

DISCRETE MATHEMATICS
Knowledge has Organizing Power

Theme 4
LOGIC
Knowledge has Organizing Power

LESSON 13
PROPOSITIONAL LOGIC
Knowledge is Structured in Consciousness

Wholeness of the Lesson

The reliability of computer programs depends on the reliability of mathematics. Mathematical knowledge is reliable because mathematicians use logic and proofs to validate their claims. Logic and proof depend on the knowledge, judgment, and intuition of mathematicians.

Science and Technology of Consciousness: Knowledge, judgment, and intuition are structured in consciousness. Transcending and enlivening the deepest levels of our own consciousness develops our judgment and intuition.

Main Points

1. Propositional logic consists of declarative sentences that can be determined to be either true or false, but not both. Combinations of such sentences are created by means of negation, conjunction, disjunction and implication, together with truth tables for determining whether these combined sentences are true or false.

Science and Technology of Consciousness: Life is structured in layers from simple to more and more complex.

2. Propositional logic is used to construct basic logic circuits in computers.

Science and Technology of Consciousness: Knowledge is for action. Action is for achievement. And achievement is for fulfillment.

3. Laws of logic can be verified using truth tables to determine if two statements are logically equivalent.

Science and Technology of Consciousness: Subtler, more abstract levels of life are more holistic and therefore bring more truth. Transcendental Consciousness is that most subtle level of life that knows only truth.

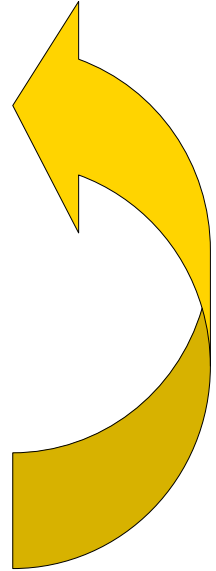
UNITY CHART

Connecting the Parts of Knowledge with the Wholeness of Knowledge

Validating Knowledge

1. Mathematical knowledge is reliable because it is based on logic.
2. Truth tables give us a systematic method to use logic to evaluate the validity of mathematical statements.

3. **Transcendental Consciousness** is experience of a field that knows only truth.
4. **Impulses within the transcendental field:** start the process of discrimination and differentiation, true and false.
5. **Wholeness moving within itself:** In Unity Consciousness, we see all mathematical statements having their source in the totality of our own unbounded Self, which knows only truth.



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LESSON 14
PREDICATES AND QUANTIFIERS
Handling the Field of All Possibilities

Wholeness of the Lesson

Predicate logic analyzes the content of a proposition, not just its structure. Using predicate logic, we consider properties (given in predicates) that can be applied to all possible objects in the domain of the predicate.

Science and Technology of Consciousness: Knowledge is structured in consciousness. After expanding our consciousness with practice of the Transcendental Meditation technique, we are at home with all knowledge.

Main Points

1. A predicate defines a propositional function that assigns a proposition to each object in its domain. The truth value of the resulting proposition can be determined by examining its content.

Science and Technology of Consciousness: It is easy to handle any specific problem after we have expanded our awareness through practice of the Transcendental Technique.

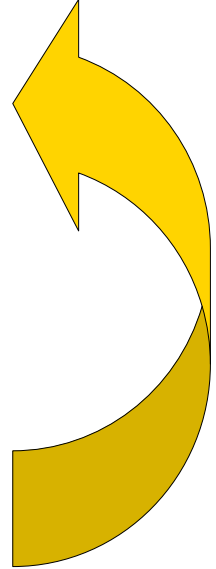
2. Quantifiers \forall (for all) and \exists (there exists) also define propositions from a given propositional function. Quantifiers allow us to handle all possible objects in the domain of the propositional function simultaneously.

Science and Technology of Consciousness: Action is most effective when we can handle all possibilities simultaneously. By establishing our awareness in the home of all knowledge through regular practice of the Transcendental Meditation technique, we handle all possibilities.

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Connecting the Parts of Knowledge
with the Wholeness of Knowledge
Validating Knowledge

1. Propositional logic evaluates the truth of a statement based on its structure.
2. Predicate logic evaluates the truth of a statement based on its content.
3. **Transcendental Consciousness** is a field free from differences and contradictions.
4. **Impulses within the transcendental field:** start the process of discrimination and differentiation between true and false.
5. **Wholeness moving within itself:** In Unity Consciousness, we see all mathematical possibilities in terms of their source in our own unbounded Self.



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LESSON 15
BOOLEAN FUNCTIONS

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LESSON 16
BOOLEAN ALGEBRA