Art103 -- Spring 2021

Reading #1, Systems & Complexity

Q1. -- What is a good working definition of what a System is and perhaps what it is not?

A good working system consists of interdependent parts and groups that when combined, works together, function, networks, and operates as a whole. When one or more part of a system is making the process of a structure to be inoperative, then it is not a good functioning system.

Q2. -- For the 4 system definitions you were to look up please give in your own words what they mean and give an example of them for each case.

Modularity - refers to the concept of using interchangeable components that can be removed or replaced without affecting the system. An example of modularity is the use of lithium-ion battery. Battery cells, if charged, have the ability to charge different devices.

Decomposability - when a part or a group breaks down, a system's functionality is reduced to its original form.

Emergence - is when a part or group of parts only achieve a behavior when interacting together. An example would be a group of 100 underground miners working together to create a giant tunnel.

Chaos Theory - is a small change that can lead to different or even larger scale outcomes. For example, the 9/11 terrorist attacks led to over 800,000 deaths around the world.

Q3 -- Give us your definition of what Tessellation means and give an example you encountered, not mentioned in the reading.

Tessellation is repeatedly using different shapes and patterns to cover a surface without gaps or overlaps. I worked in residential constructions and I've seen tessellation patterned tiles installed on floor and wall surfaces.

Q4 -- What is the difference between ideas of Modularity and Tessellation? What are the properties that are in opposition with each other?

Modularity is interchangeable and its components work on its own; whereas the tessellation is not very versatile, as the positioning of every component must work with other components to perfectly fit and work in the system.

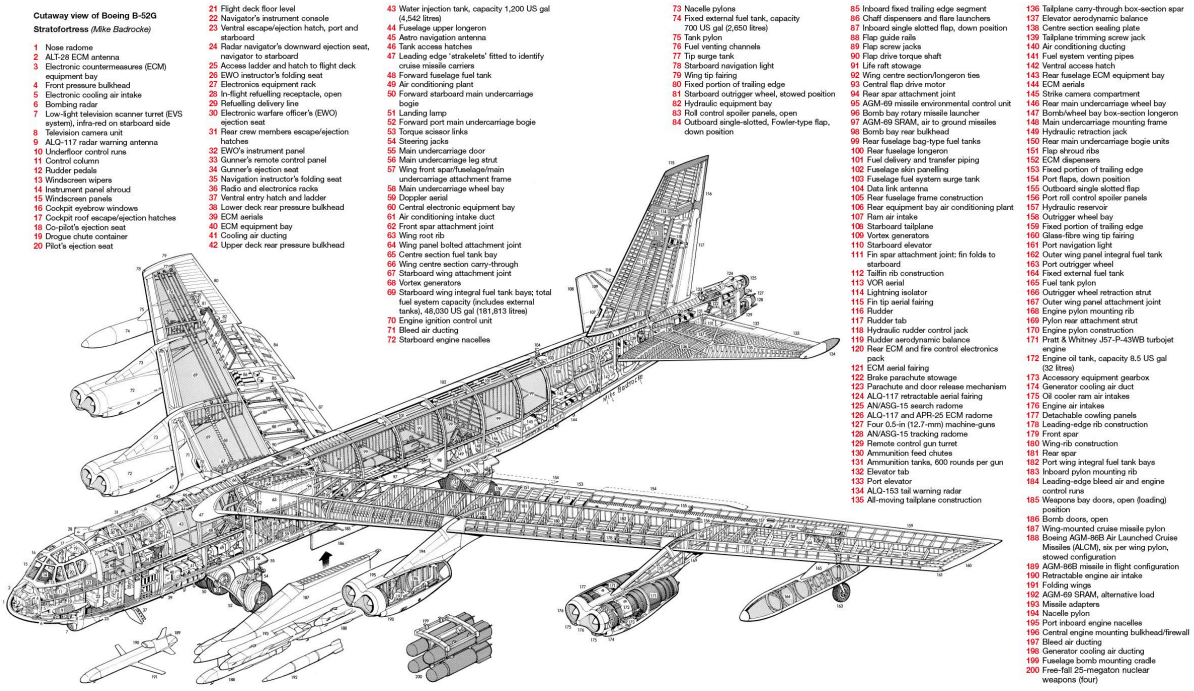
Q5 -- What is the difference between designing something that has Complexity (aperiodic) vs being Uniform (periodic)

Designing something periodic means using symmetry and repetitive patterns. On the other hand, an aperiodic design is using asymmetry shapes and patterns that fits but not necessarily repetitive and symmetrical as a whole.

