The Circle of Life

Food Webs

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Grade Level	6th – 8th Grade	**Time Frame**	2-3 class period(s)
Subject	Science	**Duration**	120 minutes

Essential Question

How does energy flow within an ecosystem? (Topical: How do food webs show energy being cycled among producers, consumers, and decomposers?)

Summary

Students will explore the flow of energy among living organisms by constructing a food web consisting of the organisms that inhabit a salt marsh. This lesson includes optional modifications for distance learning. Resources for use in Google Classroom are included.

Snapshot

Engage

Students watch a clip of Mufasa telling Simba about the circle of life and reflect on what a circle of life is to them.

Explore

Students research and become familiar with salt marshes before discovering more about the organisms that inhabit them.

Explain

Students sort the salt marsh organisms based on their diets and construct a model of energy flow among those organisms.

Extend

Students differentiate between various types of consumers and then experience a disruption to the energy flow model they constructed.

Evaluate

Students create their own scenario that disrupts the balance in the salt marsh.

Standards

Next Generation Science Standards (Grades 6, 7, 8)

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

Oklahoma Academic Standards (7th Grade)

7.LS1.7 : Develop a model to describe how food molecules in plants and animals are broken down and rearranged through chemical reactions to form new molecules that support growth and/or release energy as matter moves through an organism.

Attachments

- CER (Claim, Evidence, Reasoning) handout—The Circle of Life - Spanish.docx
- CER (Claim, Evidence, Reasoning) handout—The Circle of Life - Spanish.pdf
- CER (Claim, Evidence, Reasoning) handout—The Circle of Life.docx
- CER (Claim, Evidence, Reasoning) handout—The Circle of Life.pdf
- Lesson Slides—The Circle of Life.pptx
- Organism Card Sort—The Circle of Life.pdf

Materials

- The Circle of Life lesson slides (attached)
- Organism cards (attached, one set per pair of students)
- CER (Claim, Evidence, Reasoning) handout (attached, one per student)
- Internet connectivity to read the salt marsh research websites (or print copies for students)
- Paper
- Scissors
- Glue
- Markers

Engage

Use the attached lesson slides to introduce the lesson title and Essential Question, on slides two and four. Transition to slide five and show the students the video titled, "Morning Lesson with Mufasa." Follow the previous link, also found in the notes on slide five and in the Resources at the end of this lesson.

After showing the video, go to slide six and introduce the Think-Pair-Share instructional strategy. Have students answer the following questions:

1. Make a list of the foods that you ate at your last meal. Where did that meal ultimately come from?
2. Name something you've done today that required your body to use energy. Where did the energy you used come from?
3. What do you think Mufasa means when he says, "the Great Circle of Life?"

Student Responses:

Responses will vary based on the students' unique experiences, but here are some answers you should expect from them regarding the above questions: Question 1—Students should trace their source of food back to the fact that the sun initially provided energy for producers to make food; Question 2—Students will most likely connect to the fact that the foods they've eaten have provided them with the capability to do work; Question 3—Students will likely mention that all living things interact and are connected somehow.

Optional Modification For Distance Learning

To modify the above activity for online or distance learning, consider either discussing the questions online as a class or posting the questions to a discussion board to aggregate student responses. Download all attachments to use this lesson in Google Classroom.

Explore

Show slide eight—What is a Salt Marsh? Let students know they will be asked to research this question. Provide the students with the following web resources to begin their research (full URLs are listed in the Resouces below):

1. "What is a Salt Marsh?"—an article on the National Oceanic and Atmospheric Association (NOAA) website
2. "Salt Marshes"—an article on the National Park Service website
3. "What is a Salt Marsh?"—a PDF fact sheet by the New Hampshire Department of Environmental Services

You may print copies of these articles, or allow students to access and read them from Internet-connected devices in your classroom. As they read these materials, as students to employ a Categorical Highlighting strategy to identify key aspects of salt marshes.

Optional Tech Integration: Categorical Highlighting

Have students access the research materials online using their devices. Provide a direct URL from the Resources below or have them use keyword search terms (such as "salt marsh" and "NOAA") to find the articles using a search engine. In addition, students may be able to carry out the Categorical Highlighting strategy digitally. Some browsers, such as Microsoft Edge, allow you to highlight text in the browser. A number of extensions in the Chrome Web Store enable highlighting in the Chome browser as well.

Optional Modification For Distance Learning

The above technology integration strategy can also serve as an alternative for distance learning. Download all attachments to use this lesson in Google Classroom.

Explain

Teacher's Note: Card Sort Preparation

Prior to the lesson, print and cut out the attached Organism Card Sort document. Students will complete this activity in pairs, so you'll need to prepare half as many as the number of students in each class. For example, if you have 24 students in your class, you'll need 12 card sort sets. Notice that each card has a line next to the "C" option. Students will use this line to categorize consumers as carnivores, herbivores, or omnivores later, during the Extend portion of the lesson.

Assign students to partners and display slide 10—Organism Card Sort. For this activity, have students use the Card Sort strategy to organize the Organism Cards into producer, consumer, and decomposer categories. Begin by handing out the Organism Cards introducing students to some of the organisms that live in the salt marsh. Each card also lists what the organisms eat. Define the categories of producer, consumer, and decomposer for the students, as shown on slide 10. Ask the students to sort the organisms based on their diet type given the information on the cards and then label the cards with the category P, C, or D (producer, consumer, or decomposer) on the card.

Optional Tech Integration: Padlet Card Sort

Optionally, you may have students complete the card sort in Padlet, a free web-based visual organizational tool. Use this template (the full URL is listed in the Resources below) to allow students to create their own Padlet card sort for this lesson. Instructions for students are included on the Padlet in the top left corner. Students can explore further by researching and adding a picture of the organisms listed. They can then submit their digital card sort by sharing the link with you when they are finished.

Go to slide 11—Salt Marsh Energy Flow. Have students continue to work in pairs, and ask them to use their Organism Cards to develop a model showing how energy flows among the organisms in the salt marsh (this will be their food web). They should arrange the cards as they see fit on a piece of paper or cardstock, then glue them down, and add any graphical features necessary to show energy flow (such as arrows).

Optional Tech Integration: Padlet Energy Flow

If your students used Padlet to complete the organism card sort, they can complete the energy flow activity using that template as well. Instructions for students are on the Padlet template underneath the instructions for the card sort. After submitting the card sort to you via a link, they can remake the Padlet and change the format from "columns" to "canvas" to manipulate the card placement and add arrows. Again, they can then submit the completed model to you by sharing their Padlet link.

At the beginning of our lesson, Mufasa mentioned eating the antelope. Go to slide 12—Food Chains. Show students the savannah food chain displaying this action. Define food chain as shown on the slide. Ask the students to identify the direction of the arrows (in the direction that the energy flows—from the organism being eaten to the organism consuming).

Continue to slide 13—Food Webs. Show students the savannah food web that displays the lion eating the antelope, but also many other food chains. Define food web as shown on the slide. Now, given this new information, have students make corrections or additions to their salt marsh food web as needed, such as changing the direction of their arrows.

Move to slide 14—Producers, Consumers, & Decomposer. Use slides 14–19 to have students identify which savannah organism has each type of diet, and then reveal what salt marsh organisms have that same diet type. Have students make corrections to any cards that are not categorized correctly.

Optional Modification For Distance Learning

To modify the above Card Sort activity for online or distance learning, you can invite students to print and cut out their own Card Sorts. Students can place the cards in order and describe their thought processes for each step as part of an online discussion. Otherwise, follow the instructions in the tech integration notes above. Download all attachments to use this lesson in Google Classroom.

Extend

Go to slide 21—Different Types of Consumers. Now that they know what a consumer is, have students differentiate between carnivore, herbivore, and omnivore. Help students define these terms using their prefixes as shown on the slide.

Continue to slide 22—Different Types of Consumers. Instruct the student pairs to label the consumers on the food web according to type by placing a C, H, or O (carnivore, herbivore, omnivore) on the line next to the "C". Reveal the correct categories for the salt marsh organisms and have students make any necessary corrections.

Optional Tech Integration: Identifying Consumer Types With Padlet

If working in Padlet, the students can create new columns for carnivores, herbivores, and omnivores that fit their new understanding of the different types of consumers. Have them sort their cards according to these categories and submit their answer to you again via a link.

