
   A. **Grammar** refers to the rules for how words are modified and arranged in a sentence to convey coherent meaning.
      1. **Syntax** is a part of grammar, indicating the way in which the words are sequenced to create sentences.

5.1.1 Semiotics

Semiotics refers to information being represented in the form of symbols. Information in the form of symbols can be presented on three conceptual levels:

1. **Syntactic**: The syntactic level deals with internal relations between symbols (e.g., grammar in a language). All engineering products are on the syntactic level. Syntax is the ruleset for a language; the rules for grammar and spelling. A syntax rule-set describes the systematic ways in which words are combined to create sentences of meaning.
2. **Semantic**: The semantic level considers the meaning of the symbols to someone or to some population of people (i.e., possibly including the relationship of the meaning with reality). Semantics is a way of classifying concepts in relation to one another:
   A. Hyponym - denotes a set of hierarchical semantic relationships.
   B. Meronymy - denotes a set of relationships that form parts of a whole.
   C. Synonymy - when words have the same meaning.
   D. Antonym - when words have opposite meanings.
   E. Homonymy - when words have different meanings.
3. **Pragmatic**: The pragmatic level includes the utility and value of symbols. Math, for example, can be used to develop computational software systems. English, for example, can be used to share information globally. Some languages are designed to maintain a deference to authorities.

5.1.2 Universal language

A.k.a., Common language, linguistic unification.

Without linguistic commonality, integration, and precision [life in] society is likely to become conflicted and fractured. Without a common language how are we supposed to build complex and socially meaningful structures. Not having a common language is equivalent to chaos and it is ridiculous to debate. Yet at the same time, attempting to forcing linguistic assimilation [through what would necessarily be akin to violence] is unhelpful. Forcing assimilation through coercion is still coercion.

INSIGHT: *The names applied to concepts and objects determine how easily concepts and objects may be understood, integrated, and visualized. The wrong names are likely to confuse understanding and limit thinking.*

Community seeks a universal language with uniform meaning, so that words, concepts, and sentences are not open to [subjective] interpretation, and hence, confusion, discord, and unnecessary conflict. A best linguistic choice is a language that is uniform by meaning so that it is not subject to interpretation and allows for universally recognized objects and concepts. It becomes very difficult to make progress when the lexicon (vocabulary) is not agreed upon.

Vocabulary is formed into:

1. A term list is vocabulary.
2. A taxonomy is typically hierarchical, added both structure and descriptive power that derives from the relationships between terms. A taxonomy is created by attaching descriptive tags, or labels, to

items of information.
A. User-generated taxonomies ("folksonomy").
B. Contribution team-generated taxonomies.

5.1.2.1 Modality

In linguistics and philosophy, "modality" refers to the ways language can express various relationships to reality or truth. An example of a formal linguistic modality may be:

1. According to [a set of rules, assumptions, beliefs, observations, animations, etc.] it is [necessary, possible] that [the main proposition] is the case.
   A. According to:
      1. [a set of rules, assumptions, beliefs, observations, animations, etc.]
         i. it is
      2. [necessary, possible]
         i. that
      3. [the main proposition]
   B. is the case (is a fact, the truth, real world, etc.)
      1. with some calculated/reasoned percentage.

The set of propositions which forms the basis of evaluation is called the *modal base*. The result of the evaluation is called the *modal force*.

> **CLARIFICATION:** *The term, "modality", has different definitions depending upon the context/discipline in which the term is uses. The engineering use of the word generally means: the way or mode in which something exists or is done (this is the common dictionary definition of the term). However, there is also the linguistic use of the term, where language can more, or less, greatly be used to communicate a fact (the truth, the real world, the reality, the existence), with some degree of logical certainty.*

The two modes for which there is a degree of certainty in between are:

1. Being totally correct that something did occur (event), is occurring (process), or simply is (an object). This is simply, being right.
2. Being totally wrong that something did occur (event), is occurring (process), or simply is (an object). This is simply, being wrong.
3. And, in-between, whether or not it is possible to know that something did occur (event), is occurring (process), or simply is (an object). This is the certainty measure.

5.1.2.2 Translation

A common language is optimal for clarity and efficiency of communication. In the early 21st century, there are many languages used. Hence, in community, different languages require translation for mutual understanding and decisioning.

Without commonly defined concepts, there is no possibility of validly translating the term associated with this concept from one language into a similarly understood term in another language.

5.2 Words [in a language]

> **CLARIFICATION:** *Words are only containers for meaning itself.*

A word is an elementary bounded meaning made up of letters or other symbols. The best and most popular way to write down languages around the world is phonetic - based on an alphabet, where a letter or a combination of letters represents a certain phoneme. Herein, a word is a sequence of phonemes (Read: sounds that are heard and spoken). A phoneme is the smallest phonetic (sound) unit in a language that is capable of conveying a distinction in meaning. The alphabet [of a language] makes up the words of that language. Words are a form of human communication. All words in a language are listed in a dictionary (list of words) where they are defined. Words may also be identified in a taxonomy.

> **CLARIFICATION:** *Spelling refers to the correct rules (or memorized exceptions) for writing words with letters and diacritics.*

5.2.1 Linguistic word categories

A.k.a., Word classes.

There are two linguistic word categories in concern to communications:

1. **Content words (content word classes; object and concept variables)** - are containers/categories for identifying clearly objects and concepts. Content words are a word-type that relates to: objects (nouns) and concepts; wherein, concepts include: actions (motions, verbs) and attributes (adjectives and adverbs). Hence, the content words are all: nouns, verbs, adjectives, and adverbs.
2. **Function words (logic word classes; logic operations)** - are words that form the expressed structure or grammar (logic) of a language, such as prepositions, pronouns, determiners, conjunctions, and interjections.

For example, in the sentence "It (object) rapidly jumped to the next step", the content words are "it", "object", "rapidly", "jumped", "next", and "step", while the function words are "to" and "the". Content words and function words have different roles and properties in a language. Content words usually carry the main meaning and information in a sentence, while function words help to connect, modify, or specify the content words. Content words are usually stressed and can be modified by other words, while function words are usually unstressed and

cannot be modified. Content words are also more likely to be given multiple meanings by different people and have different people change their words classes (e.g., verb to noun as a reification). While, function words are more fixed and stable; because they form the logical structuring of the (variable) content.

There are two linguistic word categories (open and closed word classes) (McRoy, 2021):

1. **Open class (content class words; data category concepts with defined written meaning and concept modeling and objects with named visual images and animations)**: is an axiomatic class of words that commonly accepts the addition of new words. New objects and concepts may be imagined and added to the open class. People may invent new names, new objects, and new concepts. Open class words are (a.k.a., content words, as opposed to functional words):
   A. Objects (a.k.a., nouns).
   B. Concepts:
      1. Verb (a.k.a., label of motion).
      2. Adverbs (a.k.a., label of qualifier of concept; modify any concept; adverbs modify verbs, adjectives, or other adverbs).
      3. Adjectives (a.k.a.., label of object property; modify nouns).
2. **Closed class (functional class words; grammatical/functional concepts):** is one to which new items are very rarely added; because, they compose the logic of existential relationships between the language and the real-world.
   Closed classes of words are: articles, adpositions, pronouns, prepositions, conjunctions, etc.

5.2.2 Word classes

A.k.a., Word categories, lexical categories, syntactic categories, .

The words of a language can be grouped into [...] so-called word classes, also known as lexical categories or parts of speech (POS). Word classes group words together according to a number of shared phonological, morphological, syntactic and semantic properties. (Basciano, 2015) A word is assigned to a particular class according to its role in a phrase. Words are used to create distinction between "things".

At least three criteria are used in defining syntactic categories:

1. The type of meaning it expresses.
2. The type of affixes it takes.
3. The structure in which it occurs.

Languages have different categories of words. In a rational language, every word in the dictionary can be divided into two categories:

1. **Object:** that which has shape separate from another shape. Objects are given "names". Objects are the only type of noun.
2. **Concept:** a word that invokes or embodies two objects. You need two objects to define a concept; meaning that the word object must be defined before the word concept. A concept is a relation between two objects. The definition of the word concept means that two objects are required beforehand. An object is to one what a concept is to two.
3. Here, OBJECT is to ONE what CONCEPT is to TWO.

A rational language could also be one where objects are separate from concepts, but the name of an object is considered a concept too:

1. **Objects:**
   A. **Static object** - can be pointed to (2D or 3D).
      1. **Dynamic object** (object dynamics) - object being shown in motion (or animation).
2. **Concepts:**
   A. **Static concepts** - names of objects.
      1. **Nouns** - names of objects. Here, nouns come without adjectives, without qualifiers. For example, it is just a ball, table, car, etc.
      2. **Pronouns** - the identifier for a living organism (animate object). Pronouns replace the noun's label with a designated identifier:
         i. I, you, she, he, s/he, they, them, they
      3. **Proper noun** (the complete name is: proper substantive noun). These typically start with a capital letter.
         i. Peoples' names (e.g., John, Elizabeth, etc.).
         ii. Authority abstractions - are labels that indicate authority (the relative degree of power-over-others):
            1. In the form of "country" (States) names - geographic locations, jurisdictions, where a group of people have power-over-others. For example: England, Persia, Zaire, Vietnam, etc.
            2. In the form of people with "authority": President, Minister, Judge, Officer, etc.).
      4. **Non-proper nouns** (the complete name is: non-proper common substantive nouns).
         i. Authority abstraction types (E.g., European).
   B. **Dynamic concepts** - name of relationships and types of motion:
      1. **Verbs** - names of processes occurring to objects. Names of types of motion.
      2. **Abstract nouns** - ideas and feelings.

NOTE: *To eliminate authority abstraction, eliminate the verb "to be" ("is"). For example, I have a British passport versus I am British or I am a British citizen. The E-Prime English language alternative presents this as a solution to reduce reification. Note here that there is no problem using the verb "to be" before another verb to represent the continuous tense, for example, "I am eating".*

A more complete and complex way of viewing the structure is as follows (McRoy, 2021):

1. There are **objects (nouns).**
   A. **Pure objects (nouns):** Everything in materiality is an object that can be visualized and/or pointed to. For example: rock, soil, air, ball, cup, human, cat, insect, etc.
      1. **Subjects (life-form nouns, animate nouns):** There are individual organisms that animate matter. These are identified with special nouns:
         i. **Pronouns** - non-name identifier of a lifeform; replaces name of noun. For example: I, you, she, he, s/he, they, and it (note, it is generally used a pronoun for non-animate objects, not for animate ones).
         ii. **Proper nouns** - name identifier of a lifeform. For example: Anyone's name.
   B. **Reifications (abstraction nouns):** Authority other purely concept/abstraction type nouns.
      1. Proper noun authority abstractions.
         i. Country names and the titles of authority.
         ii. For example, governments.
      2. Non-proper noun authority abstractions.
         i. The subjects of an authority.
         ii. For example, money.
2. There are **concepts**.
   A. **Verbs (actions or states)** - are processes or states as the result of processes. A verb is a process in the real-world. Waste is a verb (process), and not a noun, it is a set of choices. All values are concepts, are processes, are verbs, including: sustainability, open source, freedom, and justice. Other words for a verb include, but may not be limited to: action, state, motion, process, behavior.
   B. **Modifiers** - change, clarify, qualify, or limit a particular word in a sentence in order to add emphasis, explanation, or detail. Modifiers tend to be descriptive words, such as adjectives and adverbs.
      1. **Adjectives (Ad+jectives; noun modifier, object modifier, noun descriptor)**: All adjectives modify nouns. All adjectives name an attribute (property/characteristic) related to an object. Adjectives qualify objects. An adjective is a word that modifies a noun or noun phrase or describes its referent. Its semantic role is to change information given by the noun. Effectively, adjectives are noun sub-classifiers.
      2. **Adverbs (Ad+verbs; concept modifier)**: modify the quantity or intensivity/quality of another part of speech. Adverbs are characterized by combinability with verbs, adjectives and words of adverbial nature.
         i. Categories of adverbs:
            1. Quantitative adverbs and qualitative adverbs - are essentially the same thing. Qualitative adverbs express immediate, inherently non-graded qualities of actions and other qualities. The typical adverbs of this kind are adverbs in –ly. Qualitative adverbs are, in part, subjective. Quantitative adverbs are specific lexical units of semi-functional nature expressing quality measure, or gradational evaluation of qualities. Quantitative adverbs can be measured and compared. These are derived from numerals: twice, threefold, tenfold, etc.
         ii. Adverbs can be applied to describe or modify any of the following:
            1. Verbs (verb modifier) - expressing the property of an action.
            2. Another adverb (adverb modifier) - expressing the property of another property.
            3. Adjectives (adjective modifier) - circumstances in which an action occurs.
      3. **Adpositions (Ad+positions; spatial or temporal modifier)** - used to express spatial or temporal relations:
         i. **Prepositions / postpositions / circumposition** - It is best to call these words pre-position; because, they indicate position differences between relations. These words link a noun to another word by indicating their relative positioning. Pre-positions can indicate:
            1. Location - reference of a location relationship between objects
               a. For example: Above, behind, with, atop, under, abottom, between, below, above, etc.
            2. Location in time - reference of the time relationship of an object relative to other objects.

a. For example: In, after, with, before, on, about, from, to, until, as, while, for, of, etc.

3. Role/function - reference to a work position. The role of a person or object. Used to refer to the function or character that someone or something has.
   a. For example, the "as" in the following sentence: "She has a task as an InterSystem Team member.

4. **Articles** - are category and singular object classification differentiators. Articles identify whether it is a specific object/concept, or the general classification of an object/concept that is being referred to:
   i. **Definite article (category reference; category)** - refers to a singular noun or group of nouns (refers to the category; plural, as in, all of a category of object). Refers to the category, and not a specific instance.
      1. a, an.
   ii. **Indefinite article (instance of category reference; one in a category)** - refers to a specific [instance of an] object (singular, one instance).
      1. the.

C. **Referential chain linkages (a.k.a., conjunctions, logical transformers, functional words)** - identify a separation of relationship, while simultaneously tying parts of a sentence together allowing for more complex meaning to be expressed. Words that provide links between meaning sets in a referential chain of meaning. These words function to chain/link/join together groups of meaning [in a sentence, and between sentences]. A conjunction is a word that transitions precisely/appropriately from one concept conetxt to another.
   1. **Conjunctions** - are words that join/link words, phrases and clauses, and sentences together, such as:
      i. Coordinating conjunctions.
         1. For, and, nor, but, or, yet, so, actually.
      ii. Subordinating conjunctions.
         1. After, although, as, if, since.
      iii. Correlative conjunctions.
         1. Either...or, neither...nor, both...and.

D. **Emotive vocalizations** - used to express an immediate feeling or reaction, a short exclamation:
   1. **Interjections (emotives)** - a word or expression that occurs as an utterance on its own and expresses a spontaneous feeling or reaction. They are words that express emotion. Reactionary emotive macro-expression vocalizations.

The syntactic (top-level axiomatic language classes) categories are:

1. Core concepts:
   A. Nouns (objects):
      1. Object singular: Measurement.
         i. Number: Counting, sequencing.
      2. Plural: Measurement.
         i. Number: Counting, sequencing.
   B. Verb:
      1. Motion: Measurement.
         i. Number: Counting, sequencing.
2. Modifying/qualifying concepts:
   A. Language functional concepts:
      1. Articles, adverbs, preposition, adpositions.
   B. Content functional concepts:
      1. Adverb: modifies measured motions.
      2. Adjective: modifies measured.

Special labeled word sub-categories include, but may not be limited to:

1. **Determiners** - are the pointers to objects and/or motions in the real-world:
   A. the, a, an, that, these, this, those.
2. **Interogatives** - are typically prefixed with "wh-" (or, how) and are used for posing questions (inquiries) and are thus sometimes called interrogatives.
   A. who, what, when, where, which, whose, and why and how, how much, how many, etc.
3. **States (structures)** - the wing suffixes all indicate being-in-state or state-of-being:
   A. -age, -ancy, -ence, -ety, -ity, -ibility, -cion, -sion, -ion, -tion, -tude, -ship, -hood, -ness, -th, -acy, -osity, -y, -ism, -cracy, -dom, -ery, -ty.

Even another view on the system of simplified word classes is the following (McRoy, 2021):

1. **Object words (referenced by pointing):**
   • *Point to the object(s). Show picture or animation.*
   A. **Nouns:**
      1. Labels: e.g., bowl, cat, human, table, ball, etc. (are names).
         i. First "object" - name of object.
   B. **Pronouns:**
      1. Subjects: e.g., I, you, s/he, they (them), we (us).
         i. First “person”: I (singular person)
         ii. Second “person”: you (singular person)
         iii. Third “person”:

1. she, he, s/he (singular person).
2. they, them, we, us (plural persons).

iv. Possessive pronouns (possessive subjects): e.g., Mine, yours, his, hers, ours, theirs...

1. Possessive "person" - his, hers, ...

2. Objects (third "objects"): it (indicative pronoun).

C. **Proper nouns:**

1. Names (e.g., first to last, or last to first).

2. **Concept words (referenced by thinking):**

• *Think about relationships between objects. Explain events.*

A. **Verb (process classifier):**

• *Think about motion.*

1. Action.
2. State.
3. Motion.
4. Process.
5. Behavior.

B. **Adjective modifier (a.k.a., noun classifier, noun modifier):**

• *Think about composition [scale-type] of object.*

1. Modifier of noun; classification modifier.

C. **Adverb modifier (a.k.a., process classifier, verb modifier):**

• *Think about motion sub-classification type.*

1. Modifier of verb, adjective, or adverb; attribution modifier.

D. **Identity classifier (numerical):**

• *Think about amounts.*

1. Category (articles: a, an, all) .
2. Singular (article: the).
3. Noun classifier (numerical quantity).
4. Verb classifier (numerical frequency).

