

Obtaining Energy, Part 2

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Big Idea for Physical Education	Big Idea for Science
Movement Competency	Life Science
Standards	
<p>SC.4.L.17.2: Explain that animals, including humans, cannot make their own food and that when animals eat plants or other animals, the energy stored in the food source is passed to them.</p> <p>SC.4.L.17.3: Trace the flow of energy from the Sun as it is transferred along the food chain through the producers to the consumers.</p> <p>PE.4.M.11: Apply movement concepts to the performance of locomotor skills in a variety of movement settings.</p>	
Learning Goals for integrated lesson plan	
<p>The student will</p> <ul style="list-style-type: none"> ● create a food chain. ● explain that animals, including humans, cannot make their own food and that when animals eat plants or other animals, the energy stored in the food source is passed to them. 	
Vocabulary common to both disciplines	
<ul style="list-style-type: none"> ● producer ● consumer ● herbivore ● predators 	<ul style="list-style-type: none"> ● prey ● energy ● transfer
Common Misconceptions	
<ul style="list-style-type: none"> ● Food is considered only as those things animals eat ● Energy is “formed” rather than changed or transferred ● Once eaten, energy in food disappears ● Energy adds up through a food chain, giving top predators all of the energy 	
Summary of Science Investigation	Summary of Physical Education Activity
<p>Students will view a video introducing the idea of food chains. Then the students will sort the organism cards and discuss the transfer of energy that occurs based on these various categories. The students will read the text “The Most Important Question” and identify the food chain found within the text and discuss the transfer of energy occurring. They will then take their organism sort cards and create a food chain using yarn, working together in collaborative teams to explain the transfer of energy occurring within their chain.</p>	<p>Students will demonstrate an understanding of the food chain and strategies of survival while moving in various locomotor skills.</p>

Assessment Tools - Science	Assessment Tools - PE
<p>Formative Assessments: Card Sort, Food Chain with yarn</p> <p>Summative Assessment: Food Chain Choice Menu</p>	<p>There will be teacher observation/interaction conducted while students are participating in the activity. Teacher will be observing/interacting to see if students meet and accomplish the lesson objectives and Standard. If you have Plickers cards, you can use the following questions to assess student learning:</p> <p>Plickers Questions:</p> <ol style="list-style-type: none"> 1. <i>What is the first level of the food chain called?</i> <ol style="list-style-type: none"> A. <i>predators</i> B. <i>primary producers</i> C. <i>secondary consumers</i> D. <i>prey</i> 2. <i>What travels through a food chain?</i> <ol style="list-style-type: none"> A. <i>water</i> B. <i>blood</i> C. <i>oxygen</i> D. <i>energy</i>
<h3>Integrated Assessment</h3>	
<p>Students will take the knowledge they have learned in the classroom and apply it during their Physical Education activity of Feeding Frenzy.</p>	

Science Investigation: Food Chains

<h3>Duration of Lesson</h3>
<p>20-30 minutes to make copies of articles and choice board, 75-115 minutes to conduct lesson</p>
<h3>Setup/Materials</h3>
<p>Materials:</p> <ul style="list-style-type: none"> ● Organism Card Sort (1 set for collaborative group of 5) <i>from previous lesson</i> ● manilla envelope (1 for each collaborative group of 5) <i>from previous lesson</i> ● projector ● computer with internet access ● article: "The Most Important Thing" https://www.readworks.org/article/The-Most-Important-Question/1bc604a7-d7af-4631-a220-b4ec77a3bb73#!questionsetsSection:411/articleTab:content/ (see Setup note, below) ● Organism Sort Chart: Producer/Consumer (attached) ● Organism Sort Chart: Herbivore/Carnivore (attached) ● yarn ● markers ● chart paper (one for each collaborative group) ● teacher "parking lot" from lesson one ● Food Chain Menu (attached)

Setup:

- Teacher will need the organism cards from the previous lesson.
- Teacher will need to have access to a computer with an internet connection and a projector to view video.
- Teacher will need to make a copy of the text “The Most Important Thing” for each student, or assign digitally through ReadWorks Digital. The teacher will need to create a free teacher account to access or print the article (see link, above).
- Teacher will need to display blank chart paper and list each of the following words: producer, consumer, herbivore, carnivore.
- Teacher will need to make a copy of category sort for each collaborative group.
- Teacher will need to cut four pieces of yarn 2 feet in length for each student group of five.

Teacher Notes

Note: This lesson will cover the last three components of the 5E model (Explain, Elaborate, Evaluate). It is appropriate to discuss vocabulary as students make suggestions.

Safety

As students move around to make their food chain, keep in mind personal space and collaborative group space. This might be suitable to take outside of the classroom for more room.

Procedure

Explain:

- Video: “What’s a Food Chain?” (5 minutes)
 - Teacher will now introduce the 2 minute video titled “What’s a Food Chain?” <https://www.pbslearningmedia.org/resource/thnkgard.sci.ess.chain/think-garden-whats-a-food-chain/>
 - Students will be required to interact with the video through the strategy called “Vocabulary Scavenger Hunt.”
 - **Instructions:** Introduce and list the following vocabulary terms on the board - energy, food chain.
 - As the video plays, share that the students will be actively interacting with the video. Every time they hear one of the vocabulary terms (energy, food chain) they must clap one time.
 - Have the students practice by having the teacher say the vocabulary term and have the students clap one time, be sure to throw in a few words that are not the terms they are listening for to make sure that all students understand the directions.
 - Play the video.
 - Have the students quick write in their science notebooks what they understand about the transfer of energy because of a food chain. After students have completed their quick write, allow an opportunity for a think/pair/share.
- Vocabulary Discussion: (7-10 minutes)
 - The teacher will return to the chart paper from the organism card sort that occurred during the engage lesson (lesson 1). If the students did not discuss the terms producer, consumer, carnivore, herbivore, add these words to the chart paper.
 - Pass out the Organism Sort Chart: Producer/Consumer. The students will work in their collaborative groups to sort their organism cards based on producers and consumers. They should be prepared to discuss their reasoning for the decisions they have made.

- Pass out the Organism Sort Chart: Herbivore/Carnivore. The students will work in their collaborative groups to sort their organism cards based on being an herbivore or carnivore. The students should be prepared to discuss their rationale for their sort and begin to discuss where these organisms obtain their energy.
- Article: “The Most Important Thing” ReadWorks Digital **(30-45 minutes)**
<https://www.readworks.org/article/The-Most-Important-Question/1bc604a7-d7af-4631-a220-b4ec77a3bb73#!questionsetsSection:411/articleTab:content/>
- **All teachers have access to this article, the website is a free website. The teacher will just need to register their email to the site.**
 - Teacher can conduct this using various strategies: Teacher Read Aloud, Choral Reading, Partner Reading, Independent Reading
 - After the students finish reading, have students identify the transfer of energy discussed throughout the text. **Examples:**
 - Giraffe: Sun, plants, giraffe;
 - Hippopotamus: Sun, plants, hippopotamus;
 - Zebra: Sun, plant, zebra;
 - Lion: Sun, plant, zebra, lion; Mice: Sun, plants, mice;
 - Large birds: Sun, plants, mice, large bird
 - Have students move back to their collaborative groups and provide each collaborative group with a piece of chart paper and a marker. Assign each collaborative group with one of the above food chains from the text. Explain that each collaborative student group will work together to create a method for displaying how the transfer of energy can be show on their piece of chart paper. **(10 minutes)**
 - Carousel Walk: Have collaborative groups perform a carousel walk to view each collaborative group’s idea of how to display the transfer of energy for their food chain.
 - Wrap Up: Discuss with the students that scientists create food chains to display the transfer of energy among organisms. They will list the organism and demonstrate the transfer of energy by using an arrow. This continues from organism to organism throughout the chain. The teacher can demonstrate this on the board using one of the food chains from the text.

Elaborate: (15-25 minutes)

- Physical Food Chain **(10-15 minutes):** use organism cards/envelopes from *Obtaining Energy, part 1*.
 - The students will continue to work in their collaborative groups.
 - Explain to the students that they will now create a food chain using their organism cards used in previous activities. Before handing out the manilla envelopes, the teacher **MUST** include a Sun card.
 - Provide each collaborative group with the manilla envelope containing the organism cards. Each student will become an organism.
 - The students must work together to create a food chain by organizing themselves based on the transfer of energy found within their food chain. Each student will hold one end of a piece of yarn, while the next person in the chain will hold the other end. One example:
 - student #1 holds the Sun card and one end of a piece of yarn;
 - student #2 holds wiregrass card and the other end of the Sun yarn while holding one end of a new piece of yarn;
 - student #3 holds grasshopper card and the other end of the yarn connected to wiregrass, while holding one end of a new piece of yarn;
 - student #4 holds scrub lizard card and hold the other end of the yarn from the grasshopper and one end of a new piece of yarn;
 - student #5 holds red shouldered hawk card and holds the other end of the yarn from the Florida scrub lizard.
 - Teacher will monitor students and provide scaffolded support for student groups who might be

struggling.

- Wrap Up Discussion: have students explain their reasoning for creating their food chain and how the energy is transferred.

- Exit Slip: Explain how animals, including humans, obtain energy. **(5-7 minutes)**

Evaluate

- Food Chain Assessment **(20-30 minutes)**

- The teacher will provide a choice task for students to demonstrate their understanding of a food chain (see *attached Food Chain Menu*).

Physical Education: Hawks, Lizards, Grasshoppers

Duration of Lesson

5-minute warm up/35-minute lesson

Materials/Setup

Materials

- multicolored BINGO chips (other multicolored objects work as well) to represent food
- 3 different sets of colored flags, wristbands, bracelets, or anything to help students easily identify their animal
- 1 Ziploc bag per grasshopper

Setup

- Spread out multicolored bingo chips in an open field. If you have approximately 25 students in your class, make it so you have 2 “hawks”, 6 “lizards” and 18 “grasshoppers.” Adjust numbers based on the amount of students in class.

Safety

Maintain personal space, and a clear and safe open area for movement. Additional focus should be on students looking forward and side to side when moving. Students should also work on dodging others when moving.

Procedure

Essential Question: What are the different ways our body can move through a given space?

Warm Up: Rock, Paper, Scissors Food Chain- see attachment

Procedure: Adapted from *Project Wild* “A Dire Diet”

1. Ask, “Can anyone name a link in the food chain?”
2. Review the term “food chain” with students.
3. Divide the class into 3 teams that represent animals in a food chain (Grasshoppers, Lizard and Hawk). You can use other animals if you choose this is just a suggestion of animals.
4. Give each student a colored item to wear to represent their animal in the food chain (wrist band, rubber bracelet, flag or anything they can slip on to identify their animal).
5. Distribute a ziploc bag or other small container to each “grasshopper.” The container will represent the “stomach” of the animal.
6. Grasshoppers are the first to go looking for food: lizards and hawks are to sit quietly on the sidelines watching their prey.

7. On your signal, grasshoppers are allowed to enter the area to collect as many food tokens as they can. Grasshoppers should place their food tokens in their stomachs (Ziploc bag or container). At the end of 45 seconds, grasshoppers are to stop collecting food.
8. Now it's time to allow the lizards to hunt the grasshoppers. Hawks are to still remain on the sidelines. Allow the lizards 60 seconds to try and catch 1 or more grasshoppers. Any grasshopper tagged or caught by a lizard must give its bag or container of food to the lizard and sit on the sidelines.
9. Now it's time to allow for the hawks to hunt the lizards. Allow the hawks 60 seconds to hunt the lizards. The same rules apply, if a lizard gets tagged, they must turn their bag or container over to the hawk and have a seat on the sideline.
10. Now ask all students to huddle in and bring whatever food bags they have with them.
11. Ask all students who have been "consumed" to identify what animal they are and what animal ate them.
12. Now have any animals who are still alive to empty their food bags out onto the ground where they can count the number of food pieces they have.
13. Discuss with the class what animals were the prey, predator, producer and consumers.
14. **Variation:** If time allows, you could have the students play again using different locomotor skills and then talk about how the various locomotor skills affected the outcome of the game.
15. Have students discuss ways that they thought were successful that allowed them to stay in the game longer. Then have them discuss with a shoulder buddy:
 - Which part of the food chain did you feel was the hardest to survive? Why?

Rock Paper Scissors Food Chain- Warm Up

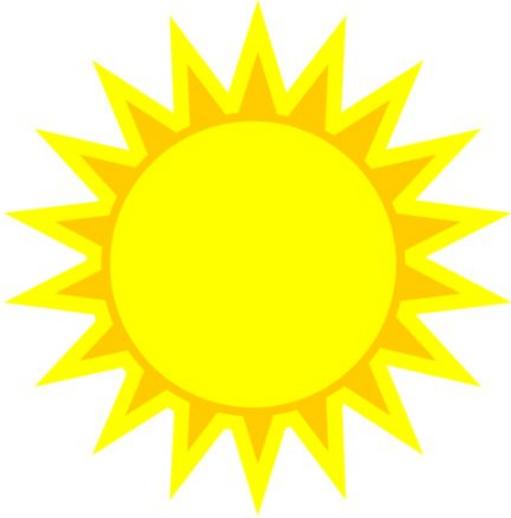
(5 minutes)

Objective: to engage students with a "rock-paper-scissors" activity that models a food chain

Procedure:

1. Explain that we will be playing a game of rock-paper, scissors "Ecosystem" edition! This activity models how energy flows from one organism to the next in a food chain. Students will represent energy moving through a food chain- we will have **Grass, Grasshopper, Lizard and Hawk.**
2. Students will play rock-paper-scissors against one another to "flow" from one trophic level to the next. Each trophic level is represented by these actions or signals:
 - a. **Grass: sit**
 - b. **Grasshoppers: hop**
 - c. **Lizard: walk and stick out tongue**
 - d. **Hawk: flap arms**
3. All students start the food chain as grass, a primary producer. Students will find a partner and sit on the ground. All pairs of students begin to play rock-paper-scissors, best out of 3.
4. The partner who lost the round will remain grass and find another grass to play against. The winner of this round "flows" to become a grasshopper, and hops around looking for other grasshoppers. Two grasshoppers play rock-paper-scissors: the one in each pair who wins "flows" to the next trophic level, a lizard (walks and sticks out tongue). The grasshopper that did not win remains a grasshopper and continues looking for other hopping grasshoppers to play against. If a grass cannot find another grass to play against, the instructor can high-five that student and "flow" to the next level.
5. Players continue to "flow" through the food chain until they become hawks, apex predators. When two hawks play rock-paper-scissors against each other, the winner will "decompose" and the other student will remain a hawk. Anyone who "decomposes" dramatically calls "I'm decomposing!" while holding their hands over their head like a mushroom and slowly sink to the ground. Once a student "decomposes," that student should high five the instructor and can "reset" in same game as grass, begin a parallel game, or cheer on their classmates.

Organism Card Sort



Grasshopper



Florida Scrub Lizard



Wiregrass



Red Shouldered Hawk

Organism Sort Chart: Producer/Consumer

Producer	Consumer

Organism Sort Chart: Herbivore/Carnivore

Herbivore	Carnivore

Food Chain Menu

Directions: Choose any of the boxes below and follow the directions within to demonstrate your understanding of food chains.

<p style="text-align: center;">Naturalist</p> <p>Explore the natural environment and take pictures to demonstrate your understanding of a food chain. The pictures should include at least one producer, one consumer and should be labeled. <i>(student could use the computer to create this if collecting pictures outside isn't an option)</i></p>	<p style="text-align: center;">Musical</p> <p>Individually or in pairs write lyrics and sing or rap the lyrics to demonstrate understanding of how energy travels through a food chain. There is no exact length to this task; however, be sure to include at least one producer and one consumer in your work.</p>	<p style="text-align: center;">Logical/Mathematical</p> <p>Make a diagram that represents a food chain found locally. Be sure to include at least one producer and two consumers.</p>
<p style="text-align: center;">Verbal/Linguistic</p> <p>Make a food chain flip book including a least three different food chains. Each food chain must include at least one producer and two consumers.</p>	<p style="text-align: center;">Intrapersonal</p> <p>Write a letter about the importance of maintaining local habitats. Include information about the food chains and how local habitat changes can impact food chains.</p>	<p style="text-align: center;">Interpersonal</p> <p>With two or three partners, design an activity to present to the class that shows how energy flows through a food chain, as well as the effects of removing one part of the food chain.</p>

Sources for making menu:

https://cadamson.weebly.com/uploads/1/2/7/6/12767717/chris_adamson_-_differentiated_lesson_plan.pdf

<https://americanshs.org/ourpages/auto/2013/12/18/48085862/Ecology%20Think-Tac-Toe.pdf>