Go to slide 23—The Delicate Balance. Remind the students that Mufasa said everything exists together in a delicate balance. Ask the students what effect a disruption to the ecosystem would have on that balance by posing the following scenario: "Insecticides are widely used by many people to kill insects. These insecticides contain chemicals that are harmful to other animals and humans that live in the environment. After these chemicals are applied, they can travel to human water supplies and to neighboring ecosystems. Predict what would happen to the food web you have made if insecticides entered the salt marsh and killed the grasshoppers." Pass out one of the attached CER (Claim, Evidence, Reasoning) instructional strategy handouts to each student. Ask students to make their prediction about the scenario and justify it using the CER.

Sample Student Responses:

Students may determine some of the following results, among others: "The populations of organisms that eat the grasshoppers would decrease because their food source was killed," "The populations of organisms that the grasshoppers eat would increase because the grasshoppers aren't eating them," or "Any organisms competing with the grasshoppers will increase due to having less competition."

After they have finished, instruct the students to share their CER with their partner. After pairs have shared with each other, solicit volunteers to share a couple of answers with the class.

Optional Modification For Distance Learning

The above "Identifying Consumer Types with Padlet" technology integration strategy can also serve as an alternative for distance learning. For the CER activity, consider creating multiple copies of the attached CER handout using Google Docs. Assign a pair of students to each copy of the CER handout and have them collaborate virtually. Students can add notes to the document and collaborate as a group using the "chat" feature in the document. You may also consider making this activity a discussion board post to which your students can respond directly. Download all attachments to use this lesson in Google Classroom.

Evaluate

Teacher's Note: Facilitating The Food Web Disruption

If your students have been using the Padlet tech integration, the forthcoming activity will be easier. Students will introduce a new scenario that will disrupt the balance of the salt marsh, causing them to reorganize their previous food web and potentially introduce new organisms. If your students manually glued their food web to paper, they can simply "X" out any organisms that were eliminated in the scenario and glue in any that are introduced. If you prefer, you can distribute a fresh set of cards for the student pairs to create a new web that depicts their scenario.

Go to slide 25—The Delicate Balance. Ask the partnered students to come up with another scenario that might disrupt the balance in the salt marsh. They need to:

1. Describe the scenario.
2. Identify the organism(s) directly affected by the introduced scenario and explain how their population is affected.
3. Identify the organism(s) indirectly affected by the introduced scenario and explain how their population is affected.
4. Reconstruct the food web based on this scenario (they can remove organisms if eliminated or add organisms if being introduced).

Use a Gallery Walk strategy to have students share their scenario and the food web they have constructed based on that that scenario.

Optional Modification For Distance Learning

The above strategy on facilitating food web distribution with Padlet can also serve as an alternative for distance learning. If conducting this lesson in an online or distance learning environment, you may choose to omit the Gallery Walk activity. You can substitute a peer review activity with a website such as VoiceThread. With VoiceThread, you can upload students' scenarios to the site beforehand. Then, students can choose whether they would like to make a quick video, a voice memo, or a written note to give feedback on other students' scenarios. Download all attachments to use this lesson in Google Classroom.

Resources

- K20 Center. (n.d.). Card Sort. Strategies. https://learn.k20center.ou.edu/strategy/147
- K20 Center. (n.d.). Categorical Highlighting. Strategies. https://learn.k20center.ou.edu/strategy/192
- K20 Center. (n.d.). Claim, Evidence, Reasoning. Strategies. https://learn.k20center.ou.edu/strategy/156
- K20 Center. (n.d.). Gallery Walk/Carousel. Strategies. https://learn.k20center.ou.edu/strategy/118
- K20 Center. (n.d.). Google Classroom. Tech Tools. https://learn.k20center.ou.edu/tech-tool/628
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- Myers, M. (n.d.). Organism card sort. https://padlet.com/morgan_myers_1/gora1a8lvkwu
- UK, D. (2011, October 3). The Lion King 3D - 'Morning Lesson With Mufasa'- Official Disney Movie Clip. https://www.youtube.com/watch?v=bW7PlTaawfQ
- What is a Salt Marsh? (2004). New Hampshire Department of Environmental Services. https://www.des.nh.gov/organization/commissioner/pip/factsheets/cp/documents/cp-06.pdf