E. **[Ad]Position classifier:**

• *Think about spatial and temporal location.*

1. Temporal classifier (noun or verb).
2. Spatial classifier (noun only).
3. Role classifier (noun and verb only).

F. **Conjunction modifier** (a.k.a., joining classifier, linking modifier):

• *Think about complexification of meaning.*

1. Links two separate meanings.

3. **Concept models (referenced by looking and thinking):**

• *Visualize conceptual understanding of relationships between objects.*

A. **Objects:**

1. Names (labels).
2. Images ("picture, or it didn't happen").

B. **Processes / Relationships:**

1. Structural relationships:
   i. Composition.
   ii. Aggregation.
   iii. Assignment.
   iv. Realization.
2. Dependency relationships:
   i. Serving.
   ii. Access.
   iii. Influence.
   iv. Association.
3. Dynamic relationships:
   i. Triggering.
   ii. Flow.
4. Requirements relationships:
   i. Requirements.
5. Relationship connector:
   i. Add / Or logic.
6. Operations connector:
   i. Designs.
   ii. Constructions.
   iii. Operations.

NOTE: *A fully visualized concept model could itself be considered a word.*

Another view on the system of simplified word classes is the following:

1. **Object-Concept axiom:**
   Objectification - naming of objects.
   A. Objects (nouns) - names of that which has shape; can be pointed to.
2. **Concept-Object axiom:**
   Taxonification - labeling within a model of relationships.
   A. Function (verbs) - relationship between concepts (states).
   B. Concept (verbs) - relationship between objects (processes).
   C. Modifier (verbs) - relationship between objects, concepts, or objects and concepts (added description or qualification).

Simplified rational scientific word classes are:

1. **Object** - that which has shape.
   A. Noun - name for that which has shape.
2. **Concept** - a word that embodies or invokes more than one object or location. A concept is a relation between two or more things or locations. (synonyms: notion, idea, mathematical object, particulars, member of a set, relation, to relate).
   1. **Verb** - what an object does.
   2. **Static concept** (does not invoke motion) - For example, a ratio is a static concept. We can look at a circle with a line drawn down the center and conceptualize the concept π in a single image or frame.
      i. **Adjectives** - True adjectives (flat,

continuous, unbounded, straight) and prepositions of location (at, on, in, below/above, behind, among) are conceptually static.
1. A word that modifies and is used to describe an object.
2. An inherent, static, objective, property or attribute of an object (e.g., flat, continuous, straight, discrete, spherical.

3. **Dynamic concept (invokes motion)** - In order to conceptualize a dynamic concept such as a rate, we need to see the thing move for two or more frames.
   i. **Adverbs**
      1. A word that modifies or is used to explain a concept.
      2. A qualitative (Physics) or quantitative (Mathematics) relation between two dynamic concepts.

The word classes may be broadly associated with the systems of any given society:

1. **Material: Object (noun).**
   A. Item category or 1 of category (**article**).
   B. Descriptor of object (**adjective**).
2. **Social: Concept** (one or more objects in relation).
   A. Event category or 1 event with category (**article**).
   B. Static concept - state (configuration).
   C. Dynamic concept - motion (process, **verb**).
   D. Definition of concept (**adverb**).
3. **Decisional: Solution (adposition).**
   A. Position (qualifier).
   B. Location (modifier).
   C. Time (tense).
   D. Allocation (role).
4. **Lifestyle: Realization of life experience (pronouns).**
   A. **Feelings** and **understandings** of conscious beings.
   B. **Needs** and **preferences** of conscious beings.
5. **Project control: Referential linkages (conjunctions).**
   A. **Coordinating** - coordination connection (priority recognition; positioning)
   B. **Sub-ordinating** - sub-ordering connection (order recognition; ordering)
   C. **Correlative** - one-to-another connection (comparative recognition; comparing).

It is possible to provide a complete breakdown of the axiomatic sub-systems of any given society by word class:

1. **Social** (axiom).
   A. **Direction** (purpose) - reason or intention for action. Humans have two motivations, one for nouns and one for verbs.
      1. Human physical needs (nouns). we have [physical] needs for objects...that require processes to produce/exist.
      2. Human feeling needs (verbs). We feel -- is an action word.
   B. **Orientation** (values) - qualities of actions that serve as the intrinsic reinforcer (adverbs).
   C. **Approach** (methodology) - methods are processes (verbs).
2. **Decision** (axiom).
   A. **Resources** are objects (nouns).
      1. **Persons** are subjects, living objects (subject nouns).
      2. **Specifics** are qualities (adjectives).
   B. **Processes** are motions (verbs).
      1. **Objectives** are [system] states (adverbs).
   C. **Solutions** are models (configuration combinations).
3. Material (axiom).
   A. **Objects** are composed of atoms/materials (nouns).
   B. **Teams** are a combination of people (subject nouns) and tools/materials (nouns) + methods/process (verbs).
   C. **Roles** (adverbs) //note that in the market, roles are often prepositional phrases or verbs. Roles describe how an object (person, tool, or material) participates in an action-relationship.
   D. **Services** are processes done to provide a physical-habitat and conceptual-knowledge (verbs) to a population.
4. **Lifestyle** (axiom).
   A. **Life cycles** are processes that conscious embodiment experiences (verbs).
      1. **Contribution cycles** requires technology support
      2. **Exploration cycles** requires exploration support).
      3. **Restoration cycles** requires life support.
   B. **Life experiences** (interjections).

The temporal tense of any statement can exist in one or more of the following phases on a timeline:

1. Present [tense, timeline phase].
2. Continuous present [tense, timeline phase].
3. Past [tense, timeline phase].
4. Future [tense, timeline phase].

Words are arranged in different ways in different languages, and even in different types of sentences in the same language. This is called word order. Some

languages have no articles, for example, Russian. One serious problem of English as it is constructed in the early 21st century is that one word can be a verb or a noun or an adjective in the exact same form. And the real meaning of articles is to indicate which exact part of speech the word is now. Like “milk cow” and “milk a cow”. Do you feel the difference? In the first instance “milk” is an adjective and in the second it is a verb. In Russian, verbs, adjectives and nouns even with the same root have different forms. As a result one can never confuse them. It is achieved by adding specific endings to words, so it is really easy to discern them in speech. So, Russian has no need to have articles, and never will. There are no articles in Russian. There are no articles in Russian because we don’t need to designate definitions every time about every object. You just say “dog” or “person” instead of “the dog” or “the person”, and significant differences in meaning are conveyed at the end of words. It is possible to use some similar article-based logic in Russian by using odin, “one” or nekotoryj, “a certain”, where English would use “a”, or using etot, “that”, where English would use “the”. but Russian speakers feel no need to specify them before every single noun, and they’re almost always omitted, unless clarification is requested explicitly.

5.2.3 What is a noun?

The question, "What is a noun?" is an important question for the design and utilization of language What is a "noun". In many English speaking areas of the planet, people are taught in school that a noun is: a person, a place, or a thing. In order for something to be a "thing", it has to be an object, something that can be visualized. There are some things that people call nouns that are not objects, such as novelty, science, knowledge, judgement, reality, tragedy, government, money illusion, are not things (i.e., not objects). There is no such object as knowledge. There is no object that can be pointed in these cases. These are a word of a different order of reality. These are words about relationships between objects ("things"), not about the name of objects ("things") themselves.

Herein, there is problem with a language when this distinction is lost, like in English, where the distinction is not identifiably present. When there is the distinction then challenging arguments become easy to resolve between people; because, in the case of an argument around an object, the object can be pointed to and visualized, and in the case of a concept, a concept can be reasoned with objects (as the subject). It is easy to decide what makes sense when objects can be pointed to and visualized, and concepts can be rationally reasoned. Settling arguments in languages where there is no distinction between objects and concepts.

Arguments can easily persist and degrade between people when a language that doesn't separate objects from concepts is used. Without an object, a "thing" that exists to recourse to, there is no way to fully settle the argument. Relationships between objects ("things") are treated as objects ("things") themselves, with their own properties independent of someone’s evaluation. The process for treating relationships (concepts) as objects (things) is called reification (to reify a concept into an object, and then think and behave as if it exists).

In English, many of these concept-type (as opposed to object-type) words have very clear noun endings that mark them as reifications. They often end in: -ty, -cy, and -tion, -ence, -ism. It is also relevant to note that in English, for many reifications, the article-word "the" is generally the default value (e.g., the resolution, the vitality, the evil). The problem here is that people begin to believe that the world is actually, really, divided into "authorities" and/over "properties". They end up thinking that this projection of their own mind, which is likely a projection of the minds of many others at the same time, is the world, and then they all treat the world as if it is really that way.

> **NOTE:** *More precise languages use less -isms (or even, none at all).*

The problem with turning verbs into nouns ("nounism") is that it erases our common humanity, and it helps us objectify each other. Is a woman who engages in prostitution a “prostitute” or a “prostituted women”? Nounism is also used in religions and cults to create the dichotomies they rely upon to divide and conquer (the saved/the unsaved, believers/doubters, suppressive people, angels/angelic/demons/demonic, and so on). Nounism adds a layer of abstraction overlayed on peoples thinking and decisioning that pulls their actions away from global human fulfillment. We don’t have to think about dissociating people from their actions: people become their actions. We are very well aware that doing something once does not justify nouning someone: lying once in your life, or even a dozen times, does not make you a liar. We do have the concept that in order to be justified nouning, the nouning must refer to something habitual, ongoing, or innate in the person.

