

ECOS Inquiry Template

1. CONTRIBUTOR'S NAME: **Hannah Elliott**
2. NAME OF INQUIRY: **Playground Food Webs**
3. GOALS AND OBJECTIVES:
 - a. Inquiry Questions:
 1. **Where do all Living Things get their Energy?**
 2. **What is a food web? What does it look like?**
 3. **How are living things at my schoolyard connected in a food web?**
 4. **What is meant by the terms: producer, consumer, herbivore, carnivore, omnivore, and scavenger**
 - b. Ecological Theme(s):
 1. **Every living thing gets its energy from the sun**
 2. **All living things are linked to each other in the energy cycle, and not just in a simple chain (food web)**
 - c. General Goal: **Students will understand what a food web looks like**
 - d. Specific Objectives:
 1. **Students will learn where organisms obtain their energy.**
 2. **Students will learn that organisms are connected to each other by how they obtain energy (food web).**
 3. **Students will learn how the words producer, consumer, herbivore, carnivore, omnivore, and scavenger apply to the food web.**
 - e. Grade Level: **6-8 (Middle School)**
 - f. Duration/Time Required: **4 hours total (I have not implemented this lesson yet, so I'm not sure about this figure)**
 - Prep time **1 hour**
 - Implementing Exercise During Class **1.5-2 hours (or 2 class periods)**
 - Assessment **1 hour, depends on assessment chosen**
4. ECOLOGICAL AND SCIENCE CONTEXT:
 - a. Background (for Teachers):
 - b. Background (to present to Students): **This lesson is meant to draw on students previous knowledge, use the "engage" activity to introduce the concept of all energy coming from the sun.**
5. MOTIVATION AND INCENTIVE FOR LEARNING:
6. VOCABULARY: **producer, consumer, herbivore, carnivore, omnivore, scavenger, and decomposer**
7. SAFETY INFORMATION:
8. MATERIALS LIST (including any handouts or transparency masters):

1. **Engage:** paper plates, pencils or crayons
2. **Explore:** index cards with 6 holes punched, string, colored poster boards, pencils, student field journals
3. **Explain:** posters from explore, markerboard
4. **Elaborate and Evaluate:** internet access, magazines, field guides, art supplies (poster boards, markers, printer for pictures, scissors, string, etc.).

9. METHODS/PROCEDURE FOR STUDENTS:

a. Pre-investigation work:

Engage (taken almost directly from “Web Your Way Through the Food Chain”)

This also addresses finding out what the students know.

1. Divide students into groups of 3 or 4.
2. Hand out a paper plate to each student and ask them to draw their favorite meal.
3. Ask students to share with their group what types of food they drew.
 - Did they draw vegetables, grain or bread, meat?
4. Ask whole class:
 - Why do we need to eat? (Wait for someone to answer with energy)
5. As groups, have students discuss where the energy in their meals came from?
 - Where does the energy come from in each food group?
 - Do all foods get energy from the same place?

b. Investigation work:

- 1) What evidence (data, samples) do students collect?
- 2) How do students present the evidence (data)?
- 3) What conclusions are drawn from the evidence students collect?
- 4) Include examples of data sheets.

Explore (this could be the next day [with a review of the previous day] or the same day if long periods or all day class)

1. Staying in groups, have students go outside with journal, pencil and glue stick, (teacher bring index cards with holes punched along sides, poster board)
 - Have students each draw or write 1 plant and 2 animals they find on their playground on a journal page
 - Have each team choose 2 plants and 4 animals to draw or write on index cards
 - The team can also choose to put bacteria or fungus on an index card.
2. The team creates a food chain or web based on how they think the organisms are connected in an energy chain.
 - Using the cards and the string, students should start with one organism in the middle and tie all organisms that use that plant or animal for energy to it with string
 - Then tie strings from those organisms to the ones that eat (or otherwise use) them
 - There will be several ways the students can make this food web, encourage them to try several arrangements until they come up with what they think works best
 - Also let students know that some organisms can be linked in several ways (e.g. a bear can eat plants and animals and be digested by bacteria and fungus)
 - If students don't know what an organism eats, encourage them to set it aside and add it to the poster later after researching it.

- At this point I'd like to point out that if the project is still being done outside, wind could make things difficult, so moving inside won't hurt.
3. When students have come to their final decision, use glue sticks to put the cards on poster board the way they think works best as a food web (with string and all).
 - Students can also work on finishing their artwork on the cards to make the poster more presentable, or search for pictures of the organisms on the internet and in magazines.

Explain (this might have to be the next class period)

1. Bring students inside; as a class, discuss which organisms ended up at the center of their food webs.
 - If most of the students understood what organisms eat what, they should have plants at the center.
 - Explain that these are the producers, and that this means they get their energy from the sun and pass some of it on to animals
 - Explain that the animals that eat the plants and the animals that eat other animals are all consumers
2. Ask students which animals they had eating only plants, which ate both, and which ate other animals
 - Explain that the ones that eat only plants are herbivores (and mention deer, elk, cattle, many birds, and many insects as examples)
 - Explain that the ones that eat both are omnivores (and talk about humans and bears as good examples)
 - Explain that the ones that eat other animals can be carnivores but also scavengers
3. Ask whether the students had anything else on their food webs
 - Some may have had bacteria or fungus, explain that these are often the decomposers, but not always (many fungi are miccorhizal, but might not try to explain that yet).

10. ASSESSMENT:

Evaluate (I envision using all of these, but picking and choosing could work)

1. The teacher can use the original posters to evaluate their learning, though since it was the students' first attempt at this concept that might not be fair.
 - Did the team try more than one arrangement before settling on the final one?
 - Did the team work together and use their current knowledge of what consumes what to form the web?
2. Do a take home quiz, in which the students are given a list of organisms to arrange on a chart already labeled with producer, consumer, herbivore, omnivore, carnivore, scavenger, and decomposer.
3. Have the students work in teams to create a poster for another environment (like in elaborate above), with pictures they find in magazines or on the internet.
 - Students should use good research sources, like field guides and scientific papers (if they haven't learned what's a good source, this is a good opportunity)
 - Have students label everything using the vocabulary they have learned
 - Everyone in the team should have a task (i.e. each research and find pictures for 2 of the organisms).

11. EXTENSION IDEAS:

Elaborate (this will likely be the next class period)

2. **Students can research the organisms they didn't know enough about, and find other organisms that could be added to their food web.**
3. **The teacher can also ask the class to find another environment to create a food web for (e.g. rainforests or deserts, or get more specific, like "flathead lake").**
4. **The teacher can discuss the amounts of energy that are passed through the system (only some of the energy from the sun gets turned into usable energy for plants, only some of the energy from plants gets turned into usable energy for herbivores, and so on).**

12. SCALABILITY

13. REFERENCES:

Web Your Way Through the Food Chain:

<http://www.beaconlearningcenter.com/Lessons/2546.htm>

Forest Food Webs:

<http://school.discovery.com/lessonplans/programs/forests/>

14. LIST OF EXPERTS AND CONSULTANTS

15. EVALUATION/REFLECTION BY FELLOWS AND TEACHERS OF HOW IT WENT: