

ECOSYSTEMS CYCLING OF ENERGY

Science Reading

Food Chain and Energy Pyramid

Have you ever wondered how energy moves through an ecosystem? Food chains act like how life sustains itself. They start with plants, the producers, that harness sunlight through photosynthesis to create energy. Next in line are herbivores, which eat plants to gain energy. Then, carnivores eat herbivores, passing energy along the chain. This transfer of energy is essential for the ecosystem.

Energy pyramids (diagram 1) help organize these energy levels within a food chain. A graphical representation that shows the energy distribution among an ecosystem's different trophic levels. Producers sit at the base, holding the most energy. Each level has less energy as you move up because some is lost as heat during bodily functions. This pyramid shape effectively shows that energy decreases as it travels through the food chain.

Diagram 1: Food Pyramid

Trophic Pyramid

Every step in a food chain (diagram 2) is called a trophic level. A food chain starts with producers, which are plants that create their own food. Each living thing gets its food, starting with producers and ending with a top predator. Herbivores, or primary consumers, occupy the second trophic level. Secondary consumers fill higher trophic levels. Decomposers break down dead matter and recycling nutrients into the soil. At each specific level of the energy pyramid, decomposers operate. They break down waste from all trophic levels, returning vital nutrients to the base.

Diagram 2: Food Chain trophic levels

Grass (Producer) → Rabbit (Herbivore)

Food Web

Have you ever thought about how all living things are connected in nature? A food web is like nature's intricate tapestry; every strand represents a vital connection. It's a complex network of interlinked food chains, showing how energy flows through an ecosystem.

At the core of a food web (diagram 1) are the producers, like plants and algae, which harness sunlight to create food through photosynthesis. Herbivores such as rabbits and deer rely on these plants for energy, while carnivores like lions and wolves hunt other animals for food. Omnivores, like humans and bears, consume both plants and animals. Decomposers, like fungi and bacteria, break down organic matter, returning nutrients to the soil. Energy flows through trophic levels, starting with producers that capture the energy from the sun. As you move up the levels, the amount of energy decreases because some energy is lost as heat. This transfer of energy sustains life across the ecosystem.

Desert Ecosystem

Marine Ecosystem

A food chain is a linear sequence showing how each living thing gets food, starting with a producer and ending with a top predator. In contrast, a food web is a more complex network of interconnected food chains, demonstrating how various organisms are connected and how energy flows through different paths in an ecosystem. While a food chain follows a single path of energy flow, a food web illustrates the many overlapping and interconnected food chains within an ecosystem. Changes in the food web can cause widespread effects. If predator populations decline, prey can become overpopulated, impacting plant life. Climate shifts, habitat loss, and invasive species can disrupt the balance, risking species' survival.

Every species, from the producer to the top predator, has a crucial role in maintaining a balanced food web. This web is not just a network of food chains but a complex system that ensures ecosystem stability. Understanding the dynamics of food webs and the importance of every species is essential for biodiversity conservation. By grasping the complexity and interconnectedness of food webs, we can actively contribute to conservation initiatives and uphold the ecological balance necessary for all life forms.

In essence, food webs are intricate systems showcasing nature's interconnectedness. Appreciating these dynamics is key to preserving our planet's delicate ecosystems and the rich diversity of life they support.

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Scroll Through

To take a peek inside!

Help students learn about how ecosystems cycle energy through food chains and food webs and test their comprehension with these easy to read science reading passages.

Why? SCIENCE READING PASSAGES?

- ✓ Increase science literacy in the classroom
- ✓ Simple passages to help students comprehend the information
- ✓ Note-taking template to help students interact with the reading
- ✓ Worksheets to review and apply their knowledge
- ✓ Reinforcement task cards to continue their understanding