5.2.3.1 Nouns and verbs

It is possible to understand concepts as nouns and verbs. As a noun, a house is a physical object and can be pointed to. As a verb, a "house" (housing) is a long-lived temporal process/state/event. Objects are things with names that can by physically pointed to; concepts are thinking relations. In relation to the concept of work, there are humans and machines, which are the contextual nouns (objects). Then, there is the verb, contribution:

1. Contribution is the state (verb) - where contribution actions are taking place.
2. Contributing is the process (verb) - whereby people work with objects to complete tasks in service to the population.

5.2.4 Decomposition of words into letters

The alphabet is an ordered succession of items devoid of any cardinal information. Both the alphabet and numbers seem to be represented on a 'mental line' .

> **INSIGHT:** *An over emphasis on spelling (the lowest form of critique) tends to obfuscate the priority or higher significance on meaning and integration of that meaning into the unified whole [information base].*

5.2.5 Illogical linguistic rules

Many informal languages contain rules that do not make logical sense and cannot be reasoned. When there are exceptions to rules which must be memorized, then the language is not optimal, because learners (and users) sometimes just do not understand the logic.

5.3 Precision of language

A.k.a., Accuracy of language.

Precision of language improves understanding and communication. Precise communication starts with definitions and meanings. A "definition" is a list of conditions by which a word (term, concept, or encoding) is used. When the word(s) used are not defined (i.e., left undefined), then there is additional, unnecessary space for error, because of the lack of a definition within an argument (i.e., when "you" don't define words, "you" leave unnecessary room for error). To explain causes, there must be objects (of which there are two types: informational (conceptual, concepts); and spatial (material, physical). We use definitions to foundation the measurement of accuracy in all communication. Here, it is essential to recognize that It is possible for languages to carry biases that alter the perception of their users when speak.

> **INSIGHT:** *The language of the universe is illustration, and not mathematics, which formally describes the behavior of illustrated objects.*

Communications is significantly based on language. Language is extremely important for safe operation together, and the imprecise use of language can cause conflict, even unintentionally. And yet, there are different dimensions to linguistic precision:

1. In concern to a system (e.g., the State), every user (e.g., authority) has a "working language" that feels most comfortable and natural to them. Here, there is technical jargon (or, technical deception).
2. In concern to teamwork, in order to more easily resolve conflict, precision of socio-technical language is important when contributing together. Here, there is clear language, description and visualization. In order to more easily resolve working tensions, precision of language is important.
3. In concern to personal feelings, in order to more easily resolve tension, precision of felt-need language is important when living together.

> **INSIGHT:** *It is always wise to question the concepts we have encoded into our selves and our community. Here, we might ask, :Do we really want these concepts encoded into our community system"?*

Precision of language, in part, means a language that includes all of the following, together:

1. A coherent, stable numeral convention (with the dimensions of):
   A. Conceptualizing (a.k.a., idea, issue, conceiving, thinking).
   B. Counting (a.k.a., numbers, numbering).
2. A coherent, stable naming convention.
   A. Label [object] convention (a.k.a., data categorization-pointing; labeling the real-world).
   B. Concept [objects] convention (a.k.a., language, linguistics, conceiving, thinking, conceptualizing).
   C. Counting [objects] convention (a.k.a., math[ematicls]).
3. A syntax (rule structure) without exceptions that require no memorization after learning the logic.
   A. No declension or conjugation tables to memorize.
   B. No unique article rules to memorize.
   C. No male or female words.
4. Has orthographic rules.
   A. No separately memorization of how each word is written and how it is pronounced. It is a system that can be reasoned—not memorized.
      1. For example, to learn English spelling is to memorize thousands of obsolete spellings of words: "whale" still has an "h" in it; "gnat" still starts with a "g". Children are forced to cram such non-information into their heads in order to pass tests that allow them to get on in life.
   B. Embodies the alphabetic principle of phoneme-grapheme correspondence. It builds phonological awareness.
5. Is rational (has rational rules).
   A. Separation of objects and concepts; no turning of objects into concepts, and no moving of concepts around like objects. Here, it is not rational to assemble an axiomatically impossible system.
   B. Integration of objects and concepts in physical technologies (Read: habitat operations) and

conceptual-model standards (Read: the societal specification standard). Here, it is not rational not to assemble a possible [better] system.

6. Uses a unique symbol set designed to work around dyslexia and various visual and learning impairments. It should not trigger, or is less likely to trigger, dyslexia.
7. It can be written quickly, and legibly.
8. It is a tool that allows for a way of converting between sight and sound, and back, that can quickly become effortless and automatic.

5.3.1 Precision mapping

A language tool designed for precision accounts for the following design principles/characteristics:

1. **Mapping precision without ambiguity:** If a language is based on an alphabet, and it is written phonetically, then learning to read and write it is straightforward: once you learn which letters and combinations of letters represent which sounds, you can then read and write most anything you can speak, and vice versa.
   A. In a well-designed, rational writing system a small set of rules determines how a word is written down by mapping phonemes to graphemes. The mapping should be unambiguous; there should be exactly one way to write a word, and there should be exactly one way to pronounce a word. This makes a language as easy to read and write as it is to speak. Many languages follow this prescription quite closely, providing a short and relatively simple path to literacy for nearly everyone who speaks them. (Orlov, 2022)
      1. There are some languages where the writing system is so simple that all one has to do is learn which symbols (or combinations of symbols) indicate which sounds. In these languages, a spelling competition would instantly bore everyone. Learning to read and write equates to learning to listen and to speak (using symbols in place of sounds in a one-to-one relationship). These languages include, but are not limited to: Turkish, Hungarian, Finnish, Estonian, Hawaiian, etc. (Orlov, 2022)
   B. Poor design involves ambiguous mapping of phonemes (sounds) to graphemes (symbols or symbol groups), wherein:
      i. There is more than exactly one way to write a word, or
      ii. There is more than exactly one way to pronounce a word.
      1. Written English in the early 21st century does not follow the precision mapping principle of one-to-one. For example, take the grapheme “th”: it corresponds to two phonemes: [θ] (the sound in “thing”) and [ð] (the sound in “this”). Therefore, it is not possible to determine how the grapheme “th” is pronounced. Going the other way, take the phoneme [i], which is the sound in “keen,” “bean,” “people,” “fierce” and “creme.” There are many graphemes that correspond to it. Therefore, it is not possible to determine how the phoneme [i] is written. Unfortunately for those who seek to learn to read and write English, these two examples are typical cases rather than exceptions. Not a single letter in the English alphabet is pronounced unambiguously, and not a single sound of the English language is written unambiguously. (Orlov, 2022) In English, there are some words that can be said to obey some set of rules, but they are vastly outnumbered by the exceptions. Any given sound can be written several different ways, and any letter or combination of letters can be pronounced in several different ways, such that learning to read and write becomes largely a process of memorization. This memorization is not only tedious, but it also gets in the way of learning other, more important things. Unlike most other languages, written English isn't based on how it's spoken, but on how words were spelled in other languages, some going back centuries, and most of them extinct. Barely half of the English language is spelled “regularly”; having learned the words “over,” “open,” and “only” sound alike, the learner finds to their dismay that ”other“ and “osprey” do not.
      iii. There is more than one way to write down the same sound, but there is almost always a consistent way to pronounce it.
      1. This group includes languages such as Spanish, French and German. (Orlov, 2022)
2. **No vowel reduction:**
   A. There is a group of languages that have a phonological process called “vowel reduction”: stressed vowels are pronounced fully, but most

unstressed vowels are reduced. The reduction rules vary by language and even by dialect. This group of languages includes Portuguese, Russian and English. In English most unstressed vowels decay to something called a “schwa”: an indistinct middle vowel. The question is, how does one write down a schwa? It does have the clumsy symbol 'æ' in the International Phonetic Alphabet, but it is used for phonetic transcription, not any actual writing. Giving it an orthographic identity by assigning an orthographic symbol to it means promoting an automatic phonological process (something everyone does unconsciously as a matter of habit) to the status of an orthographic rule, and that is a very strange thing to do. More importantly, words definitely do contain the non-reduced versions of the vowels: they just aren't being pronounced fully when they aren't stressed, but they are pronounced fully when they are. Take the word “syllable”: we know that the second vowel is an [æ] (the vowel in "cat") because when the stress is shifted, as in the word “syllabic,” we do hear it. For this reason, a precise language (e.g., "Unspell") does not directly represent vowel reduction, and unstressed vowels are written down based on how they would sound if they were stressed: the "a" in "syllable" is written as the "a" in "cat" because that's how it sounds when you stress it "syllAble". (Orlov, 2022)

B. A precise language (e.g., "Unspell") does not directly represent vowel reduction, and unstressed vowels are written down based on how they would sound if they were stressed: the "a" in "syllable" is written as the "a" in "cat"; because, that's how it sounds when speaking it (i.e., you stress it), "syllAble". (Orlov, 2022)
C. Vowel reduction introduces some unavoidable complexity into a precise language, which does not create too much difficulty with reading (after all, vowel reduction is automatic and unconscious). However, it does make it harder to write. Through software technology, it is easy to create a language-checker that will prompt the user/inputting agent to make a choice based on context. (Orlov, 2022)

INSIGHT: "*Slave speak" refers to the language of the slave that perpetuates their own enslavement. Language can be used to free as well as to enslave. If you don’t read into language and critically analyze it, then it can be highly programming in a non-beneficial way.*

5.3.1.1 English Prime (E-Prime)

A.k.a., English-prime, É, E'.

