

Energy and Matter Pyramid Lesson Plan (Grade 6)

Description:

Students engineer a 3-D model that displays a food web and its energy pyramid for the ecosystem that exists in the classroom aquarium (students must use all organisms included and will need to incorporate additional organisms).

Materials:

shoebox, markers, construction paper, computer with internet access, aquarium (stocked with several fish and real plants) string, coat hangers, other creative materials, student handout

Background Information:

All organisms need energy to survive. Energy from the Sun is the main source of energy for all living things. Plants transform energy from the Sun to chemical energy. We call plants producers. When producers are eaten by other organisms, the chemical energy is transferred to the consumer.

Food chains and food webs are used to show how energy flows through an ecosystem. An energy pyramid not only shows the flow of energy within an ecosystem but also the amount of energy. When we look at the energy transfer in a food web, we can start with the producer receiving 100% of its energy from the Sun. Only 10% of the energy taken in to each level of the pyramid is stored as biomass; the rest is used to sustain life processes or is lost as heat. This means that only 10% of the energy producers receive from the Sun is available to primary consumers, and only 10% of that energy is available to secondary consumers. Secondary consumers only transfer 10% of the energy they receive from primary consumers to tertiary consumers.

Bell Work:

Describe the difference between a producer and consumer. Give an example of each.

Hook:

View *BrainPop* video on “Energy Pyramids” and take the quiz
<https://www.brainpop.com/science/energy/energypyramid/>

Student Procedures:

- A. Identify the problem?
- B. Explore and research the problem. List what you know and what you need to know.
- C. Brainstorm and design a solution to the problem.
 - Identify what materials you will use. Create some sketches or diagrams of your approach. You may need to brainstorm with other people on other teams to share ideas
 - List the steps of your plan and design for the challenge. Identify any scientific tools or other materials/technology you will need.
- D. Build, test, and analyze your solution.
 - How will you organize your data on your food web and energy pyramid?
 - How will you determine if your design of the ecosystem's food web and energy pyramid is effective or not?
- E. Improve or redesign and retest your solution.
 - Are the procedures easy to follow, so that others could complete this activity?
 - What errors could have been made during collection of data, and how can you improve this technique?
 - Were you able to create an effective model? If not, what changes do you need to make to your model?
- F. Present and share your solution.

Closing:

1. How does your model show the flow of energy through the energy pyramid of the class fish tank?
2. What are the similarities in each model presented to the class?