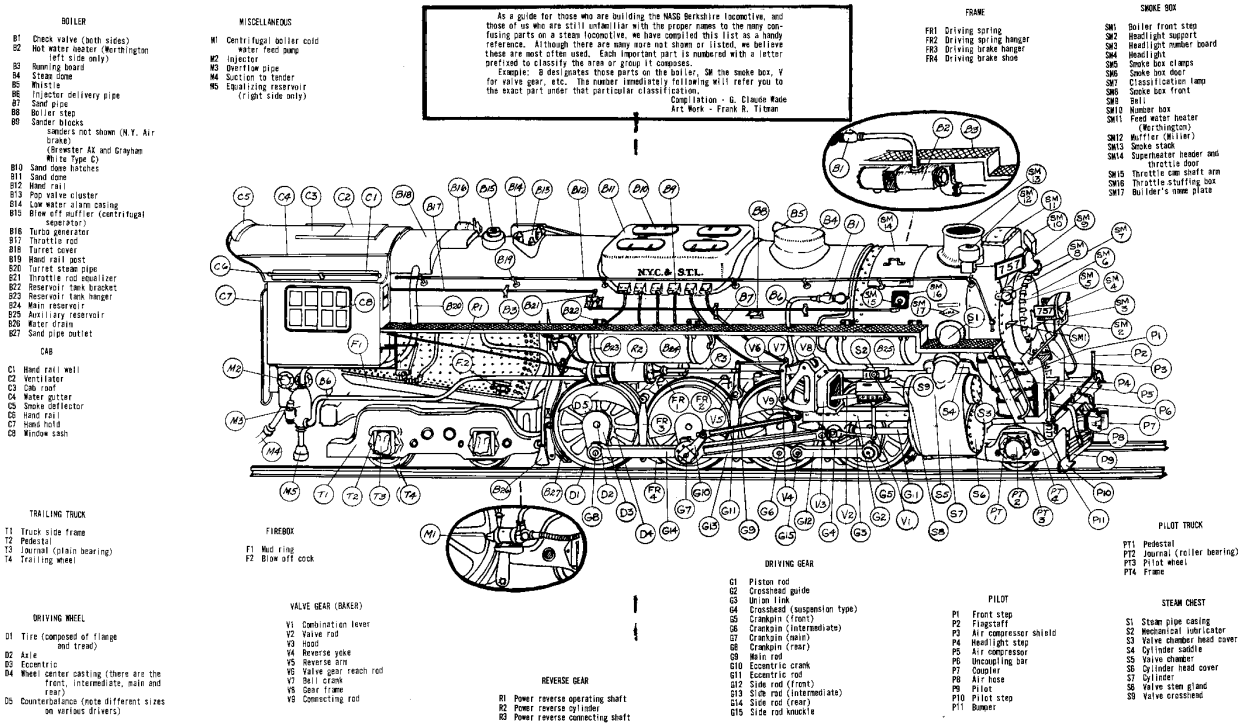
Q6 Group Activity. Each student will need to Bring in a series of 8 diagrams

Specifically :