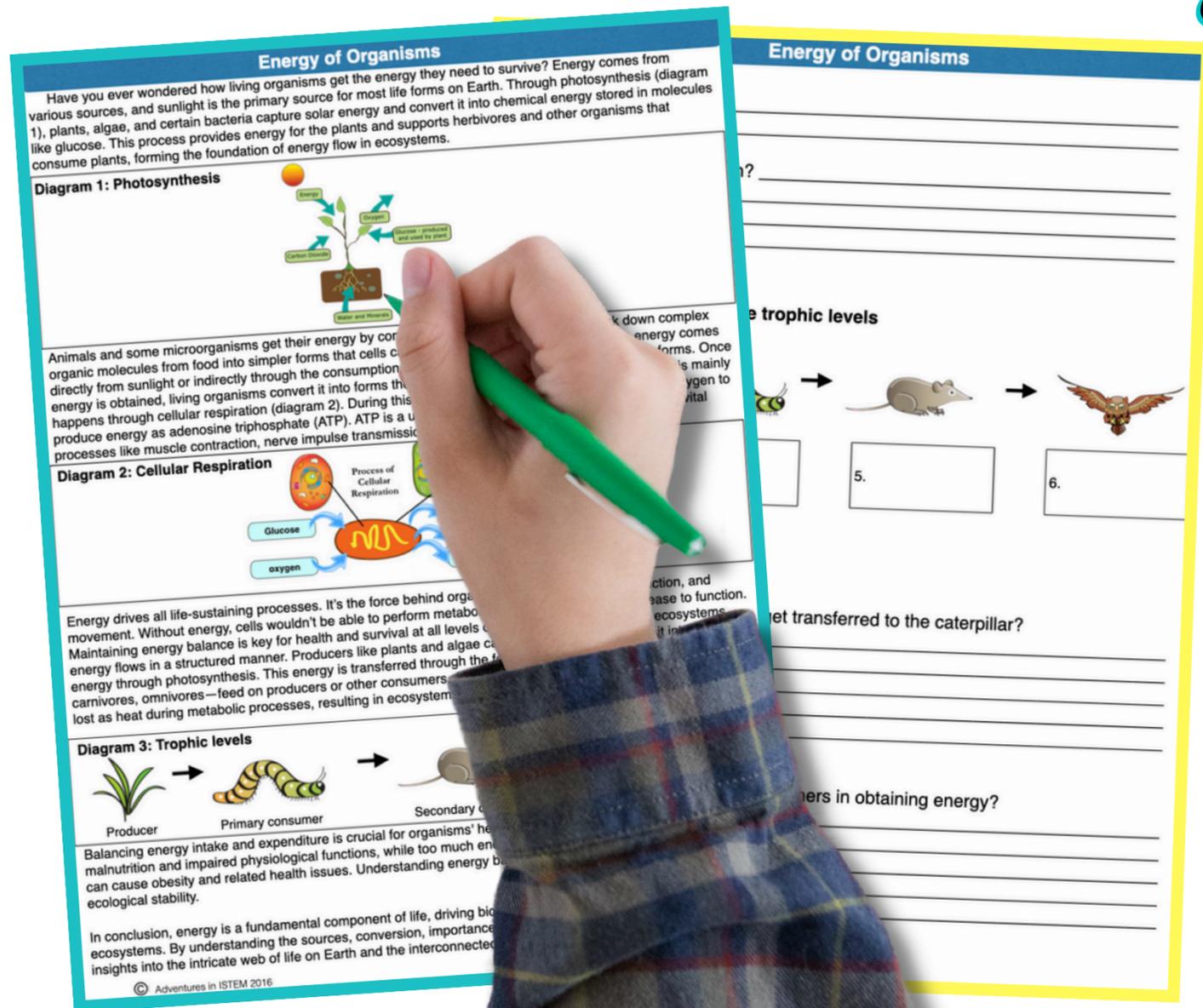


“This resource was absolutely perfect for when I was out sick with covid for multiple days. The content is exactly what I wanted to cover with my students, easy for a substitute to implement, and I was happy knowing my students’ time was being used productively!

Thank you! “- Emily

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What Are *students* Doing?

- ✓ **Marking the text**
- ✓ **Filling in the guided note-taking template**
- ✓ **Reviewing and applying their knowledge**
- ✓ **Reinforcing their understanding**

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Food Chain and Energy Pyramid

Define and Describe:

1. What is a food chain? _____

2. What is a food pyramid? _____

Label the different parts of the food pyramid

Trophic Pyramid

3. _____

4. _____

5. _____

6. _____

Extend:

7. Create a hypothetical food chain for a _____ of producers, primary consumers, secondary consumers, and decomposers. Explain how energy is transferred between levels.

Food Chain and Energy Pyramid

Have you ever wondered how energy moves through an ecosystem? Food chains act like energy maps, showing how life sustains itself. They start with plants, the producers, that harness sunlight through photosynthesis to create energy. Next in line are herbivores, which eat plants to gain energy. Then, carnivores or omnivores consume herbivores, passing energy along the chain. This transfer of energy is essential for all life in an ecosystem.

Energy pyramids (diagram 1) help organize these energy levels within a food chain. An energy pyramid is a graphical representation that shows the energy distribution among an ecosystem's different trophic levels. Producers are at the base, holding the most energy. Each level has less energy as you move up the pyramid because energy is lost as heat during bodily functions. This pyramid shape effectively shows how energy flows through the food chain.

Trophic Pyramid

Each level in a food chain (diagram 2) is called a trophic level. A food chain is a linear sequence that shows how energy flows from one living thing to another, starting with producers and ending with top predators. At the first trophic level, you have producers. Herbivores, or primary consumers, occupy the second level. Then, carnivores, omnivores, or secondary consumers fill higher trophic levels. Decomposers, like bacteria and fungi, play a crucial role by breaking down dead matter and recycling nutrients into the ecosystem. While they are not typically depicted in a specific level of the energy pyramid, decomposers operate at all levels. They break down dead organisms and waste from all trophic levels, returning vital nutrients to the soil and supporting the producers at the pyramid's base.

Diagram 2: Food Chain trophic levels

Grass (Producer) → Rabbit (Herbivore) → Snake (Carnivore) → Hawk (Top Predator)

Energy is lost at each trophic level due to activities like breathing and maintaining body warmth, which reduces the number of organisms that can be supported at higher levels. As a result, energy efficiency decreases as you move up the energy pyramid, which is why ecosystems can only sustain so many top predators as primary producers. Maintaining a balanced food chain and energy pyramid is crucial for ecosystem health. However, overfishing or habitat loss can upset this balance, affecting energy flow and organisms' roles. Protecting biodiversity and adopting sustainable practices are essential for keeping ecosystems healthy and functioning correctly.