E Prime is an English language alternative where the verb "to be" has been eliminated from the language. E Prime removes the "is" of identity, the verb, "to be". Simply, E-Prime the English language without the verb 'to be' or any of its conjugates. The premise underlying e-prime language is that humans often overstate their perceptions and turn them into “facts”. Some have called this process “reifying” a concept, taking an idea and treating it as if it were absolutely true—when in fact it may not be. Note here that the other definition for the term 'reification' is taking a concept and turning it into an object. (*E-Prime Language*, 2023)

Reifying statements that make something into a fact are often directed at the following targets:

1. Objects in the world,
2. Socio-psychological targets:
   A. Other people, and
   B. Oneself.

Reifying statements about oneself or others might include, “You are a bad boy.” Or, “You are so stupid.” These statements carry with them a false completeness or false absolutism; because, so-called “bad boys” do lots of good things, and so-called "stupid people" do lots of intelligent things. These statements, repeated often enough, can become “true” to the listener and perhaps introjected into their personalities so that they come believe them. These statements then become internal, self-limiting beliefs that constrain one’s growth and development. People can become identified with these limiting and false beliefs about themselves. And, when not accepted by another as a valid identified of oneself, they breed defensiveness (and even, aggression) in social relationships. Reifying statements about the identities of individuals are dangerous in general, because they tend to perpetuate stereotyping and limiting beliefs.

Note that this line of reasoning does not mean that the verb "to be" should never be used, particularly when it comes to objects.

5.3.2 Precision alphabet

There are a number of reasons why a precise language doesn't use the Latin alphabet, including but not limited to (Orlov, 2022):

1. A precise language uses a unique symbol to represent each English phoneme. The Latin alphabet doesn't have enough letters to accomplish that. Various Latin-based languages use a number of additional characters, such as ç, ñ, å, š, ï and ø, but that approach would make English look confusing and be even harder to write.

2. Reusing the Latin alphabet for a precise language would cause interference effects with spelled English (which will likely remain on the planet for a while longer) by making it difficult to remember which is which. Because the symbols of a precise language look so different from the Latin alphabet, your English spelling will not deteriorate no matter how much you are exposed to a precision language.
3. Inventing an entirely new set of symbols will allow a precise language to solve a range of additional problems. A precise language is designed to accommodate special needs students who have trouble with the complicated curved shapes of Latin letters. English language students whose native language is not Latin-based (especially if it is Chinese, Japanese, or Korean) find the stroke-based graphics easy to learn. A precision language is easy to write quickly, but, because the shapes are so simple, very hard to write illegibly. It can be written calligraphically using a brush or a pen and stencilled without modification. When embossed, the visually impaired can read it using a fingertip. It is easy to carve and embroider. It can be entered using a touch-interface using stroke recognition software. It can be processed by OCR software even when hand-written. Because the shapes are rectilinear, it scales down to very small bitmap sizes without loss of legibility.

5.3.3 Precision of labeling

A.k.a., Names, naming conventions.

Labels can be disabling in terms of critical thinking, because once “you” have labeled, “you” know, because “you” have named, and therefore, “you” think there is no need for any more critical thinking about the conception itself. After labels comes application, and so, without continuous analysis about the veracity of the label, the conceptualization can become continuously conformed to the biases/assumptions (if there are any) inherent in the label. In other words, once “we” label something a lot people tend to stop thinking about what else might be going on. "Cognitive fusion" is a psychological concept that indicates that people perceive things the way they label them. A label is a focus, and what we focus on biases what we move toward.

> **NOTE:** *If people can't agree on what a label means, then progress in a conversation is halted. In the process of removing contradiction, sometimes labels need to change.*

There are some functional label-type words that describe the object’s function, such as “transparency paper”. There are also labels that describe how the object was made, such as “butter paper”, because the butter made the paper transparent. A good name should give "you" some information about the structure/function.

It is important to be careful of the words/concepts used, because they will partly shape the perception of and solution to [real] social problems. The way of conceiving of the problem is part of the problem itself. When a war exists, you have an enemy. First, though, we have to find out what an "enemy" is/ There is something about the war metaphor that reveals something about the people who use the term. It says that their first instinct is to reach for the gun instead of achieve an understanding of the actual problem with human need fulfillment.

In general, it is best when a concept is easily understood by its name (i.e., just by seeing its name, it can be understood).

> **INSIGHT:** *The names we use determine how easily concepts may be integrated. The wrong words limit our thoughts. We must be careful of the language that we use because it shapes social and economic problems.*

Language can give the illusion of knowing when "you" (or others) don't really know. If "you" have language for something, can label it, then "you" think "you" know it, but is it actually known or is there just language for some expression of it. Just like labels, all definitions (no matter the language) should be considered probationary.

> **INSIGHT:** *There is a difference between knowing the name of something and knowing something.*

5.3.3.2 Mislabelling

A.k.a., Misnaming.

Misnaming leads to all sorts of assumptions that lead to all sorts of false conclusions. Under a complete scientific process, names/labels can always be updated, given new definitions, understandings, and assumptions. Most importantly, the discoverer of something is not the same as the thing itself. The thing itself should not be named after the discoverer so as not to cause confusion for others, and to provide intuitive first sight (when anyone sees it for the first time they can reasonably approximate its meaning because of a set of rules without exceptions.

5.3.3.3 Scientific misnaming

> **INSIGHT:** *The scientific vocabulary works everywhere.*

Spaces which have been investigated and found to be of interest are usually named after one or more of their investigators, this practice unfortunately leads to names that are irrelevant to the properties of that space.

Science using individuals' names to name things creates a whole host of problem. Among the problems it creates are that it leads to future scientists believing in something [that does not exist], because they have faith in the former "scientists" imagined superior intellect.

By naming phenomena after individuals the individual becomes an authority, and in an authoritarian society it is considered disrespectful to question the authority. If the thing is named after an honored authority, then confusion becomes more likely, and the letting go of bad ideas and labels becomes more challenging.

Often in science in the early 21st century, because of ego and the market, the name of scientific/technical things does not help a user/observer actually uncover or understand the difference between things. In other words, often in science, the name given to a thing has no relation to the thing itself and its classification. In general, scientific labels come from the name(s) of prominent individuals and inventors.

Science names given that don't mean anything in relation to the thing itself. In early 21st century science, all of measures and units have mostly been named from their "inventor". There is a common saying, "The beginning of wisdom is to call things by their proper names."

> **NOTE:** *It's always a bad idea to let science terms have more than one meaning.*

5.3.3.4 Honor/eponymous naming

Honor naming (a.k.a., eponymous naming) is a form of scientific misnaming. For example, electricity is measured in units of power called watts. A watt is the unit of electrical power. It was named to honor James Watt, the inventor of the steam engine. Eponymous naming is naming things in reality after people, after subjective individuals. In physics, the name of measurements is eponymous as are the units as are processes. Unfortunately, by using individuals' names, scientists end up cluttering the information landscape with useless drivel.

It is selfish and unfortunate when people name discoveries, ideas, and theories that relate to the natural order of reality after themselves (or, others name it after then, which is more often the case). Egotistical and ownership-oriented mis-naming/mis-labeling just make life harder for others. One of the few ways in which a scientist can gain lasting recognition (often after they are deceased) and make life (and learning) more difficult for everyone else is by having a scientific discovery named after them. Such behavior, and the resulting linguistic-conceptual non-coherence creates a more confusing world for everyone and further obfuscates reality. Some scientifically identifiable items, such as species have two names, the scientific name and the common name. The question is, why have two names, which causes confusion; wherein, the common name is what the "everyday" person calls something and the scientific name is what scientists call something to coherently differentiate it from other things in the same group/family/section/category/type. Also, some scientific names reflect the common names which may not follow acceptable naming rules and conventions.

5.3.4 Precision of language and oppression

> **INSIGHT:** *Language in cults us controlled because language is powerful in shaping human thought and behavior.*

There is a belief, incorrectly, that using precise language is oppressive in some manner. When in fact, it is the conflict that arises out of imprecise language that generates an oppressive environment. Community encourages precision in speech and thought. Of course, it can sometimes be important in the formation of coherent thoughts to ramble, think out loud, construct an argument as you go along, or say anything provocative.

> **NOTE:** *It is possible to control the way people think by controlling their language.*

Precision of language refers to being precise in the identities we refer to in communication. There is a profound danger in watering down our discussion of identity. Doing so ensures that the conversation remains about interpersonal slights rather than about the larger systems, which may be the true problem. There is a profound danger in watering down our discussion of identity by removing any mention of societal power, oppression, and privilege. What is dystopian is a world where most people are uninterested in clarity in communicating ideas. Language, like other forms of communication, can have sub-perceptual properties.

> **NOTE:** *In community, there are no words approved or disapproved by any authority figure.*

In the novel, 1984 by George Orwell, one of the ways the government controlled its subjects was to control their language. If people can't use the right words, they can't have the right thoughts.

