

Objectives:

- Students will demonstrate the relationships among ecological components by organizing them into energy pyramids.

Materials:

- Copies of the Pyramids worksheet
- Copies of the Pyramid form
- Colored Pencils
- Scotch Tape

Anticipatory Set:

- Begin with a discussion of common organisms in food chains beginning with producers and ending with top carnivores. Have students estimate the numbers of individual organisms that might be in each trophic level. Guide the discussion so that they realize producers make up the greatest numbers, followed by herbivores, then carnivores, and finally the top carnivores of which there are only relatively few.

Procedure:

- Distribute copies of the worksheet, pyramid form, and colored pencils. Explain the directions to the class as printed on the worksheet.
- The labels are written in a scrambled order, so students need to decide which term belongs on the base of each side of the pyramid, working their way to the top.
- When students have completed labeling and drawings, have them fold the pyramids and secure with tape.

Summary:

- Have the students answer the discussion questions on the bottom of the worksheet.
- Review and discuss the questions as a class.
- This activity may be used as an introduction to the Cycles in Nature Game.

Energy Pyramid Directions

1. Using colored pencils shade the first (bottom) level of each pyramid green.
2. Shade the second level of each pyramid yellow.
3. Shade the third level of each pyramid blue.
4. Shade the fourth (top) level of each pyramid red.
5. Label each level of the first pyramid side of the pyramid with the following terms as you move up the pyramid: producer, primary consumer, secondary consumer, tertiary consumer.
6. Label each level of the second pyramid side with the following terms as you move up the pyramid: plants, herbivores, carnivores, top carnivores.
7. Label each level of the third pyramid side with the following terms as you move up the pyramid: autotroph, 1st order heterotroph, 2nd order heterotroph, 3rd order heterotroph.
8. Draw a picture of what might belong in each level:
1st: flowers, trees, grass, algae
2nd: caterpillars, cows, grasshoppers, beetles
3rd: humans, birds, frogs
4th: lions, dogs, snakes
9. Label the fourth side of the pyramid starting at the largest section as you move up: 100% of energy, 10% of energy, 1% of energy, 0.1% of energy.
10. Label the bottom row of the fourth side of the pyramid with 35,000 Kg of biomass. Calculate and label the amount of biomass at each level.
11. Fold your pyramid on the lines radiating from the center and glue it together using the extra flaps.

Answer the following questions using your pyramid:

- a. What are three terms used to describe organisms such as trees?
- b. What are three terms used to describe organisms such as cows?
- c. What are three terms used to describe organisms such as humans?
- d. What are three terms used to describe organisms such as lions?
- e. What do the organisms in each trophic level eat?
- f. Do organisms always stay in the same level? Explain your answer.
- g. How much energy transfers from one level to the next?
- h. Why does only this much energy transfer to the next level?
- i. What happens to the energy that does not transfer to the next level?
- j. 34 Kg is about the mass of a middle school student. What inferences can you make about yourself using the pyramid?
- k. Why is it more ecologically friendly to eat a salad than a steak?