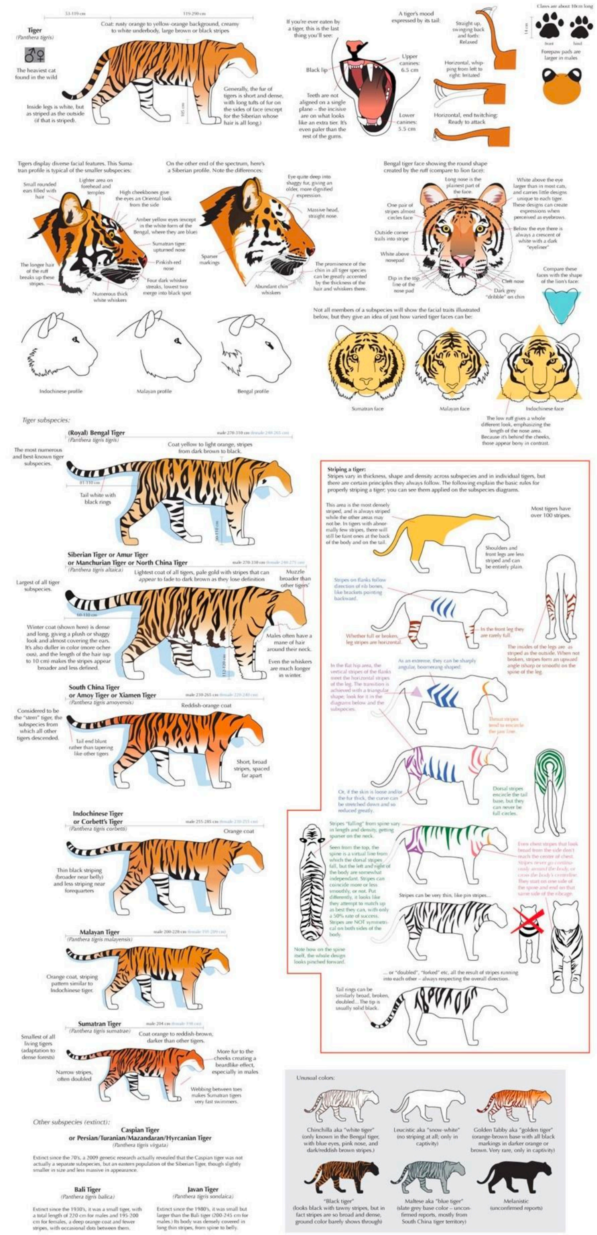
1. -- Bring in 2 system diagrams that have more than 100 elements