> **APHORISM:** *When you learn new words you will have new thoughts. And, when you are in denial of something, it is hard to know how much you are in denial of it, because you are facing away from it.*

5.3.5 Mathematical language optimization

The language of math can be composed more and less efficiently.

5.3.5.1 Multiplication

Multiplication is taking a set (group) of something that is the same and copying/identifying the set a number of times:

- 3(5)
  - May also be written as: 3x5 or 3*5 or 3•5
- Three groups (sets) of five of the same objects (or, movements) each:
  - Three is the count of groups (of sets of objects or

actions).
- Five is the count of objects (or action repetitions) in each group.

5.3.5.1 The fraction (ratio) in both languages

A fraction differentiates (or "measures") parts versus the whole.

- XX/YY.
- XX is the part.
- YY is the whole.

In the English language, this read as: XX parts of YY. Note that the number representing the whole comes at the end.

In the Chinese languages, parts of a whole are stated as: YY 分之 XX. Note that the number representing the whole comes at the beginning. When expressing a fraction in Chinese, the whole (denominator) is always said before the part (numerator).

For example, in concern to the fraction 2/3:

- 2 is the part.
- 3 is the whole.

In the English language, it is read as:

- Two thirds.
- Two [parts] of three [parts].
- Two over three.
- Two [out] of three.

In the Chinese languages, it is read as:

- From three [pieces] there are two [pieces].
- Three pieces, two.

5.3.5.2 Percentages in chinese

In the Chinese languages, the same basic "part of whole" construction is used. In this case, the whole is 100 or 百 and the part is the actual percentage (as represented by an integer). Hence, the expression is as follows:

- 百分之 XX = %, where XX parts of one hundred (XX%)
- For example, 20% may be expressed as: from 100 there is 20%

5.3.5.3 Decimal in different languages

Fractions can be stated as decimals easily in Chinese. This is because each digit of the decimal fraction is stated individually. So instead of remembering tens, hundredths, thousands, etc., the numbers following the decimal point (to the right) are numerically listed.

The decimal point in Mandarin decimal fractions is stated as 点 (diǎn). If the number begins with the decimal point, it can optionally be prefaced with zero or 令 (líng).

Here are two examples:

- 1.3= 一点三 (yī diǎn sān)
- 0.5674= 零点五六七四 (ling diǎn wǔ liù qī sì)

The West reads and writes from left to right but the numbers come from India and Arabia where one reads and writes from right to left. In English 14 is pronounced as fourteen but it should rather be ten·four. 21 is pronounced in proper order as twenty·one, but is better pronounced as two·ten·one, so that the decimal positional system is also supported by pronunciation.

5.3.5.4 Counting (value incrementing) in both languages

Counting from 0 to [1 through] 10 in English and Chinese generates ten unique words, which symbolize the ten numbers of the most widely used base-10 digit system (0-9). From 11–20, the English and Chinese ways of linguistically expressing count begin to differ.

In the English language, to count from 11–20, ten additional words are required. Hence, to count from 1–20 in English, 20 unique words need to be learned. In the Chinese language, to count from 11–20, no new words are introduced. Instead, the Chinese language reincorporates the same words used for 1–10, to cover all the numbers from 11–20. If "you" can count from 1–10 in Chinese," you" can count to 20 by default.

In the English language, to count from 21–100, eight new words are introduced (thirty, forty, fifty…,hundred.). In the Chinese language, to count from 21–100, only one new word is introduced: hundred. No new words are introduced to count from 11–99 in Chinese.

Therefore, to count from 1–100 in English, someone needs to account for 28 words. To count from 1–100 in Chinese, someone need only account for 11 words. This is a significant difference and impacts learning. While the English number words from 11-100 undergo sound changes, the Chinese numbers remain predictable.

After a child learns to count from 1–10 in Chinese, one additional logical concept/rule is applied (iteration), and they can seamlessly count from 11–99. The logic stream remains, and the child doesn't have to learn a single new word to count from 11–99. By learning to count from 1–10, they have learned everything they need to count from 1–99. Further, there are no additional spelling complexities and exceptions that need to be learned.

Watch a child learn to count in English. What happens after they learn 1–10? They get confused, because it's ten new words to count from 11–20. And what happens after they count to 20? They often get stuck at each ten segment for the simple reason that it's a new word – thirty, forty, fifty, etc.

5.3.5.5 Measurement in both languages

How to express a certain amount or quantity [of

something] is different in different linguistic expressions of numbers.

Counting in Chinese requires the use of a special class of words called "measure words". Some words in English perform similar functions, but the difference is that in Mandarin all words require a measure word when being counted. These serve to give units for counting and classifying nouns. In Chinese, there are 'measure words' for [almost] everything. Many of the measure words may be applied to multiple different [types of] objects. Every object has a measure word that must be known (and is to be used when expressing a measure concerning that object).

When counting objects, Chinese uses the following formula:

- Number + Measure Word + (Object)

When counting fractions of a thing, Chinese uses the following formula:

- Whole Number + Measure Word + Fractional Number + (Object)

For instance:

1. For pens, it is said, "three sticks of pens".
2. In English, one could say that there are three sheets of paper. In this case, the word "sheets" would act as a measure word. It would not make sense in Chinese to say, "three papers" (as in, "I have three pencils and three papers in my hand").
3. It is not possible to say "one person" or "two people", as in English. Instead, it is said, one *ge* person or two *ge* people. Here, *gu/ge* is [one of] the measure word for person/people.

In English, counting things involves two inputs, the quantity, and the name of that which is being counted.

For example,

1. [There are] a *quantity [#]* of *objects [name]*.
2. [There are] three pens.
3. [There are] three pieces of paper.

English does, occasionally, use measure words.

- For instance, how many 'heads' of livestock are there? Herein, 'heads' is a measure word. There are nine heads of livestock; nine cows.

The linguistics around measurement in Chinese make quantification and comparison unnecessarily more complex by requiring users to remember and apply an additional word. Therein, that word may or may not be inherently relevant to the conceptual characteristics of the measured object itself. And, it certainly introduces the likelihood for conceptual confusion. For instance, in Chinese, the concept 'stick' is used as the measurement word for quantifying pens; as in, "three sticks of pens". To a large extent measure words pertain to an objects shape or a significant characteristic, but this is not always the case. For instance, there is a measure word pertaining to long flexible/flowy things, "tiao". For example, a fish, dragon, and pair of pants all use tiao as their measure word. There is a measure word for things that are flat, and this word is used for pieces of paper and for tables (even though tables are not flat, but have legs).

5.3.6 The "Unspell" alternative way of writing the English [spoken] language

INSIGHT: *Changing language arbitrarily is the same as imposing law arbitrarily.*

The "Unspell" written language is an alternative way of writing down the English language that is fast and easy to learn. It adheres closely to the alphabetic principle, in that each symbol is used to represent exactly one phoneme (speech sound). The human mind is wired for the distinct tasks of speech perception and speech production, and phonemic memory is the vital link between the two. Every child comes equipped for building a mental dictionary, and the symbols that comprise this dictionary are not letters but phonemes. In most languages, in which letters map directly to phonemes, this distinction is largely irrelevant, but the incomplete mapping of written English is a major impediment to learning. This is because the human mind, and especially a child's mind, is not especially good at memorizing sequences of abstract symbols, such as phone numbers, lists of random pictures or the spellings of English words. It expands the reading horizons of children by removing the barrier of learning English spelling, allowing them to immediately start reading whatever they like. For some children it can be a way around dyslexia and other learning disabilities. It gives children of all abilities a shortcut to learning how to read and write English by focusing on the important part of language learning first - the words themselves, and the ideas they represent - leaving the rote memorization of how they are spelled for later.

Project Unspell has produced a precision written language known as, "Unspell" as an alternative to the latin-based writing system of the English language. The "Unspell" language was designed by first selecting a minimum set of phonemes that captures all the key distinctions of spoken English across all the major dialects. The goal was to be neither overly precise (that would make it more difficult to use) nor overly general (leading to incorrect pronunciation and confusion). The number and significance of minimal pairs was taken into account; thus, Unspell distinguishes pin/pen and pull/pool, but not cot/caught. (Orlov, 2022)

The second step was to map the phonemes to symbols. This was done in a way that renders the most

common phonemes using the fewest strokes. As many symbols as possible were made to resemble the shapes of corresponding Latin letters (making them easier to learn). Vowels and consonants were made to look different at a glance, using the same set of symbols for both but distinguished by their height, thus halving the number of symbols that have to be learned. Paired voiced and unvoiced consonants, such as p/b, f/v, k/g, etc., were distinguished using a single stroke (a voicing mark), further reducing the number of symbols that need to be learned by eight. Overall, similar sounds were assigned to similar symbols. (Orlov, 2022)

The overarching principle that was applied throughout the design of Unspell is the "Principle of Least Astonishment": there are no surprises, except for the initial shock of encountering something radically new. In other words, optimal design means that if a necessary feature has a high astonishment factor, it may be necessary to redesign the feature (design > test for astonishment/intuitiveness > redesign where astonishment/unintuitive). In general engineering design contexts, the principle means that a component of a system should behave in a way that users expect it to behave; that is, users should not be astonished by its behavior (i.e., more intuitively expected behaviors are better). (Orlov, 2022)

Additionally, the Unspell symbols map onto the QWERTY keyboard that is standard throughout the English-speaking world, taking up both upper- and lower-case registers. Stressed vowels (which are wider than unstressed ones) and the eight paired voiced consonants are accessed via the shift key. Those who can already touch-type English on a QWERTY keyboard will find that they have very little to learn. (Orlov, 2022)

5.3.7 The failure of the current written English language to meet the linguistic requirements of humanity

English is a relatively simple language to learn: a simple, analytical grammar with no declension or conjugation tables to memorize, a largely international vocabulary mainly derived from French and Latin, and a sound system that features just a few sounds that are exotic.

