HU GK-12 Activity

TITLE: Food Chains and Energy Transfer

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DCPS STANDARDS: E.7.5

GOALS:

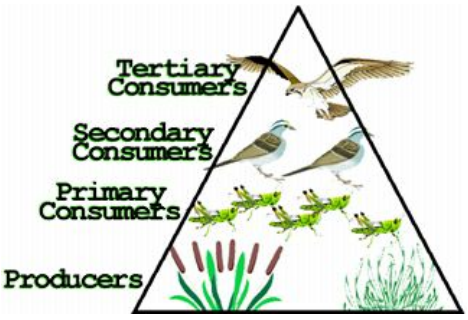
1. Scholars will be able to construct a food chain with at least ten components.
2. Scholars will be able to trace the energy flow as it passes through a food chain of at least 10 components.
3. Scholars will be able to explain energy flow through trophic levels.
4. Scholars will be able to justify the need for sunlight within an ecosystem.

OBJECTIVES:

1. Given poster board, scholars will diagram a food chain containing at least ten components and label the energy passed and heat released at each stage.

PREREQUISITE KNOWLEDGE:
Background

The organisms in a food chain can be producers, consumers, or decomposers. Producers are green plants capable of making their own food using energy from the sun in a process called photosynthesis. Consumers are animals that cannot make their own food. They get their energy from other plants and animals. A food chain can have as many as three to four consumers. There can be many levels of consumers who rely on each other as a food source.



First level consumers feed directly on plants; an example of this would be a mouse. Second level consumers feed on first level consumers; an example of this would be a rattlesnake that eats the mouse. Third level consumers feed on second level consumers; an example of this would be a hawk eating the rattlesnake. Predators are often second or third level consumers. These organisms obtain their energy by eating a prey. An example of a predator would be a mountain lion. Prey then refers to an organism that is eaten by another organism. See the food pyramid above to see an example of this. Notice that if there were 1000 units of energy at the producers level, the primary consumers would receive 100 units of energy, the secondary consumers would receive 10 units of energy,

and the tertiary consumer would receive 1 unit of energy. This pyramid helps to demonstrate the loss of energy from one level of the food chain to the next. Decomposers are also unable to make their own food. Bacteria and fungi are decomposers. They break down waste products and dead organisms for food. These broken down materials are returned to the soil to be recycled and used by plants again. An example of this would be the mushroom in the picture at the right growing on decaying wood in the forest. Although decomposers are very important to ecosystems, they are usually not shown on the food chain.

ESSENTIAL QUESTIONS:

1. What is an ecological pyramid?
2. How is energy lost between trophic levels and where does this energy ultimately go?
3. About how much energy that appears in one trophic level will appear in the next?
4. What are food chains and food webs, and how are they related?
5. In most ecosystems, the first trophic level contains more organisms than the second trophic level. Can you suggest a reason that explains this pattern?

LABORATORY MATERIALS:
Magazines, colored pencils, large-sized paper for mounting pictures or drawing, scissors, glue, and poster-board.

DIFFERENTIATING INSTRUCTION:
English language limited students should have no problems with this activity because Thomas will present the activity procedure in Spanish. The Spanish-speaking scholars will also be grouped together for this activity.

RATIONALE:
This activity is designed to illustrate the flow of energy through various trophic levels of food chains within ecosystems, describe how each link in a food chain stores some energy in newly made structures and how much of the energy is dissipated into the environment as heat. Scholars will also understand that a continual input of energy from sunlight is needed to keep the process going.

RESEARCH ACTIVITY:
You should demonstrate your knowledge of food chains by creating some chains of your own. Draw (or clip pictures from magazines) and color three food chains with at least four organisms in each. Make your food chains for diverse ecosystems ... include food chains from at least one of the following: the desert, the forest, the plains of Africa, the ocean, and the Arctic. Be creative. Be sure to include arrows to show the direction of energy flow. Label each member of the food chain as the producer, first, second, or third level consumer.

EVALUATION AND ASSESMENT:
Scholars will diagram a food chain containing at least 10 components. Scholars will also label energy passed and heat released at each stage and justify the importance of the sun.