Name: _____ #: _____

Energy Transfer

STEMscopes:

Standards that will be addressed:

- **5-PS3-1:** Students use models to describe a phenomenon that includes the idea that energy in animals' food was once energy from the sun.
  - Students identify and describe the relevant relationships between components, including: The relationship between plants and the energy they get from sunlight to produce food. The relationship between food and the energy and materials that animals require for bodily functions (e.g., body repair, growth, motion, body warmth maintenance). The relationship between animals and the food they eat, which is either other animals or plants (or both), to obtain energy for bodily functions and materials for growth and repair.
  - Students use models to describe causal accounts of the relationships between energy from the sun and animals' needs for energy, including that: Since all food can eventually be traced back to plants, all of the energy that animals use for body repair, growth, motion, and body warmth maintenance is energy that once came from the sun. Energy from the sun is transferred to animals through a chain of events that begins with plants producing food then being eaten by animals.

Remember to look at the Science tab on our class website for additional resources, information, and updates.

Pages included in the packet:

1. Investigative Phenomena
2. Hook- Backtracking Energy
3. Explore- Got Energy?
4. STEMscopedia
5. Linking Literature:
   a. Describe with an Image
   b. Write a Story
6. Content Connection Videos
   a. Food Chains
   b. Food Webs
   c. Sharks and Fur Seals
7. Science Today- Zoo Foods
8. Independent Practice
9. Concept Attainment Quiz

Optional Extensions- For optional extensions, please visit our class website.

Test Date & Journal Collection: _____

Investigative Phenomena

Name: _____ Date: _____

Student Wondering of Phenomena:

Other than for heat, how do animals depend on the sun?

Record your thoughts about the Student Wondering of Phenomena question in the boxes below.

Before Instruction	During Instruction (Refine your thoughts as you learn more throughout the scope.)	After Instruction

Hook

Name: _____ Date: _____

Backtracking Energy

Draw a picture of your favorite food. Label the ingredients.

1. What plants or animals are used to prepare your favorite food?

_____

_____

_____

_____

2. Where do these ingredients come from?

_____

_____

_____

_____

Explore

Name: _____ Date: _____

Got Energy?

Draw a diagram showing where plants, rabbits, and wolves get their energy. Use arrows to represent the movement of energy.

What are some things that happened when you did not get enough energy in the game?

_____

_____

_____

_____

Where did all the energy originally come from?

_____

_____

Think about what the rabbits and wolves in the game had to do to stay alive. How do animals gain energy, and what do they use energy to do?

_____

_____

_____

Reflect

Imagine for a moment that you stay after school one day to clean up the classroom. While cleaning, you move some plants away from the sunny windows. A week later, you remember to move the plants back. You notice that something strange has happened. Instead of standing upright, the plants appear to be leaning toward the windows! Why?

Plants need sunlight to survive. If a plant is moved away from sunlight, it will try to turn back toward the Sun.

The Sun's energy allows plants to produce their own food. Plants then use this food energy to grow and reproduce. However, not all organisms can make their own food. How do other organisms get their energy? Do they get it from the Sun?

Where do all living things get their energy?

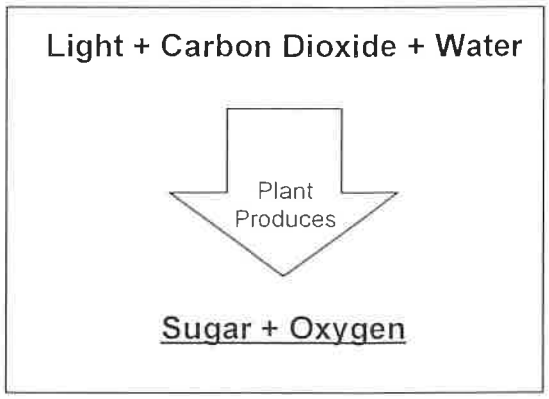
All the energy that passes between organisms comes from the Sun. You might be wondering how this is possible. After all, humans can't eat sunlight! Only certain organisms, such as plants, can gather energy directly from the Sun. That energy then passes to other organisms that eat plants.

What Do You Think?

Suppose a dust storm blocked sunlight in your town for several weeks. What do you think would happen to the plants in the area? What would happen to the organisms that depend on the plants for food? Why?

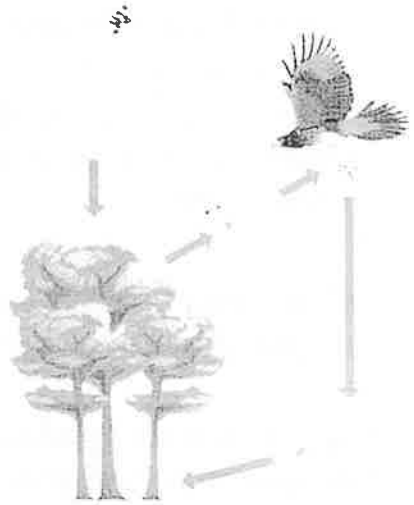
How do plants make their own food?

Plants make their own food from sunlight in a chemical process. Sunlight, water, and carbon dioxide from the air are combined in the leaves of the plant. Sugar is one product of the chemical process. Plants use the sugar for energy. Another product of the chemical process is oxygen. Plants release oxygen as a waste product. Plants and other organisms, such as green algae, are the source of the oxygen in the air we breathe.



Look Out!

Animals must eat plants or other animals to gain energy.



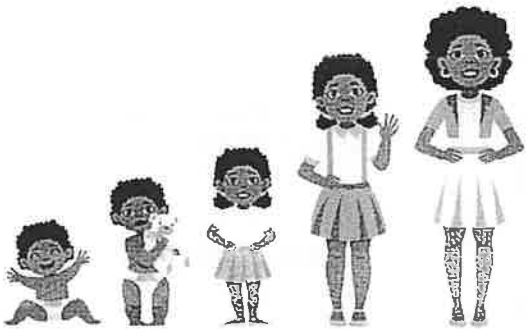
Look at the diagram of the Sun's energy being passed to several organisms. The plants get their energy from the Sun. The mouse gets energy by eating plants. The hawk gets energy by eating the mouse. Organisms such as mushrooms also help move energy. They break down material from the hawk or other organisms once they die. Some of the material becomes part of the soil that is later used by plants.

Animals use a chemical process to gain energy, too!

When an animal eats something, its body digests the food and breaks it down using a chemical process. The food is broken down into tiny pieces the body can use to grow and survive. These pieces include nutrients that help the body stay healthy and sugars that give the body energy.

Animals need energy every day for different tasks.

All organisms use the Sun's energy to grow, repair any injuries, maintain their body temperature, and move. Think about a time you played outside for a long time. How did you feel afterward? You probably felt hungry! You may have started to sweat! All animals use energy to move. Muscles in the body use sugars from food as energy to work. The body also needs energy to stay at the right temperature. Your body used energy to produce sweat and keep you cool.



Were you always as tall as you are now? How did you grow bigger? Your body uses energy and nutrients to grow over time. You are made up of tiny pieces, called *cells*, and your body makes more of these tiny pieces in order to get bigger. The same thing happens when you get a cut or a scrape. Your body uses energy to make more cells and repair the damaged part of your body.

Linking Literacy

Name: _____ Date: _____

Describe with an Image

Directions: Answer each question in the first column. Then draw a picture in the second column to help explain your answer.

Where do all food chains and food webs get their energy?	Illustrate where all energy in a food chain or web begins.
How do plants make their own food?	Illustrate the process of plants using energy from the Sun to make their own food.
How do animals use energy?	Illustrate an action in which animals use energy.

Linking Literacy

Name: _____ Date: _____

Write a Story

Directions: Imagine you are the Sun, shining down on the plants and animals on Earth. Write a story from the perspective of the Sun. Describe how plants and animals use your energy to survive. Draw a picture to illustrate your story.

Content Connections Video

Name: Date: Group:

Food Chain

1. What is one of the world's fastest hunters? (Pause 0:16) _____

2. Where does the cheetah get his energy? (Pause 0:40) _____

3. What forms a food chain? (Pause 1:03)

_____

_____

_____

4. What does the arrow in a food chain show? (Pause 1:13)

_____

_____

5. What is at the bottom of every food chain? (Pause 1:24)

_____

6. What are producers? (Pause 1:38)

_____

_____

_____

7. What is a consumer? (Pause 2:11)

_____

_____

_____

8. Explain the flow of a food chain. (Pause 2:59)

_____

_____

_____

Content Connections Video

9. Draw a food chain.

Content Connections Video

Name: _____ Date: _____

Energy Flow Through Living Systems

Recommended Materials: None

1. **Explain:** How does an owl use the energy from the sun? *(Pause 2:33)*

_____

_____

_____

_____

2. **Directions:** Sketch some other food chains, like the one Kendall described, that might interconnect to make a food web in an environment like this. *(Pause 4:16)*

3. **Explain:** How much grass do you think it takes to make an owl? *(Pause 5:23)*

_____

_____

_____

_____

Content Connections Video

8. Draw the algae food chain. (Pause 1:53)

9. Even though the great white shark is the top of the food chain, _____ gives it the energy it needs. (Pause 2:10)

Content Connections Video

Name: Date: Group:

Sharks and Fur Seals

1. What is the great white shark? (Pause 0:24)

   _____

2. What does the seal give the great white shark? (Pause 0:50)

   _____

3. The great white shark and the fur seal are part of a _____ _____. (Pause 1:03)

4. Fur seals are _____, just like the great white shark, and they eat a lot of fish. (Pause 1:11)

5. What are algae? (Pause 1:27)

   _____

   _____

   _____

6. What is a producer? (Pause 1:38)

   _____

   _____

   _____

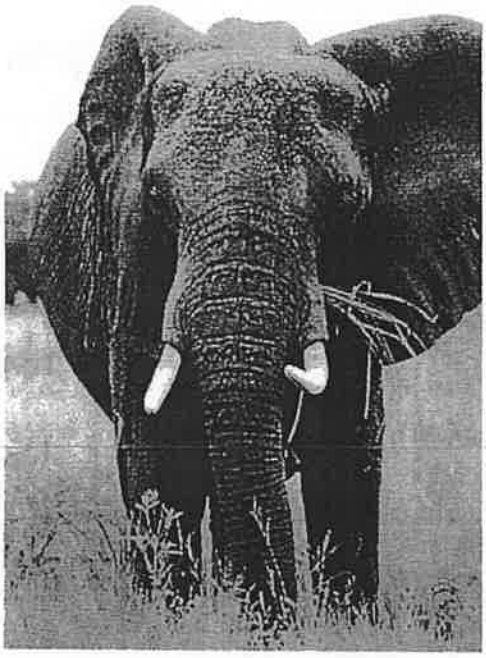
7. What produces the energy at the bottom of the shark food chain? (Pause 1:44)

   _____

Science Today

Name: _____ Date: _____

Zoo Foods



1. Why do you think the zoo has a nutritionist?

_____

_____

_____

2. Explain how energy is transferred to each animal and where the energy originally comes from.

_____

_____

_____

_____

Science Today

You are the nutritionist at a shelter for homeless dogs. Use the feeding guide below to plan each dog's diet.

Adult Dog Feeding Guide	
Dog's Weight	**Cups of Food Per Day**
10 pounds or less	1 cup
10–25 pounds	2 cups
25–50 pounds	3 cups
50–75 pounds	4 cups
75–100 pounds	5 cups

Dog	Weight	Daily Food Amount
Joey	9 pounds	
Haus	87 pounds	
Sebastian	43 pounds	
Ranger	31 pounds	

3. How much dog food does the shelter need per day to feed all four dogs?

_____

4. What would happen if the dogs were not fed the correct amounts?

_____

_____

_____

_____

Independent Practice

Name: _____ Date: _____

Part I: True Statements

Directions: Circle the word in parentheses that makes the statement true.

1. Energy from the sun, or (energy transformation, solar energy), travels through space to be absorbed by producers in order for them to create food.
2. In order for children to grow up healthily, they must have (energy, play time) to fight off illnesses.
3. After the sun's energy is used to make plants grow, (solar energy, plant matter) is consumed by some animals.
4. A model showing the flow of energy in an ecosystem, sometimes known as a (food pyramid, food chain), always starts with the sun's energy.
5. When plants make their own food, they use (water, soil) and the gas humans breathe out.

Part II: Diagrams

Directions: Draw a simple diagram of each word. Below the diagram, write the numbers of the phrases that describe each word.

Photosynthesis	Food Chain	Energy Transformation
_____	_____	_____

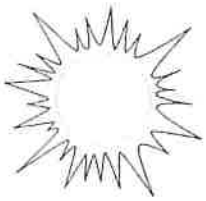
1. Shows how energy changes
2. Involves plant matter
3. A chemical process happens.
4. Starts with the sun; solar energy
5. Water + solar energy + gas
6. Uses arrows to show where the energy goes
7. Shows consumers

Concept Attainment Quiz

Name: Date: _____

Part I: Matching

Place the following organisms in a food web. Use arrows to represent the flow of energy.



Grass
Rabbit
Wolf
Flower
Frog
Insect
Snake

Part II: Identification

Use the word bank to fill in the blanks below.

Repair	Transferred	Energy	Grow	Move

1. The _____ used by plants and animals was originally from the Sun.

2. This energy is used for growth, motion and to _____, or make the body well again.

3. The energy from field mice is _____ to snakes, which will help the snakes grow.

4. The snake would also use the energy from the field mice to help it _____ from one place or another to catch more food.

5. You also use food to help you to _____, or increase in size.