In spite of that, around 50% of all native English speakers struggle with learning to read and write, and the levels of functional illiteracy in English-speaking countries are often many times those of other developed nations. Of the billion or so students around the world who are studying English at any given time, only a very small percentage go on to achieve any sort of competency in it. In many English speaking countries, children spend approximately eight years memorizing the spellings of words to achieve basic competence in written English. But eighth-grade-level reading and writing skills are too limited for most practical uses, such as understanding law, science, medicine, technology or commerce. In contrast, schoolchildren in countries where the national language has a regular, consistent orthography achieve adequate literacy in just a year or two, by memorizing a small set of rules, and are then free to learn other things. It is little wonder that many of these countries are surging ahead while English-speaking countries are falling behind. To learn English spelling is to memorize thousands of obsolete spellings of words: “whale” still has an “h” in it; “gnat” still starts with a “g”. Children are forced to cram such non-information into their heads in order to pass tests that allow them to get on in life.

The reason for this is perfectly simple: English spelling is a nightmare. It was haphazard to begin with, but then it was simply frozen in time sometime in the 17th century. Since then, the way English sounds has evolved almost beyond recognition. English has no orthographic rules, just an assortment of patterns. Which of the many patterns applies in any given case depends on what word it is. Because of this, to learn English one has to separately memorize how each word is written and how it is pronounced. It is not a system that can be taught or learned—only memorized.

A poorly constructed language system makes learning the language and learning other things in life more difficult, and more likely to fail its users in its purpose to optimize communication and understanding. Illiteracy has many wide-ranging effects (Orlov, 2022):

1. Students waste years on a memorization task they may not be ready for, rather than learning something interesting.
2. Job training and retraining is more difficult for trainees as well as potential employers.
3. Public health and safety is impacted when people can't read safety brochures or health information.
4. It can put you in jail: as a barrier to legitimate employment in the modern-day world, illiteracy can force people to commit economic crimes.

> *"In spite of the vast resources and effort directed at achieving basic literacy in English-speaking countries, and in spite of the excessive failure rate of these efforts, few people have dared to ask the simple question: Why is this? Yet all you have do is look, to find both the source of the problem and its solution. It is curious how a culture that embraces radical change in some ways chooses to remain tradition-bound in other ways, even where these old ways inflict great harm."*
> *-Orlov (Orlov, 2022)*

The typical sequence of events in learning to read an alphabetic language is as follows:

1. Learn what sounds the letters make.
2. Learn to form syllables out of these sounds.
3. Learn to form words out of the syllables.

In a language where the mapping is ambiguous, the learner has to memorize the spelling of each word as a whole and then look up its sound in non-verbal

memory. For many people, unfamiliar words become incomprehensible, because the learner is afraid to sound it out for fear of making a mistake and remembering it incorrectly. (Orlov, 2022)

In this case, the learner is not being provided with something vital: a way of converting between sight and sound, and back, that can quickly become effortless and automatic. This is the main cause of trouble with basic education in English-speaking countries which accounts for both its inefficiency and its unacceptable failure rate. (Orlov, 2022)

The precision language [tool] is a way to cleanly circumvent all of these difficulties. "Unspell", for example, uses a simple set of just 13 symbols which, with 4 equally simple modifications that group symbols into sets (vowel vs. consonant, voiced consonant vs. unvoiced, etc.) represent all of the 40 speech sounds of the English language that signal changes in meaning. Most of these symbols are not part of the Latin alphabet, making spelled English and "unspelled" English impossible to confuse. The learner sounds out each symbol, then groups sounds into syllables, syllables into words, and words into phrases. (Orlov, 2022)

5.4 Intelligence and language

Language has a direct impact upon cognition. Language has an impact on our psychology and a limited language can limit our understanding of self and other. We are all profoundly impacted by the language we adopted from childhood. It is akin to software running in the background that we might not be aware of. The principles of a language can set our minds free or restrict our thoughts and our lives. Imprecise languages can slow down the learning process for children and potentially even reduce capabilities (e.g., math). (Vangelova, 2015) Languages with higher precision will be learned more quickly, because a set of rational/logical rules is used for their construction, without needing to memorize exceptions. Additionally, languages that convey more precise technical elements will convey a higher intelligence (better understanding and decisioning) for the people who use them. Language is a tool, if someone has a precise technical tool, then it can be used to do work precisely, and therein, communicate and understand more effectively and efficiently.

For example, in general, Chinese speakers do mathematics better than those who don't speak Chinese natively, because the Chinese language has a more precise language around mathematics. Chinese speakers are technically more precise in their language around mathematics, and so, they are literally more intelligent when it comes to mathematics.

> **INSIGHT:** *If it can't be encapsulated in language, then a conversation about it becomes somewhat impossible. If you don't have the vocabulary for a subject matter (e.g., colours), then you aren't going to have a nuanced understanding of that subject (e.g., the total spectrum of things that you might see).*

5.5 Machines and language

The common language of machinery is logic. Within the intricate circuits, algorithms, and operations of machines, logic serves as the universal language - a language that enables the animation of machines to express behavior, functionality, and intelligence.

Machine language, also known as machine code, operates on the basis of binary logic. Binary logic, or Boolean logic, is a system of logic that deals with operations using only two values: true (represented as 1 or ON) and false (represented as 0 or OFF). In the context of machine language, the fundamental operations and instructions are based on binary logic, manipulating sequences of 0s and 1s to represent data, instructions, and commands that computers can understand and execute.

There are three axiomatic logical operations in machine language:

1. AND
2. OR
3. NOT

> *Note: these three operations may be combined in a variety of manners.*

These operations form the basis for the computational processes within a computer's processing units (CPs), enabling the manipulation of EM signals, interpreted as data by software and human users. At the hardware-power level, the execution of instructions takes on a binary format. While high-level programming languages may abstract away much of this binary logic, the hardware machine language directly deals with these binary instructions, making it the fundamental layer of communication and operation for computers.

After "binary" [hardware] machine language, computers often utilize "assembly" language as the next level of programming language. "Assembly" language is a low-level programming language that uses mnemonic codes or symbols to represent the instructions understood by a computer's processor. Although "binary" language is readable by humans, "assembly" language is considered the first really useful human-readable and human-workable representation of machine instruction.

Each mnemonic in "assembly" language corresponds to a specific machine code instruction. However, assembly language instructions are still closely related to the underlying architecture of the computer's CPU, and they provide a more intuitive way for programmers to interact with the hardware. Higher-level programming languages like C, Python, Java, and others are built on top of "binary" language or "assembly" language machine code; most are built on "assembly" language machine

code. They offer more abstraction, increased readability, and greater portability, allowing programmers to focus more on problem-solving and less on the specific details of hardware. These high-level languages are translated into machine code or assembly language by compilers or interpreters before execution on the computer.

Compilers and interpreters are software used in the process of translating higher-level programming languages (which are closer to human-readable and workable form) into "binary" language computers can execute, or "assembly" language that is then converted into "binary" language. Compilers and interpreters provide the same function of converting one language into another lower language (language conversion software tools),

1. **Interpreters** are used for real-time conversions and executions. Each time the program runs, the interpreter reads and processes the source code, translating and executing it in real-time (i.e., "on-the-fly"). Interpreters functions like a real-time language interpreter, translating and executing the source code line-by-line or statement-by-statement as needed during runtime without producing a separate translated version.
2. **Compilers** are used for producing a stand alone executable object that no longer requires the original source code, or even the compiler, to run. Compilers create executable final files. Compilers function to translate an entire body of content (source code) into another language (machine code) before execution.

Scholarly references (cited in document)

- Basciano, Bianca. (2015). *Word Classes, Modern, in: Encyclopedia of Chinese bLanguage and Linguistics*. General Editor Rint Sybesma. https://doi.org/048/10.1163
- Cook, C., Goodman, N.D., & Schulz, L.E. (2011). *Where science starts: Spontaneous experiments in preschoolers' exploratory play.* Cognition, 120(3), pp341–349. https://doi.org/10.1016/j.cognition.2011.03.003
- Drogoul, A., & Ferber, J. (1994). *Multi-agent simulation as a tool for modeling societies: Application to social differentiation in ant colonies*. In C. Castelfranchi & E. Werner (Eds.), Artifcial social systems (Vol. 830, p. 2-23). Springer Berlin Heidelberg. http://dx.doi.org/10.1007/3-540-58266-5
- Epstein, J. M. (2008). *Why model? Journal of Artificial Societies and Social Simulation*. 11 (4), 12. http://jasss.soc.surrey.ac.uk/11/4/12.html
- Gaede, B. (2014). *What is physics?* https://vixra.org/pdf/1705.0185v1.pdf | https://ropehypothesis.com/foundations-of-physics/what-is-science/ | https://www.researchgate.net/profile/Bill-Gaede
- Greening, L. A., Greene, D.L., Difiglio, C. (2000). *Energy Efficiency and Consumption—The Rebound Effect—A Survey.* Energy Policy, 28, 389-401.
- Kim, J. (1999). *Making Sense of Emergence*. Phil. Stud. 95, 3–36. DOI:10.1023/A:1004563122154
- Siebers, P., & Aickelin, U. (2008). *Introduction to multi-agent simulation*. CoRR, abs/0803.3905. http://arxiv.org/abs/0803.3905
- Haber, J. (2015). *Modeling Distributed Cybernetic Management for Resource Based Economies: A simulation approach to Stafford Beer's 1971 CyberSyn Project*. University of Amsterdam, Intelligent Systems Lab. Bachelor thesis. https://esc.fnwi.uva.nl/thesis/centraal/files/f1930828629.pdf
- Steen, Gerard J. (2007). *Finding Metaphor in Grammar and Usage: A Methodological Analysis of Theory and Research*. [Converging Evidence in Language and Communication Research 20], Amsterdam/Philadelphia.

Book references (cited in document)

- Fuller, R.B., Applewhite, E.J. (1982). *Synergetics: Explorations in the Geometry of Thinking*. Macmillan Pub Co. Estate of Buckminster Fuller availability http://www.rwgrayprojects.com/synergetics/toc/toc.html
- McRoy, S. (2021). *Principles of natural language processing. Overview of English syntax*. University of Milwaukee Press Books. https://uwm.pressbooks.pub/naturallanguage/chapter/chapter-3-overview-of-english-syntax
- Peikoff, L. (1993). *Objectivism: The Philosophy of Ayn Rand*. Meridian.
- Rand, A. (1990). *Introduction to Objectivist Epistemology*. Binswanger, H., Peikoff, L. (Eds.). NAL.
- Rand, A. (1997). *Letters of Ayn Rand*. Berliner, M.S., Peikoff, L. (Eds.). NAL.
- Rand, A. (2011). *The objectivist ethics*. Literary Licensing, LLC.
- Porter, T. (1999). *Ayn Rand's Theory of Knowledge*. Tom Porter.

Online references (cited in document)

- Bellus, J., Plumer, B., Resnick, B. (2016). *The 7 biggest problems facing science, according to 270 scientists*. VOXMEDIA. https://www.vox.com/2016/7/14/12016710/science-challeges-research-funding-peer-review-process
- Burner, B. (2013). A *Reply to Stefan on Induction and Deduction*. Incinerating Presuppositionalism. http://bahnsenburner.blogspot.com/2013/11/a-reply-to-stefan-on-induction-and.html
- Dennet, D. (2013). *Daniel Dennett: "Intuition Pumps and Other Tools for Thinking"*. Talks at Google Channel. https://youtu.be/4Q_mY54hjM0
- *E-Prime Language. UVA-OB-0722*. Darden University of Virginia. Accessed: 12 June 2023. https://faculty.darden.virginia.edu/clawsonj/COURSES/TACTICAL_LEADERSHIP/OB-722_E-Prime.pdf
- Mcshanahan, M-C. (2011). *Student's don't lose their ability to think scientifically*. Boundary Vision. https://boundaryvision.com/2011/09/22/students-dont-lose-their-ability-to-think-scientifically/
- Orlov, Dimitry. *FAQ*. Project Unspell. Accessed: 7

January 2022. http://unspell.blogspot.com/p/faq_27.html
- Vangelova, Luba. (2015). *How Spelling Keeps Kids From Learning.* The Atlantic. https://www.theatlantic.com/education/archive/2015/02/how-the-english-language-is-holding-kids-back/385291/
- Zoudros, Leonidas. (2013). *World Goodwill Seminar, London 2013 - Leonidas Zoudros*. LucisTrust. https://youtu.be/iafKnCt1u54

Online references (non-cited)

- Cheung, P. (2010). *Introduction to systems*. Imperial College London. http://www.ee.ic.ac.uk/pcheung/teaching/ee2_signals/Lecture%202%20-%20Introduction%20to%20Systems.pdf

TABLES

Table 25. *Differences between the system thinking forms.*

Methodological Thinking	Systematic Thinking	Systems Thinking	Systemic Thinking	Synthetical Thinking
Thinking about methods.	Thinking methodically (i.e., using a systems-oriented method).	Thinking about how things interact with one another.	A techniques for finding systems-wide focus and gaining systemic [root] insights into complex systems.	Synthesizing an understood identification of complex interactions of patterns (i.e., similarities) in a system. Whereas analytical thinking is an identification of differences.

Table 26. *Linguistic word classes divided by the axioms of concepts and objects. For example, if the verb is living (process); the adverbs (modifiers) are alive and dead. Alive and dead are adverbs, because they embody a process or relation. The noun is chair, the adjectives are color (property) and red (quality). Note here that a concept is a relationship between (Read: associates) two or more objects.*

Parameters	[Motion] Concepts		[Shapes] Objects	
Word Classes	**Verbs**	**Adverbs**	**Nouns** *(including: pronouns and proper nouns)*	**Adjectives**
Rational Word Classes	Dynamic Concept, Not Object	Static Concept, Not Object	Object [Name], Not Concept	Object [Property], Not Concept
Functions	Define [Concept]	Modify [Concept]	Describe [Object]	Qualify [Object]
Axioms	Conceptual	Conceptual	Physical	Physical
System Labels	Process (Action)	State (Relation)	Shape (Volume)	Property (Attribute)
System Attributes	Motion (Action)	Configuration (Relation)	Location (Distance)	Quality (Expression)
Requirement to Understand	Animation of Shape(s)	Labeled Animation	Image of Shape	Labeled Image
Static and Dynamic Representations of understanding	Dynamic representation of concepts (action): # of image frames	Static representation of objects before, during, or after motion: configuration Static representation of concepts: state	Static representation of object: image Static representation of objects: image	Static physical representation: position (volume) Dynamic physical representation: Δ location

Table 27. *Functional linguistic word classes are all concepts, because they explain relationships between concepts. There are four functional classes: Articles and numbers, conjunctions that join meanings, adpositions that identify spatial location, and roles that identify working/using functions.*

Parameters	[Functional] Concepts			
Word Classes	**Articles**	**Conjunctions**	**Adpositions**	**Roles**
Rational Word Classes	Numerical-Category Concept, Not Object	Link prepackaged units of meaning	Spatial, Temporal	Team
Functions	Identify Category, or 1 of Category	Link, Join	Identify Spatial and/or Temporal Location	Human objectives
Axioms	Conceptual (Category and Number)	Conceptual (Complex Meaning Associations)	Physical (Spatial) and/or Conceptual (Temporal)	Conceptual (Work)
Category	A/an, or The	Link (function)	Location	Work (Service)
One of	Quantity of The, or Quantity in Category	Association sub-type	Time	(Service) Habitat Standard

TABLES

Table 28. *Table outlining some broad axiomatic categories of mathematics along with brief descriptions of each category, including the axiomatic concepts of variables and constants.*

Axiomatic Categories	Description	Use of Variables	Use of Constants
Algebraic Mathematics	Focuses on relationships between quantities (mathematical structures) including: vector spaces, matrices, and linear transformations based on algebraic operations.	Utilizes variables to denote unknowns or changing quantities.	Involves constants as fixed values or elements in mathematical structures.
Number Theory	Studies properties of integers and their relationships, including prime numbers, divisibility, and number patterns.	Involves variables to denote integers, variables for exploring number properties.	Often deals with constants such as specific numbers like 2, 3, or mathematical constants.
Calculus and Analysis	Deals with rates of change and accumulation functions, limits, derivatives, integrals, and their applications in analyzing change and continuous phenomena.	Utilizes variables to represent changing quantities, rates of change.	Involves constants for fixed values, such as mathematical constants like π or e.
Probability and Statistics	Involves probability theory, statistical analysis, and methods used in analyzing data, making inferences, and dealing with uncertainty.	Utilizes variables to represent random variables, outcomes, or unknown parameters.	Includes constants for probabilities, fixed parameters, or statistical distributions.
Geometry and Topology	Studies shapes, sizes, properties of space, and relationships between geometric objects; topology deals with properties preserved under continuous transformations.	Utilizes variables to represent geometric properties, coordinates, or transformations.	Involves geometric constants like π for circles, or fixed properties of shapes.
Mathematical Logic	Studies formal systems, reasoning, and proofs, including propositional and predicate logic, set theory, and formal proofs.	Involves variables to represent logical statements, predicates, or unknowns.	Utilizes constants for fixed logical values or properties in formal systems.
Combinatorics	Deals with counting, arrangements, combinations, and permutations of discrete objects and structures.	Utilizes variables to represent counts, arrangements, or combinations.	Involves constants such as factorials or specific counts in combinatorial problems.
Mathematical Modeling	Utilizes various mathematical tools and principles from different branches to describe real-world phenomena and systems.	Utilizes variables to model real-world quantities, parameters, or properties.	Includes constants for fixed parameters or known quantities in mathematical models