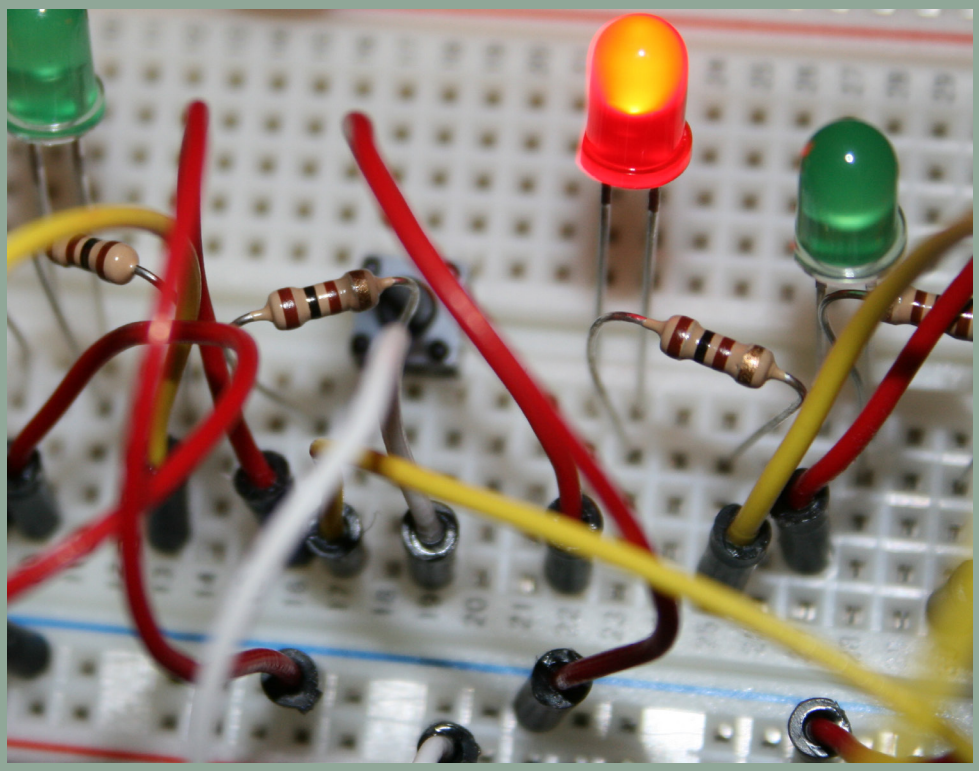
STEM Sims™

Trophic Tower



Trophic Tower

Do you need an idea for a scientific study?
Try out one of our ideas or make one of your own.

Start learning right now about how energy moves through an ecosystem. Take the following brief quiz to see how much you already know about how energy passes from one organism to the next in a typical environment. See the bottom of page 4 to check your answers.

1. In a typical ecosystem, which category of organisms usually occurs in the largest numbers?
   a. primary producers
   b. primary consumers
   c. secondary consumers
   d. tertiary consumers

2. As the resistance of an electrical circuit increases, what happens to the energy available to do work in the circuit?
   a. the energy available for work increases.
   b. the energy available for work decreases.
   c. the energy available for work remains the same.

3. A typical person is best classified as any of the following *except* a:
   a. primary producer
   b. primary consumer
   c. secondary consumer
   d. tertiary consumer

4. What happens to the total resistance in an electrical circuit as more resistors are placed in series?
   a. the total resistance increases
   b. the total resistance decreases
   c. the total resistance remains the same

5. A typical plant is best classified as a(n):
   a. autotroph.
   b. heterotroph.
   c. omnivore.
   d. carnivore.

Pyramid Power

Complete the puzzle below by writing the correct term in the spaces to the right of the clue. One letter goes on each blank.

Opposite of bottom ___ ___ ___

Aquatic organism ___ ___ ___ ___

Primary producer ___ ___ ___ ___ ___

A deer, for instance ___ ___ ___ ___ ___ ___

Water environment ___ ___ ___ ___ ___ ___ ___

Living things ___ ___ ___ ___ ___ ___ ___ ___

They eat others ___ ___ ___ ___ ___ ___ ___ ___ ___

Self-feeders ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Trophic Tower

Trophic Levels

So hopefully you're wondering what pyramids, trophic levels, and electrical circuits have in common. Very simply put, one way that living organisms are classified is based on how they feed. The greatest amount and mass of organisms that provide the structure for all other living things occur at the foundation or base of the trophic levels. These organisms are called primary producers. Plants are the major species found in this classification level. The energy they extract from the sun through the process of photosynthesis works its way into all other living things. Just as a pyramid narrows as it reaches its top, the amount of organisms found within a trophic level decreases as it moves upward.

Energy brought into the foundation of the trophic levels is dissipated as it moves upward to organisms that depend on others for food. Only a small portion of the energy converted by the primary producers reaches the top level of the pyramid. An electrical circuit can be used to model the energy conversion that occurs at the various trophic levels. Resistors in an electrical circuit act much like organisms do with respect to consuming and converting energy to various forms. A resistor changes some electrical energy it receives into waste heat, which reduces the net amount of electrical energy available to do work at some later point in the circuit. The more resistors in the series in a circuit, the greater the conversion of energy to a less useful form commonly called waste heat.

In the late 1950's, a scientist named Howard Odum first applied the electrical circuit model to the flow of energy in an ecosystem. He determined all energy inputs into a natural spring in Florida and then measured all of the energy that left the system to find the energy budget of the spring. He is credited with being the first to use electrical circuits to model ecological systems.

Please visit our site for more helpful information:
STEMsims.com

Answers: Page 2 Answers: 1) a, 2) b, 3) a, 4) a, 5) a. **Page 3 Pyramid Power Answers:** top, fish, plant, animal, aquatic, organism, consumers, autotrophs.

The Science Fair Kits project was funded in part under the Department of Homeland Security Science and Technology Directorate grant contract #N10PC20003. Its contents are solely the responsibilities of the authors and do not necessarily represent the official views of the Department of Homeland Security.