

JSD 3D Learning Activity Template

Grade: 6th

Title: Natural Population Change Among Organisms

Utah Science with Engineering Education Standard (SEEd): 6.4.3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. Emphasize food webs and the role of producers, consumer, and decomposers in various ecosystems. Examples could include Utah ecosystems such as mountains, Great Salt Lake, wetlands, and deserts.

Key crosscutting concept(s) (CCC): Cycling of Matter and Flow of Energy

Key science and engineering practice(s) (SEP): Develop a Model

Materials: Computer and Internet, pictures of animals in a certain habitat, 12" x 18" piece of white construction paper

Time: 2-forty-five minute classes

Teacher background, key content information and hints: Teacher needs to know the cycling of matter and flow of energy and how food webs work. They also need to know the role of producers, consumers and decomposers in a forest habitat.

Prior knowledge that students need: Students need to know key words to look for on a computer to find what the different forest animals eat. They need to know how to build a food web and that the arrows show the flow of energy from one organism to another. They should know that the population of organisms decrease as the energy flow flows to bigger animals.

Learning Activity Plan

These three aspects of a lesson should be identified in your learning activity.

Gathering:

Students will research knowledge of the different animals shown on the picture of animals as to what they eat. The students will plan out the model they will make to show how the energy flows from plants to animals to higher order animals. They will also process the idea how the population decreases as the energy flows to higher level animals.

Reasoning:

The students will develop a model to show the energy flow, by using arrows, from plants to animals to bigger animals. They will analyze their model to figure out the populations of each organism. The students are to make an argument of what happens to the energy from larger populations to smaller populations and why the populations get smaller. The students are to make tables of their findings to strengthen their arguments.

Communicating:

The students will present their arguments of the energy flow from organism to organism telling of the population change and the energy flow. They will use their charts and tables to explain their arguments.

Phenomenon:

As insects are eating plants, and smaller animals are eating small insects, and larger animals are eating smaller animals, the population of the higher order of organisms seems to decrease in population.

Learning Activity:

1. Put the students in groups of three.
2. Give them the page with different organisms on it that live in a forest area.
3. As a group, they are to do research on those organisms of what they eat and what part of a forest they may live in.
4. By using their notes about the organisms, they are to draw a picture of a forest habitat noting where each organism is going to be placed.
5. When done, they are to cut out the pictures and paste them in their particular place you have designed them to be on the construction paper.
6. They are then to draw arrows of the flow of energy from one organism to another. There can be more than one arrow coming from or going to different organisms.
7. Along each line connecting two organisms, identify the relationship that exists between the two:
 - Producer to Primary Consumer
 - Primary Consumer to Secondary Consumer
 - Secondary Consumer to Tertiary Consumer
 - Consumer to Decomposer
 - Producer to Decomposer

8. When they are done, on another piece of paper, they are to tell what is happening to the population of the organisms as the energy moves from one organism to another. On the same paper, they are to tell why that is happening.
9. The students are to make charts and/or tables showing the population change of the organisms as the energy flows to the organisms.
10. The students are to prepare an argument as to what is happening in their forest picture as it comes to energy flow and organism population.

Assessment of student learning

1. The students are to show the energy flow from the smallest of organisms to the larger of organisms using the correct arrow positions.
2. The students are to show why the populations of organisms get less as the organisms get bigger.
3. The students are to show why more energy flow is needed from small organism to larger organisms.

Student Sheet

Title: Natural Population Change Among Organisms

Introduction: Why are there more insects and other small organisms born at once than among larger organisms?

Materials: Computer and Internet, pictures of animals in a certain habitat, 12" x 18" white piece of construction paper

Procedures:

1. Get in groups of three or four.
2. You will be given a page with different organisms on it that live in a forest area.
3. As a group, you are to do research on those organisms of what they eat and what part of a forest they may live in.
4. By using your notes about the organisms, you are to draw a picture of a forest habitat noting where each organism is going to be placed.
5. Cut out the pictures and paste them in their particular place you have designed them to be on the construction paper.
6. You are to draw arrows of the flow of energy from one organism to another. There can be more than one arrow coming from or going to different organisms.
7. Along each line connecting two organisms, identify the relationship that exists between the two:
 - a. Producer to Primary Consumer
 - b. Primary Consumer to Secondary Consumer
 - c. Secondary Consumer to Tertiary Consumer
 - d. Consumer to Decomposer
 - e. Producer to Decomposer
8. When you are done, on another piece of paper, you must tell what is happening to the population of the organisms as the energy moves from one organism to another. On the same paper, you are to tell why that is happening.

Data tables or graphs:

By the picture you have drawn and the research of each of the organisms, you are to make a simple charts and/or table showing roughly the population change of the organisms as the energy flows to the organisms.

Conclusion:

Prepare an argument as to what is happening in their forest picture as it comes to energy flow and the populations of the organisms.



Coyote



Mule deer



Elderberry bush



Fox



Frog



Wild grasses



Grasshopper



Hawk



Jackrabbit



Lizard



Meadowlark



Mosquito



Field mouse



Mushroom



Oak tree



Rattlesnake



Scrub jay



Squirrel



Sunlight