🌍 Lesson Plan: Energy and Ecosystems

Grade Level: 5
Subject: Life Science
Duration: 45–60
NGSS 5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

🎯 Learning Objectives

By the end of this lesson, students will be able to:

- **Explain** how energy flows through an ecosystem from the sun to producers to consumers.
- **Identify** the roles of producers, consumers, and decomposers in energy transfer.
- **Describe** how energy is lost at each trophic level in a food chain.

the chain, showing the transfer of energy from one organism to another.

- **Energy:** The ability to do work. In ecosystems, energy flows from the sun through producers to consumers and is essential for all life processes.
- **Photosynthesis:** The process by which green plants, algae, and some bacteria use energy from the sun to convert carbon dioxide and water into simple sugars, storing chemical energy.
- **Trophic Level:** Each step in a food chain or food web, representing a position in the flow of energy through an ecosystem, from producers at the base to top predators at the highest level.

💼 Materials Needed: (all links are included in this PDF)

- Printed copies of the Study Guide (https://newpathworksheets.com/api/guide/study-guide-science-grade-5-energy-and-ecosystems.pdf)
- Vocabulary matching worksheet (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-energy-and-ecosystems-1.pdf)
- Practice worksheets (0, 1, and 2) (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-energy-and-ecosystems-0.pdf)
- Chart paper or whiteboard
- Markers or colored pencils
- Small samples of soil, leaves, or compost (optional for decomposer demonstration)

ecosystems.pdf)

- Discuss the roles of producers, consumers (herbivores, carnivores, omnivores), and decomposers in energy transfer and nutrient cycling.
- Demonstrate energy loss at each trophic level by drawing an energy pyramid on the board, showing that producers have the most energy and top predators have the least.
- If available, show a small sample of decomposing organic matter (soil with leaves or compost) and explain how decomposers break down dead material to recycle nutrients back into the ecosystem.

Step 3: Guided Practice (15 minutes)

- Distribute the vocabulary matching worksheet and work through the first two terms as a class, reinforcing definitions of ecosystem, producer, consumer, and decomposer. (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-energy-and-ecosystems-1.pdf)
- Have students complete the rest of the vocabulary worksheet in pairs, then review answers together.
- As a class, create a food chain on chart paper using examples from local ecosystems (for example, sun → grass → rabbit → hawk), labeling each organism's role and discussing energy transfer at each step.

Step 4: Independent Practice (15 minutes)

- Provide students with Practice Worksheet 0 to complete individually, which includes questions on ecosystem components, energy flow, and the roles of different organisms. (https://newpathworksheets.com/api/worksheet/worksheet-science-grade-5-energy-and-ecosystems-0.pdf)
- Encourage students to refer to the Study Guide and vocabulary sheet as needed.

- Challenge advanced learners to research and diagram a more complex food web (rather than a simple food chain) for a specific ecosystem, such as a wetland or ocean, showing multiple energy pathways.
- Have students calculate the approximate energy available at each trophic level if producers start with 1000 units of energy, applying the 10% rule of energy transfer.

For learners needing support:

- Provide pre-labeled food chain cards for students to sequence in the correct order, showing the flow of energy from sun to top predator.

- Offer one-on-one or small-group support during independent practice, using visual aids such as the energy pyramid diagram and simplified vocabulary definitions.

Extension Activities

- Have students build a physical model of an energy pyramid using blocks or paper, labeling each trophic level with examples of organisms and the relative amount of energy available.
- Assign a research project where students investigate a local ecosystem (forest, pond, or grassland) and create a poster showing the food chains, energy flow, and the roles of producers, consumers, and decomposers.
- Conduct a class discussion or debate on how human activities (such as pollution, deforestation, or overfishing) can disrupt energy flow and ecosystem balance.

- Vocabulary Set 3 (https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-5-energy-and-ecosystems-3.pdf)

ENERGY AND ECOSYSTEMS

What Is an Ecosystem?

An **ecosystem** includes all the living and non-living things in an area. This includes populations and communities of many different animals.

A **population** is a group of organisms *of one species* that live in the same area at the same time and

A **community** is all the populations that live in an area.

So in a grassland ecosystem, you could have a large population of lions, a small population of wildebeests, and a large population of elephants. All of these populations could make up a community in one area of Africa.

A **habitat** is where an organism lives.

All living things have a role to play in their environment...a **niche** is an organism's role in the environment. For example,

Rivers are made up of freshwater. Many organisms live in or near rivers. Rivers provide food, water (obviously), and a place to live for many organisms!

Wetlands are areas of land often covered or drenched in water. Wetlands are home to a wide variety of organisms. However, wetlands do not just supply organisms with a place to live. A wetlands area acts as a water filter too! Plants, soil, and microorganisms filter water that flows through the wetlands, cleaning the water of any impurities it may have.

Oceans are ecosystems too! Scientists study the ocean and its creatures by zones, which are defined by water depth. Sunlight only reaches the shallow zones, which means plants can't grow in the deepest ocean zones. Most ocean organisms live in the shallower zones so that they have plants to eat and the comfort of the warmer shallower waters.

many plants.

Not all change in an ecosystem is bad, of course. Some things can be a BENEFICIAL change to an environment. When a beaver builds a dam, it stops the flow of water creating a pond which provides homes and food for MANY organisms.

Flow of Energy

All animals need ENERGY to carry out their life processes, to move, to run, to hunt, to build homes…to do everything! A food chain represents how energy is transferred from one organism to another. An **energy pyramid** represents the amount of energy that flows through an ecosystem. Producers have the MOST energy in an ecosystem. You can see that the producers are at the base of the energy pyramid and that means there are more of them than any other kinds of creatures.

A lot of energy is released as heat into the environment. Animals get their energy from the food they eat, from eating other animals and/or plants. They then use that energy to run around and carry out life processes. When they are busy running around, energy is released as

Food shortage, limited resources, dramatic changes in climate, and human intervention are just a few main reasons for the extinction of animals. Fossils are evidence that a great number of plants and animals have become extinct over time.

Energy and ecosystems

Sci E

Name_____ Class_____ Date_____

1 **Ecosystems** include _____ in the same area.

A living and nonliving things
B only nonliving things
C only living things
D only plants living

2 A **group of squirrels** in a forest is an example of a(n) _____.

A community
B population
C biome
D ecosystem

3 A(n) _____ is all the **populations** that live in the same area.

A biome
B environment
C community
D populations

4 A **niche** is an organism's role in its ecosystem. What is a plant's **niche** in its ecosystem?

A to provide energy to other organisms
C soil
D a chipmunk

5

7

9 Why are **abiotic factors** an important part of an ecosystem?

A they need animals to survive
B they are living organisms
C they are necessary for living organisms' survival
D they depend on plants for their survival

10 **Plants** use the **Sun** to obtain energy. **Animals** get their energy from the plants they eat or from eating other animals that have eaten plants. Which of the following is a true statement?

A Animals are independent.
B Living organisms do not need energy.
C Living organisms depend on the Sun for energy.
D Nonliving organisms get energy from plants.

Energy and ecosystems

Sci E

Name_____ Class_____ Date_____

1 **Ecosystems** include _____ in the same area.

A living and nonliving things
B only nonliving things
C only living things
D only plants living

A

2 A **group of squirrels** in a forest is an example of a(n) _____.

A community
B population
C biome
D ecosystem

B

3 A(n) _____ is all the **populations** that live in the same area.

A biome
B environment
C community

C

4 A **niche** is an organism's role in its ecosystem. What is a plant's **niche** in its ecosystem?

A to provide energy to other organisms

A

5

D

7

D populations

C

C soil
D a chipmunk

9 Why are **abiotic factors** an important part of an ecosystem?

A they need animals to survive
B they are living organisms
C they are necessary for living organisms' survival
D they depend on plants for their survival

C

10 **Plants** use the **Sun** to obtain energy. **Animals** get their energy from the plants they eat or from eating other animals that have eaten plants. Which of the following is a true statement?

A Animals are independent.
B Living organisms do not need energy.
C Living organisms depend on the Sun for energy.
D Nonliving organisms get energy from plants.

C

Energy and ecosystems

Sci E

Name_____ Class_____ Date_____

1 A **river** is an example of a _____ ecosystem.

A freshwater
B saltwater
C taiga
D tundra

2 What do rivers **provide** to animals?

A warm temperatures
B precipitation
C food and water
D nitrogen

3 Plants, soil, and microorganisms found in a **wetland** act as a _____ in that ecosystem.

A water filter
B water heater

4 **Wetlands** are areas covered with water all or most of the year. Wetlands provide **habitat** for many organisms that live on land or in the water.

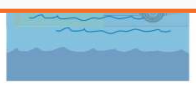
True or false?

5

7

B change an ecosystem slowly
C develop an ecosystem
D dry out an ecosystem

D a newly formed pond



9 The **introduction of a new species** in an ecosystem could be **harmful** to the native species that have always lived in that ecosystem. For example, the new species might _____.

A take resources from others
B share resources with others
C provide more food
D provide shelter

10 Which of the following can bring about a **beneficial change** to an ecosystem?

A beetles eating a large amount of plants
B beavers building a dam
C a drought occurring
D a lake being polluted

Energy and ecosystems

Sci E

Name_____ Class_____ Date_____

1 A **river** is an example of a _____ ecosystem.

A freshwater
B saltwater
C taiga
D tundra

A

2 What do rivers **provide** to animals?

A warm temperatures
B precipitation
C food and water
D nitrogen

C

3 Plants, soil, and microorganisms found in a **wetland** act as a _____ in that ecosystem.

A water filter
B water heater

A

4 **Wetlands** are areas covered with water all or most of the year. Wetlands provide **habitat** for many organisms that live on land or in the water.

True or false?

A

5

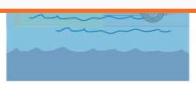
C

7

B change an ecosystem slowly
C develop an ecosystem
D dry out an ecosystem

C

D a newly formed pond



9 The **introduction of a new species** in an ecosystem could be **harmful** to the native species that have always lived in that ecosystem. For example, the new species might _____.

A take resources from others
B share resources with others
C provide more food
D provide shelter

A

10 Which of the following can bring about a **beneficial change** to an ecosystem?

A beetles eating a large amount of plants
B beavers building a dam
C a drought occurring
D a lake being polluted

B

Energy and ecosystems

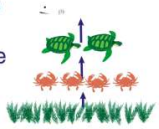
Sci E

Name_____ Class_____ Date_____

1 Why is the clearing of trees **harmful** to an ecosystem?

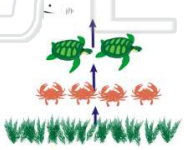
A it takes away fire hazards
B trees can be used for firewood
C it takes away animals' habitats
D trees can be used as building material

2 There are **fewer animals** shown at the top of an **energy pyramid** because there _____.



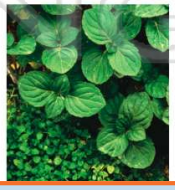
A is only room to show one animal
B are fewer plants than animals
C are more animals at the top
D is less energy at the top

3 What does this energy pyramid show concerning **plants**?



A an ecosystem only needs a few plants
B an ecosystem needs many producers

4 Which organisms have the **most energy** in ecosystems?

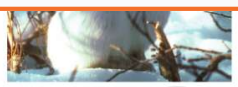


A consumers
B decomposers

5

7

D ability to see in the dark



stays the same
C the number of that species increases
D that species becomes extinct

9 If a species is **endangered**, there is still hope for the species. If a species is **extinct**, _____.

A it is still living
B it is not in trouble
C it is gone forever
D there are a small number of organisms of that species

10 Palentologists study **fossils** of animals that have died. This has shown scientists that **dinosaurs** are the **only** animals that have become **extinct**.

True or false?

A true **B** false

Energy and ecosystems

Sci E

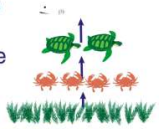
Name_____ Class_____ Date_____

1 Why is the clearing of trees **harmful** to an ecosystem?

A it takes away fire hazards
B trees can be used for firewood
C it takes away animals' habitats
D trees can be used as building material

C

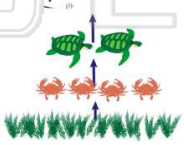
2 There are **fewer animals** shown at the top of an **energy pyramid** because there _____.



A is only room to show one animal
B are fewer plants than animals
C are more animals at the top
D is less energy at the top

D

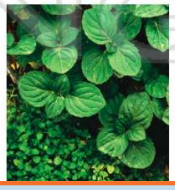
3 What does this energy pyramid show concerning **plants**?



A an ecosystem only needs a few plants
B an ecosystem needs many producers

B

4 Which organisms have the **most energy** in ecosystems?



A consumers
B decomposers

D

5

D

7

D

D ability to see in the dark

stays the same
C the number of that species increases
D that species becomes extinct

9 If a species is **endangered**, there is still hope for the species. If a species is **extinct**, _____.

A it is still living
B it is not in trouble
C it is gone forever
D there are a small number of organisms of that species

C

10 Palentologists study **fossils** of animals that have died. This has shown scientists that **dinosaurs** are the **only** animals that have become **extinct**.

True or false?

A true **B** false

B

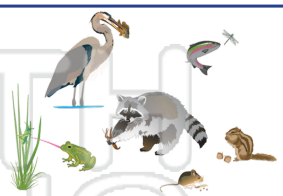
Energy and ecosystems

Name_____ Class_____ Date_____

Match each of the following terms to its definition:

Food chain	Abiotic factors	Biotic factors	Photosynthesis
Habitat	Energy	Consumer	Wetland

1. - an organism that is not able to make its own food and obtains energy from eating other organisms



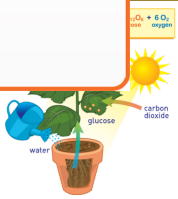
2. - the place where an organism lives within an ecosystem; where living things make their homes and live; a place that supports a plant or animal and has everything they need to survive

3. for so

4. anima

5. move

6. bacter simple sugars



7. - the non-living components of an environment

8. - the living components of an environment

Energy and ecosystems

Name_____ Class_____ Date_____

Match each of the following terms to its definition:

Food chain	Abiotic factors	Biotic factors	Photosynthesis
Habitat	Energy	Consumer	Wetland

1. consumer - an organism that is not able to make its own food and obtains energy from eating other organisms

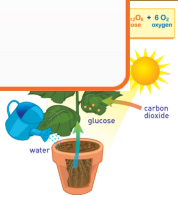
2. habitat - the place where an organism lives within an ecosystem; where living things make their homes and live; a place that supports a plant or animal and has everything they need to survive

3. wet
time d

4. foo
eaten

5. ene

6. pho
bacter
simple sugars



7. abiotic factors - the non-living components of an environment

8. biotic factors - the living components of an environment