STEAM LOCOMOTIVE PARTS

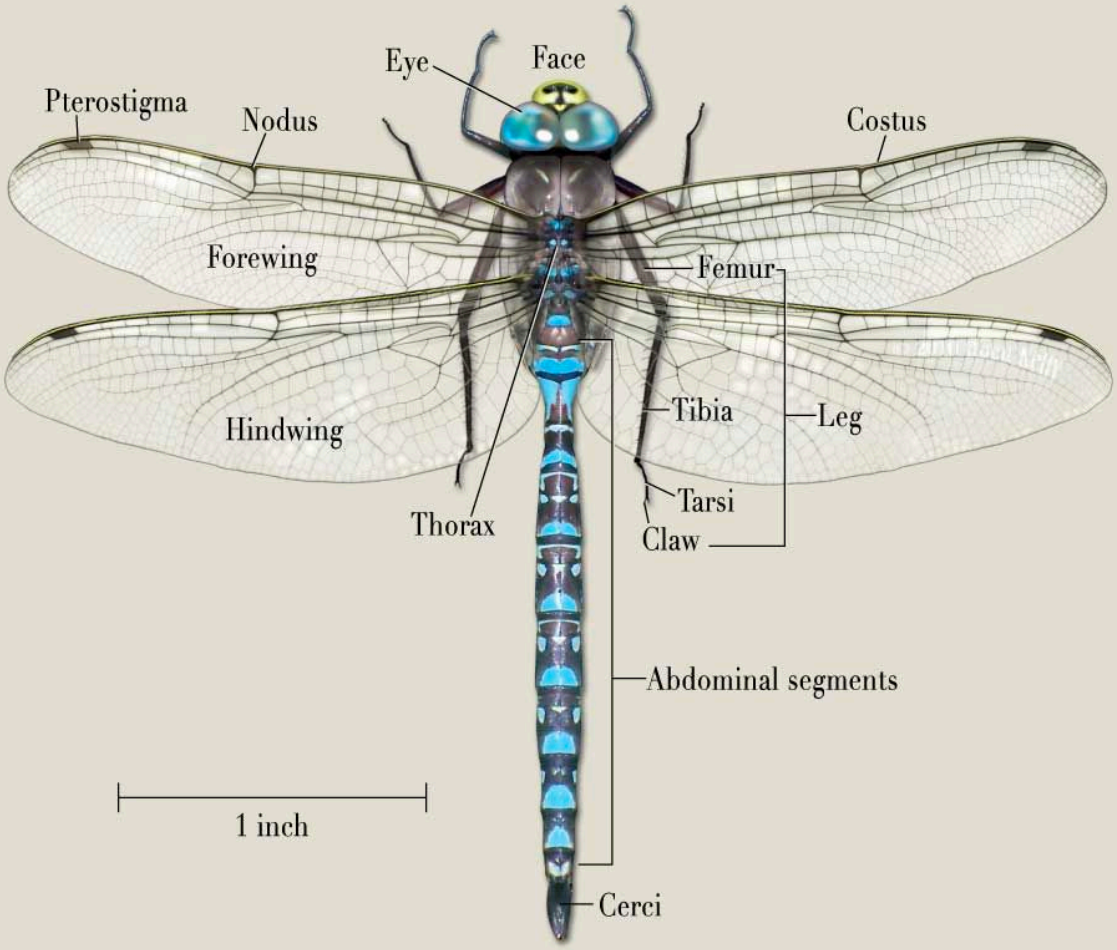


2. -- Bring in 2 system diagrams that is something considered living



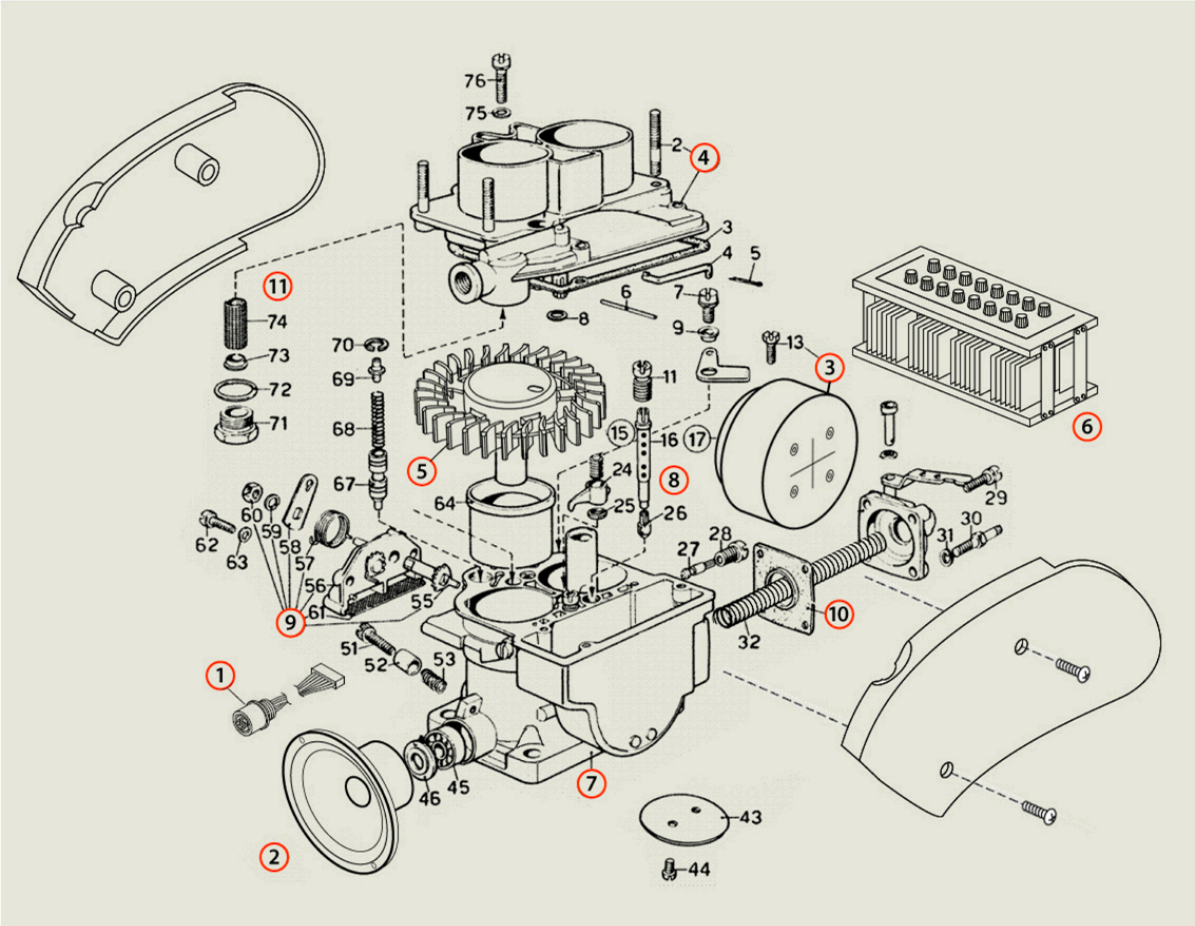
Tiger
(Panthera tigris)
The heaviest cat found in the wild
53-119 cm
119-290 cm
Coat: rusty orange to yellow-orange background, creamy to white underbody, large brown or black stripes
105 cm
Inside legs is white, but as striped as the outside (if that is striped).
Generally, the fur of tigers is short and dense, with long tufts of fur on the sides of face (except for the Siberian whose hair is all long.)
If you're ever eaten by a tiger, this is the last thing you'll see:
Black lip
Upper canines: 6.5 cm
Teeth are not aligned on a single plane – the incisive are on what looks like an extra tier. It's even paler than the rest of the gums.
Lower canines: 5.5 cm
A tiger's mood expressed by its tail:
Straight up, swinging back and forth: Relaxed
Horizontal, whipping from left to right: Irritated
Horizontal, end twitching: Ready to attack
Claws are about 10cm long
14 cm
front
hind
Forepaw pads are larger in males
Tigers display diverse facial features. This Sumatran profile is typical of the smaller subspecies:
Small rounded ears filled with hair
Lighter area on forehead and temples
High cheekbones give the eyes an Oriental look from the side
Amber yellow eyes (except in the white form of the Bengal, where they are blue)
Sumatran tiger: upturned nose
Pinkish-red nose
Four dark whisker streaks, lowest two merge into black spot
Numerous thick white whiskers
The longer hair of the ruff breaks up these stripes.
On the other end of the spectrum, here's a Siberian profile. Note the differences:
Eye quite deep into shaggy fur, giving an older, more dignified expression.
Massive head, straight nose.
Sparser markings
Abundant chin whiskers
The prominence of the chin in all tiger species can be greatly accented by the thickness of the hair and whiskers there.
Bengal tiger face showing the round shape created by the ruff (compare to lion face):
Long nose is the plainest part of the face.
One pair of stripes almost circles face
Outside corner trails into stripe
White above nosepad
Dip in the top line of the nose pad
White above the eye larger than in most cats, and carries little designs unique to each tiger. These designs can create expressions when perceived as eyebrows.
Below the eye there is always a crescent of white with a dark "eyeliner"
Cleft nose
Dark grey "dribble" on chin
Compare these faces with the shape of the lion's face:
Indochinese profile
Malayan profile
Bengal profile
Not all members of a subspecies will show the facial traits illustrated below, but they give an idea of just how varied tiger faces can be:
Sumatran face
Malayan face
Indochinese face
The low ruff gives a whole different look, emphasizing the length of the nose area. Because it's behind the cheeks, those appear bony in contrast.
Tiger subspecies:
(Royal) Bengal Tiger
(Panthera tigris tigris)
male 270-310 cm female 240-265 cm
The most numerous and best-known tiger subspecies.
Coat yellow to light orange, stripes from dark brown to black.
81-110 cm
Tail white with black rings
90-110 cm
Siberian Tiger or Amur Tiger
or Manchurian Tiger or North China Tiger
(Panthera tigris altaica)
male 270-330 cm female 240-275 cm
Largest of all tiger subspecies.
Lightest coat of all tigers, pale gold with stripes that can appear to fade to dark brown as they lose definition
Muzzle broader than other tigers'
60-110 cm
Winter coat (shown here) is dense and long, giving a plush or shaggy look and almost covering the ears. It's also duller in color (more ocherous), and the length of the hair (up to 10 cm) makes the stripes appear broader and less defined.
112-120 cm
Males often have a mane of hair around their neck.
Even the whiskers are much longer in winter.
South China Tiger
or Amoy Tiger or Xiamen Tiger
(Panthera tigris amoyensis)
male 230-265 cm female 220-240 cm
Reddish-orange coat
Considered to be the "stem" tiger, the subspecies from which all other tigers descended.
Tail end blunt rather than tapering like other tigers
Short, broad stripes, spaced far apart
Indochinese Tiger
or Corbett's Tiger
(Panthera tigris corbetti)
male 255-285 cm female 230-255 cm
Orange coat
Thin black striping (broader near belly) and less striping near forequarters
Malayan Tiger
(Panthera tigris malayensis)
male 200-228 cm female 191-209 cm
Orange coat, striping pattern similar to Indochinese tiger.
Sumatran Tiger
(Panthera tigris sumatrae)
male 204 cm female 198 cm
Smallest of all living tigers (adaptation to dense forests)
Coat orange to reddish-brown, darker than other tigers.
More fur to the cheeks creating a beardlike effect, especially in males
Narrow stripes, often doubled
Webbing between toes makes Sumatran tigers very fast swimmers.
Other subspecies (extinct):
Caspian Tiger
or Persian/Turanian/Mazandaran/Hyrcanian Tiger
(Panthera tigris virgata)
Extinct since the 70's, a 2009 genetic research actually revealed that the Caspian tiger was not actually a separate subspecies, but an eastern population of the Siberian Tiger, though slightly smaller in size and less massive in appearance.
Bali Tiger
(Panthera tigris balica)
Extinct since the 1930's, it was a small tiger, with a total length of 220 cm for males and 195-200 cm for females, a deep orange coat and fewer stripes, with occasional dots between them.
Javan Tiger
(Panthera tigris sondaica)
Extinct since the 1980's, it was small but larger than the Bali tiger (200-245 cm for males.) Its body was densely covered in long thin stripes, from spine to belly.
Striping a tiger:
Stripes vary in thickness, shape and density across subspecies and in individual tigers, but there are certain principles they always follow. The following explain the basic rules for properly striping a tiger; you can see them applied on the subspecies diagrams.
This area is the most densely striped, and is always striped while the other areas may not be. In tigers with abnormally few stripes, there will still be faint ones at the back of the body and on the tail.
Most tigers have over 100 stripes.
Shoulders and front legs are less striped and can be entirely plain.
Stripes on flanks follow direction of rib bones, like brackets pointing backward.
Whether full or broken, leg stripes are horizontal.
In the front leg they are rarely full.
The insides of the legs are as striped as the outside. When not broken, stripes form an upward angle (sharp or smooth) on the spine of the leg.
In the flat hip area, the vertical stripes of the flanks meet the horizontal stripes of the leg. The transition is achieved with a triangular shape; look for it in the diagrams below and the subspecies.
As an extreme, they can be sharply angular, boomerang shaped:
Throat stripes tend to encircle the jaw line.
Or, if the skin is loose and/or the fur thick, the curve can be stretched down and so reduced greatly.
Dorsal stripes encircle the tail base, but they can never be full circles.
Stripes "falling" from spine vary in length and density, getting sparser on the neck.
Seen from the top, the spine is a virtual line from which the dorsal stripes fall, but the left and right of the body are somewhat independant. Stripes can coincide more or less smoothly, or not. Put differently, it looks like they attempt to match up as best they can, with only a 50% rate of success. Stripes are NOT symmetrical on both sides of the body.
Note how on the spine itself, the whole design looks pinched forward.
Even chest stripes that look broad from the side don't reach the center of chest. Stripes never go continuously around the body, or cross the body's centerline. They start on one side of the spine and end on that same side of the ribcage.
Stripes can be very thin, like pin stripes...
... or "doubled", "forked" etc, all the result of stripes running into each other – always respecting the overall direction.
Tail rings can be similarly broad, broken, doubled... The tip is usually solid black.
Unusual colors:
Chinchilla aka "white tiger" (only known in the Bengal tiger, with blue eyes, pink nose, and dark/reddish brown stripes.)
Leucistic aka "snow-white" (no striping at all; only in captivity)
Golden Tabby aka "golden tiger" (orange-brown base with all black markings in darker orange or brown. Very rare, only in captivity)
"Black tiger" (looks black with tawny stripes, but in fact stripes are so broad and dense, ground color barely shows through)
Maltese aka "blue tiger" (slate grey base color – unconfirmed reports, mostly from South China tiger territory)
Melanistic (unconfirmed reports)

Subarctic Darner *Aeshna subartica* (male)



3. -- Bring in 2 system diagrams that represent something that is not visible or physical

Hearing Aid



KEY

1 microphone
2 speaker
3 battery
4 wax sump
5 fan noise generator
6 paper amplification unit
7 toilet flush enhancer
8 whistle
9 fiddly bits
10 entrainment spring
11 squeaky floorboard equalizers (cookie bite model only)

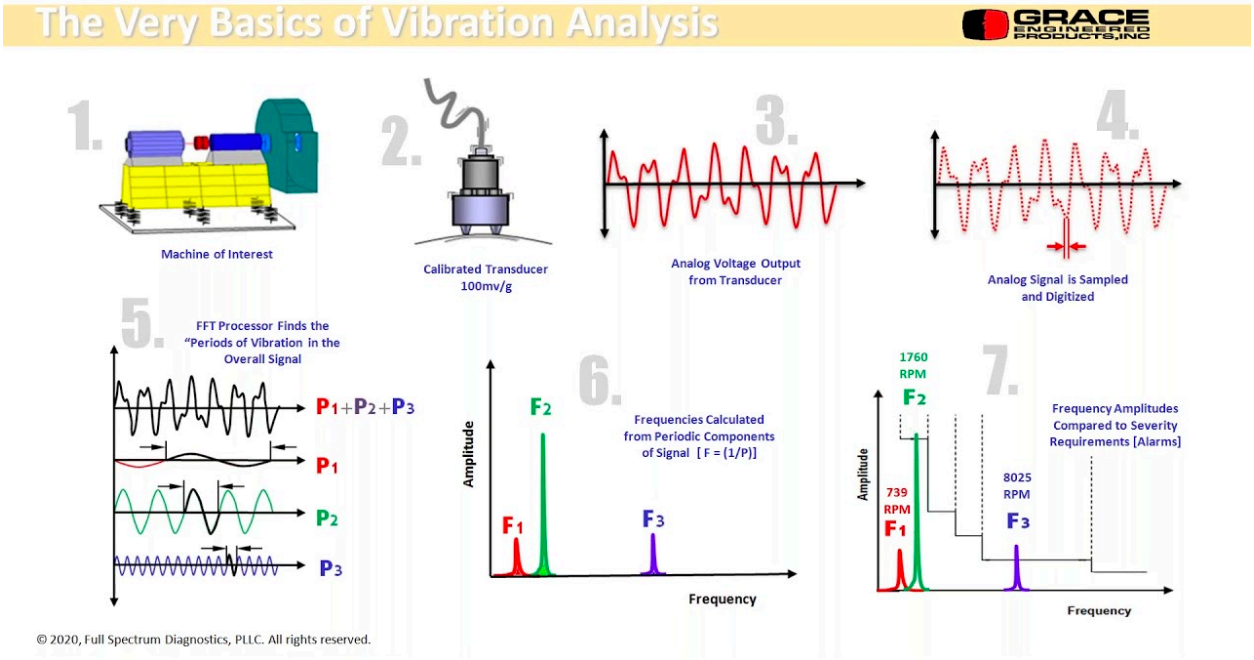
Drawn for The Cookie Bite Chronicles

TITLE Inside a Hearing Aid

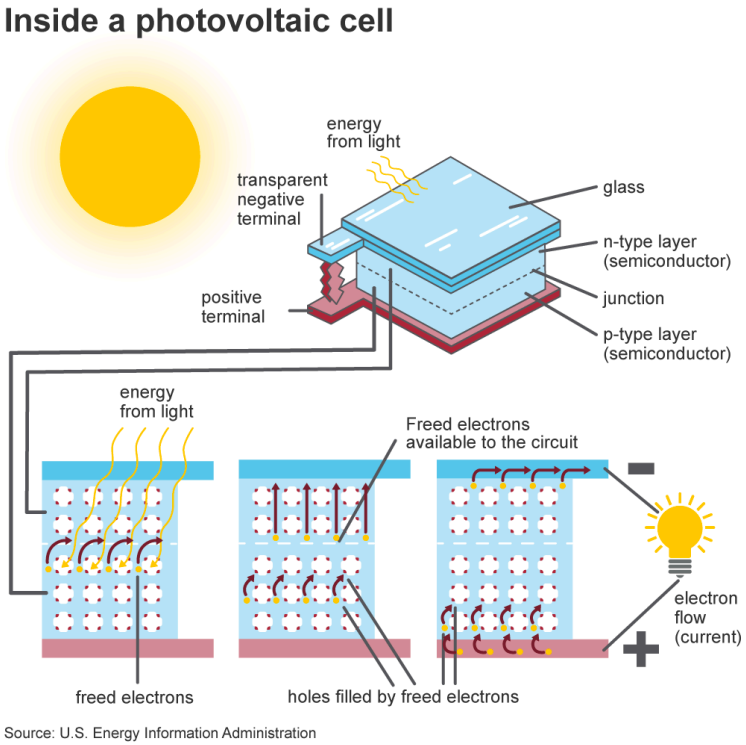
SHEET 1 | DWG No

SCALE 1:1 | SHEET 1 OF 3000

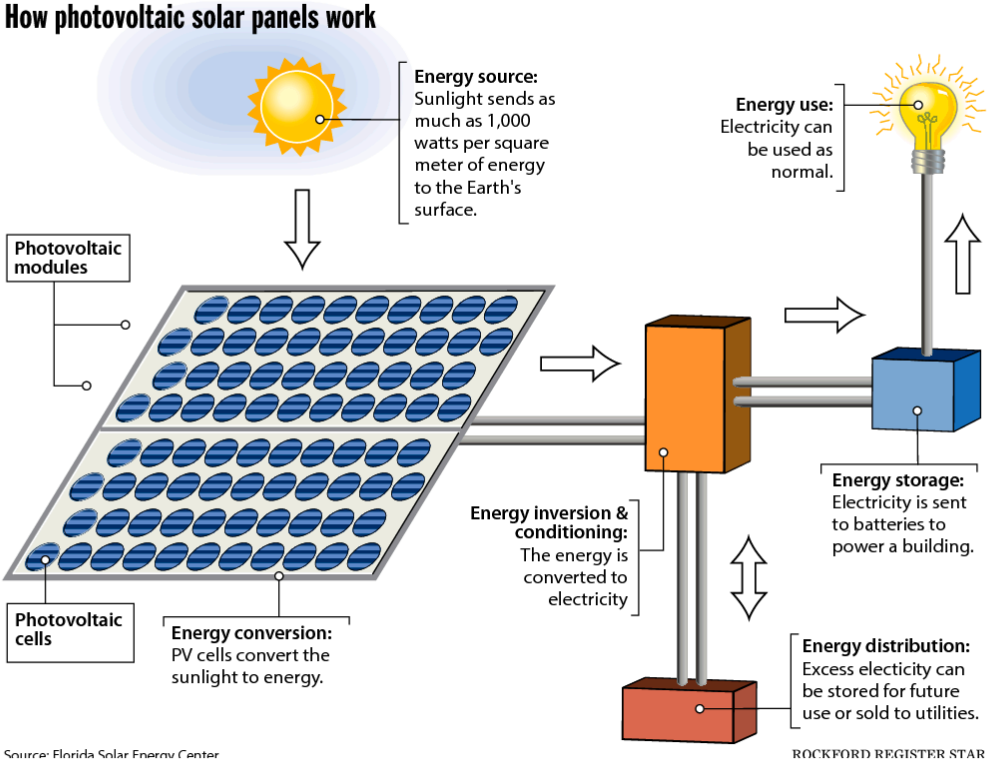
Diagram of a Vibration Analysis



4. -- Bring in 2 system diagrams that represent a system that incorporates modularity



How photovoltaic solar panels work



Source: Florida Solar Energy Center

ROCKFORD REGISTER STAR