How Energy Flows Through An Ecosystem

Grade Level

Grade 5

Engage

This activity is designed to start your students in recognizing themselves as scientists and thinking critically about problem-solving. The goal is to teach concepts through discovery and to encourage using scientific thought processes. As with all lessons provided, please feel free to adapt them according to your students' abilities. Some of your students may be early readers, in which case you may find it more successful to lead activities and discussions as a whole group rather than using individual Research Plan sheets. Certain scientific vocabulary may or may not be appropriate for your students' level of understanding. Take these ideas, make them your own and your students will have a greater chance at success.

How might energy flow in a marine ecosystem be disrupted by human activity?

1. Begin this lesson by telling students that they will be investigating how energy flows through an ecosystem.
2. If your students are familiar with brainstorming and recording their ideas, break them into small groups. If your students need more guidance, work with them as a large group. Engage your students in a discussion of what they predict the answer to this question to be. More importantly, <u>why</u> do they think this?

Explore

3. Continue with the above discussion and encourage the group to come up with ways that they could investigate the question and test their predictions scientifically (all suggestions are welcomed). What tools might they need to carry out their suggested explorations? Are there materials that would help them find the answer? Should they be making observations? What kinds of records will they need to keep? What will they do with the information once they have it? And how will they know that they've successfully answered the question? Allow a wide variety of ideas and encourage conversation amongst the students to refine the details of their ideas.

4. Ideas should be recorded on the Research Plan sheets. Small groups can record their own answers or you can record ideas as a group.

Explain

5. Explain to the group that you have an activity that might help to give them some insight into the question posed.
6. Give each student a picture that represents an organism in an ecosystem – phytoplankton, krill, squid, jellyfish, small fish, tuna, sea turtle, shark, killer whale. Give each student a piece of sidewalk chalk, as well.
7. Ask the group how energy enters an ecosystem (the sun). Place the sun place card on the ground.
8. Explain that each member of the group represents a unit of energy that has entered the ecosystem and it is their job to figure out and create the path energy follows based on the organisms they have been assigned. Everyone will start at the sun place card and draw their arrows branching off of another organism, creating a path along the way. Before beginning, they should consider what their animal eats and what eats their animal.
9. The group should begin in one spot and take turns creating the path, using the chalk to draw arrows from one organism to the next. For example:
    a. The student holding the phytoplankton place card will draw their arrow off of the sun and stand at the end of that arrow.
    b. The student holding the krill place card will start at sun, follow the arrow past phytoplankton, draw their arrow off of phytoplankton, and then stand at the end of that arrow.
    c. The students holding jellyfish or squid will go next. They will follow the path, drawing their separate arrows off of krill.
    d. Each student will take turns following the path and then drawing their arrows.
    e. See diagram below for what the final product could look like. Please note, there are several outcomes to this activity.

Expand

10. As a group, reflect on how energy flowed through the ecosystem.
11. Discuss how human interference might affect the flow. Examples could include: how does pollution affect an ecosystem? How does overfishing or bycatch affect an ecosystem? How do laws that protect marine organisms affect an ecosystem? How do organizations that rescue/rehabilitate marine organisms affect an ecosystem?
12. To further the discussion, brainstorm ideas for possible solutions to the problems presented as a result of human interference.
13. Feel free to repeat the activity, as there are several ways energy can flow through an ecosystem. Add or eliminate organisms, based on scenarios presented/discussed to see how energy flow would be disrupted.

Assess

14. Reflect back on the original question. Were any predictions correct or close?
15. If the students are working in small groups, observe their work and review what they are writing on the Research Plan. If working as a whole group, fill in the Research Plan together.

Standards

Ohio Academic Content Standards
Grade 5 Life Science Topic: Interconnections Within Ecosystems All of the processes that take place within organisms require energy.

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Supplemental Materials

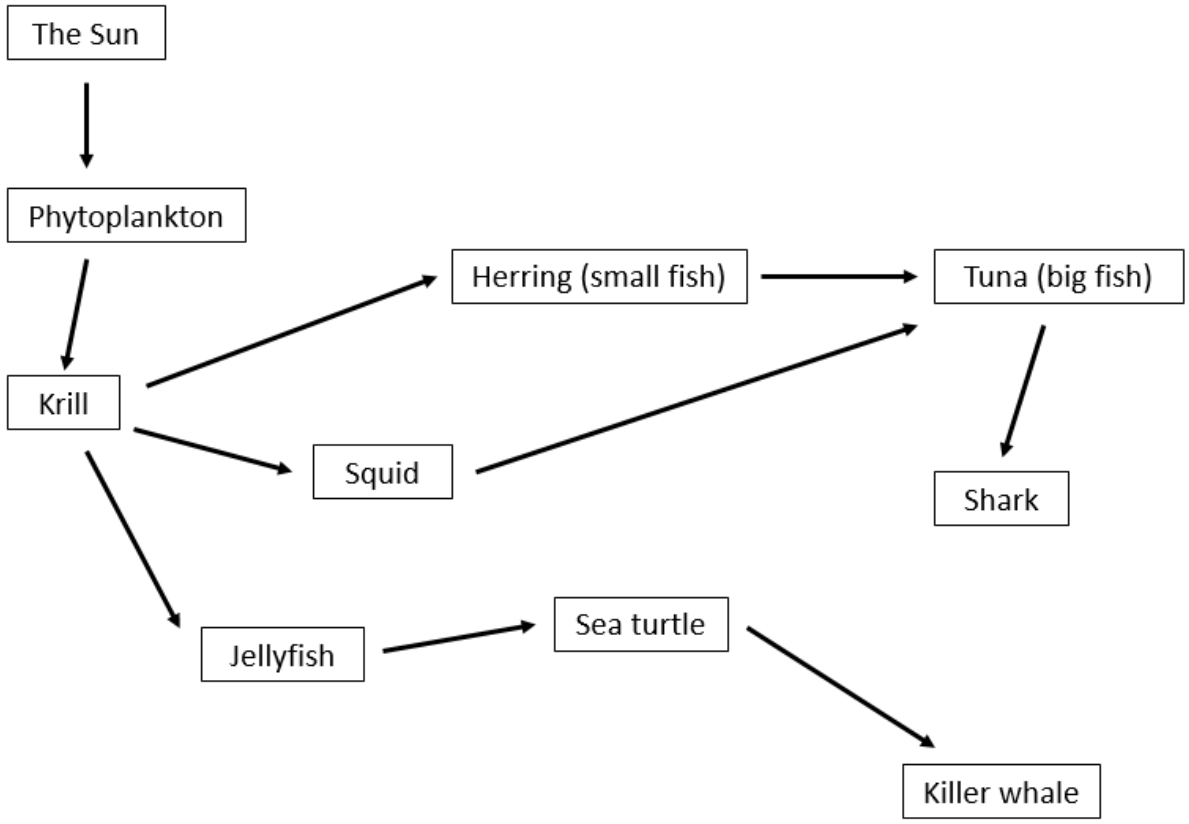
My Research Plan

1. What is my research question?
Is it a good question?

How might energy flow in a marine ecosystem be disrupted by human activity?

2. How can I get my information?

3. What will I do with this information?

4. How will I know I did my job well?

Example of finished energy flow activity: