



LESSON PLAN

FOOD WEBS: CYCLING OF MATTER AND FLOW OF ENERGY • GRADES 6-8

SUMMARY

Given a list of living things from a specific ecosystem, students create a model of how energy flows through the ecosystem.



MS-LS1-7. Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

| Science & Engineering Practices | Connections to Classroom Activity |
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| <p>Developing and Using Models</p> | <ul style="list-style-type: none"> • Students will develop a visual model that illustrates the energy flow through an ecosystem. • The teacher will demonstrate the equation for photosynthesis using beads or colored candies. |
| Disciplinary Core Ideas | Connections to Classroom Activity |
| <p>LS2.B: Cycle of Matter and Energy Transfer in Ecosystems</p> <p>Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead</p> | <ul style="list-style-type: none"> • As students create their models of food chains, they will draw arrows to indicate the flow of energy and cycling of matter. |



plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (MS-LS2-3)

Cross Cutting Concepts

Energy and Matter

Connections to Classroom Activity

- Students' models will illustrate the transfer of energy.

DURATION

45 minutes

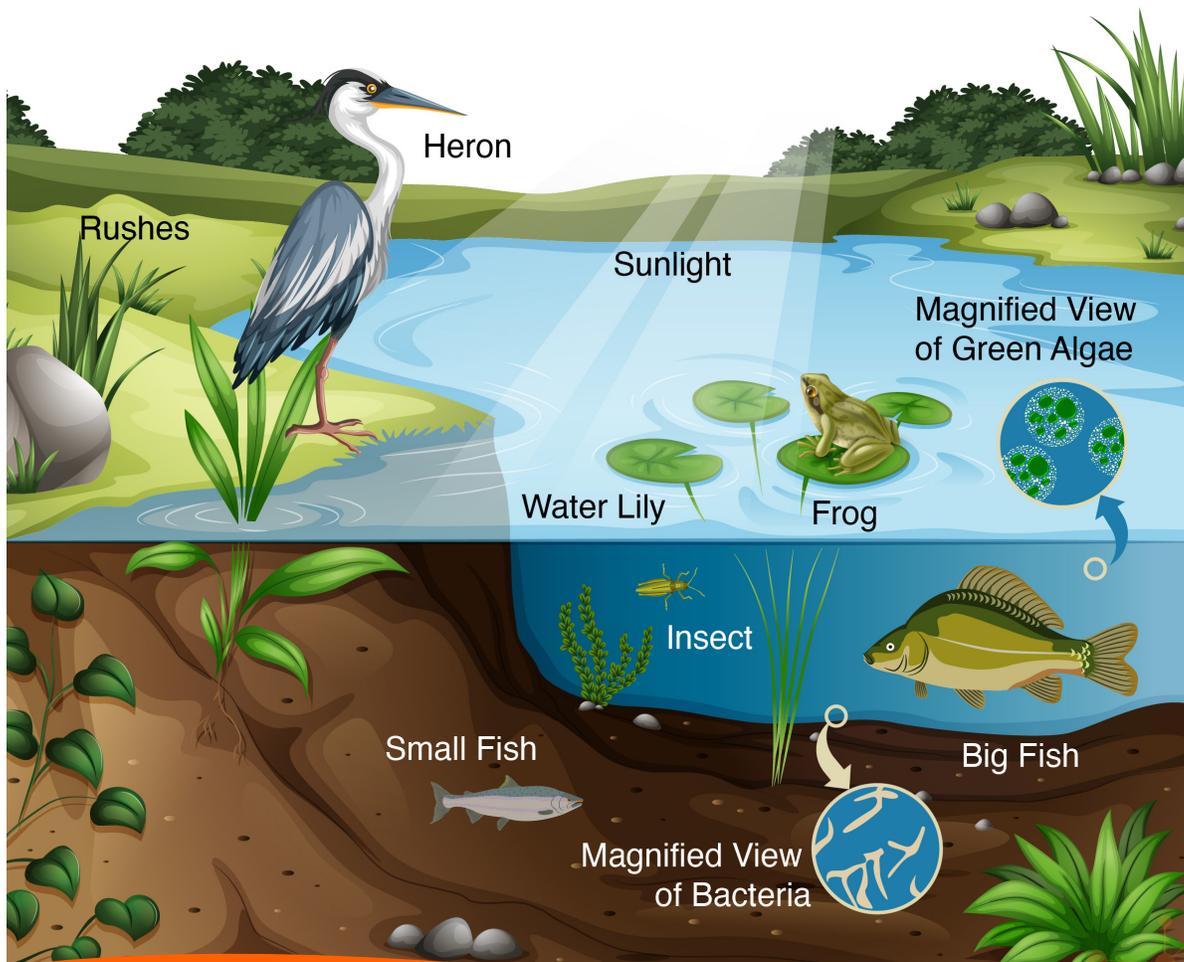


ENGAGE

Share this image of an ecosystem:

MATERIALS

- Poster paper
- Colored pencils or markers
- Beads or colored candies for the elaboration



Ask students what they notice. Elicit ideas from students by asking open ended questions such as “How does the heron get its energy? What about the water lily? Continue this line of questioning so that students identify how the energy flows up through the ecosystem, first with plants and moving up to the consumers.



EXPLORE



AS A GROUP, WATCH THE GENERATION GENIUS VIDEO: FOOD WEBS

Facilitate a conversation using the Discussion Questions.



EXPLAIN

Next provide students with a list of organisms from an ecosystem. ([Student Assignment](#)) The task of student groups is to illustrate an ecosystem’s flow of energy and cycling of matter. First, they will draw all the organisms on the list, including one dead organism. Next, they will label each as either a producer, consumer or decomposer. Finally, they will draw arrows to indicate the flow of energy. Students should also include the sun on their posters to show where the energy flow begins. Give student groups an opportunity to share their posters.



ELABORATE

For this part of the lesson, focus on the process of photosynthesis and how consumers get their energy from producers. Share the equation for photosynthesis and ask students what they notice about the equation.



After students share their noticings, model the equation using beads or candies of different colors. (a different color for each element) To begin you would show the 6 carbon dioxide molecules and the 6 water molecules. You could then rearrange those molecules (or beads) to make the 6 sugar molecules and 6 oxygen molecules. When living things eat the plants, they take in the sugar molecules for energy. Their cells then convert those molecules to other useful molecules within their cells.



EVALUATE

There are multiple ways to assess your students’ understanding of this topic.

- Genius Challenge
- Quiz Game
- Exit Ticket

Students can do these activities in digital or print form.



EXTENSION

Students could go further with this activity by creating a food web from their list of living things to show how food chains overlap within an ecosystem. One way to do this would be to arrange the living things in a circle and show arrows of how the energy flows between the living things. A rabbit, for example, could be energy for a coyote, but also might be energy for a large snake. Arrows would be moving from the rabbit to both of those higher order consumers.