In summary, understanding food chains and energy pyramids reveals ecosystems' complex web of energy and life. From plants to decomposers, each organism has a role in sustaining life and maintaining ecological harmony. By grasping these concepts, we can contribute to conservation efforts and support the well-being of Earth's diverse ecosystems.

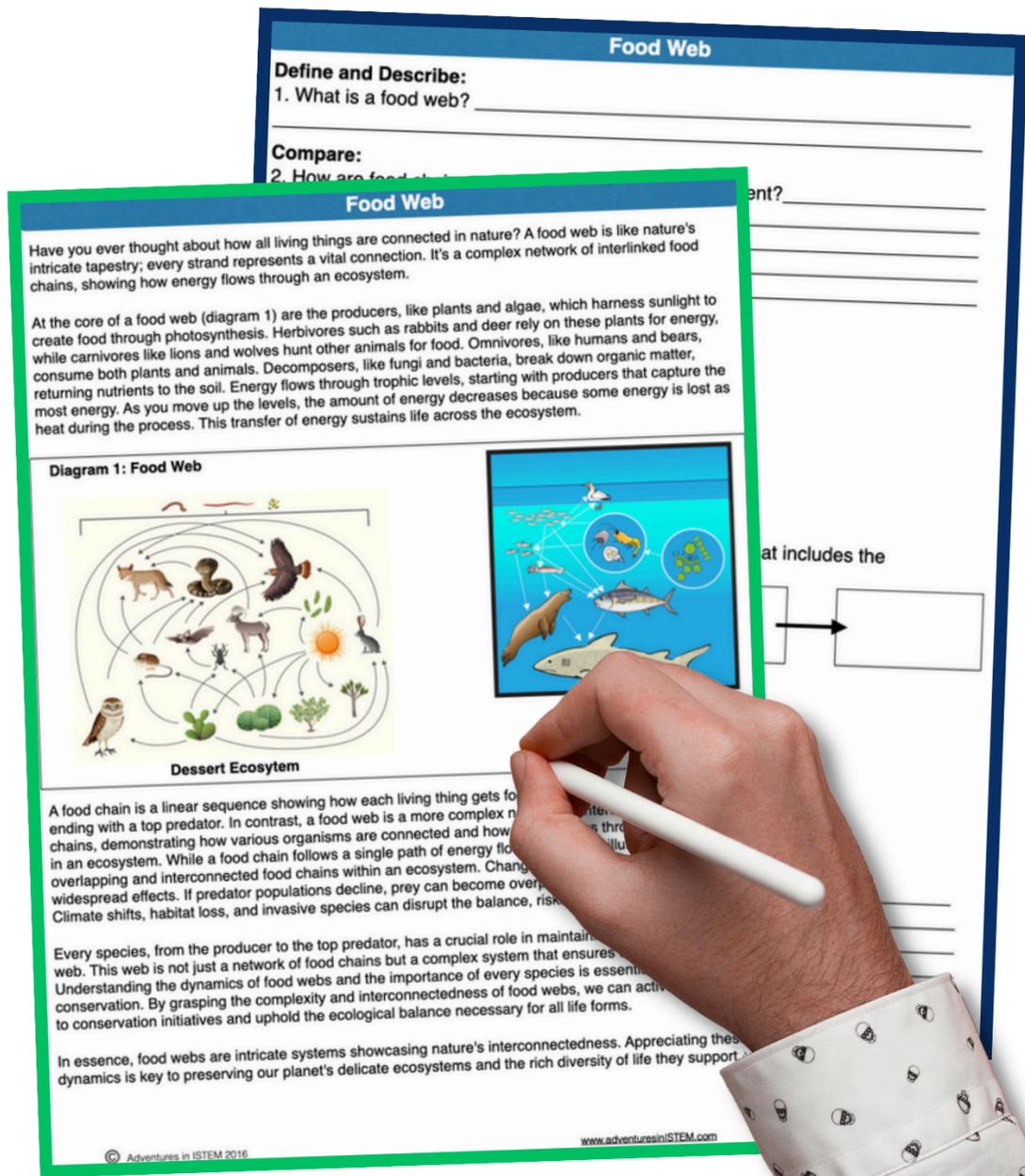
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Different ways to use the science readings

- ✓ Substitute plan on days you will be out
- ✓ Introduction of the material at the beginning of the unit
- ✓ During the explain phase of the 5E model
- ✓ As part of a science station
- ✓ For reteach to reinforcing their understanding
- ✓ During the review at the end of the unit

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Science Reading



Check out what teachers just like you have said about these product:



“I have incorporated these into my regular lessons and could not be more pleased. They are thorough, engaging and fun. I am very pleased with this purchase.” Rahim



“Perfect sub activities! Bought the bundle so I would have something for every unit. If there was nuclear section that would be icing on the cake! :) Maybe in the future?” Karis



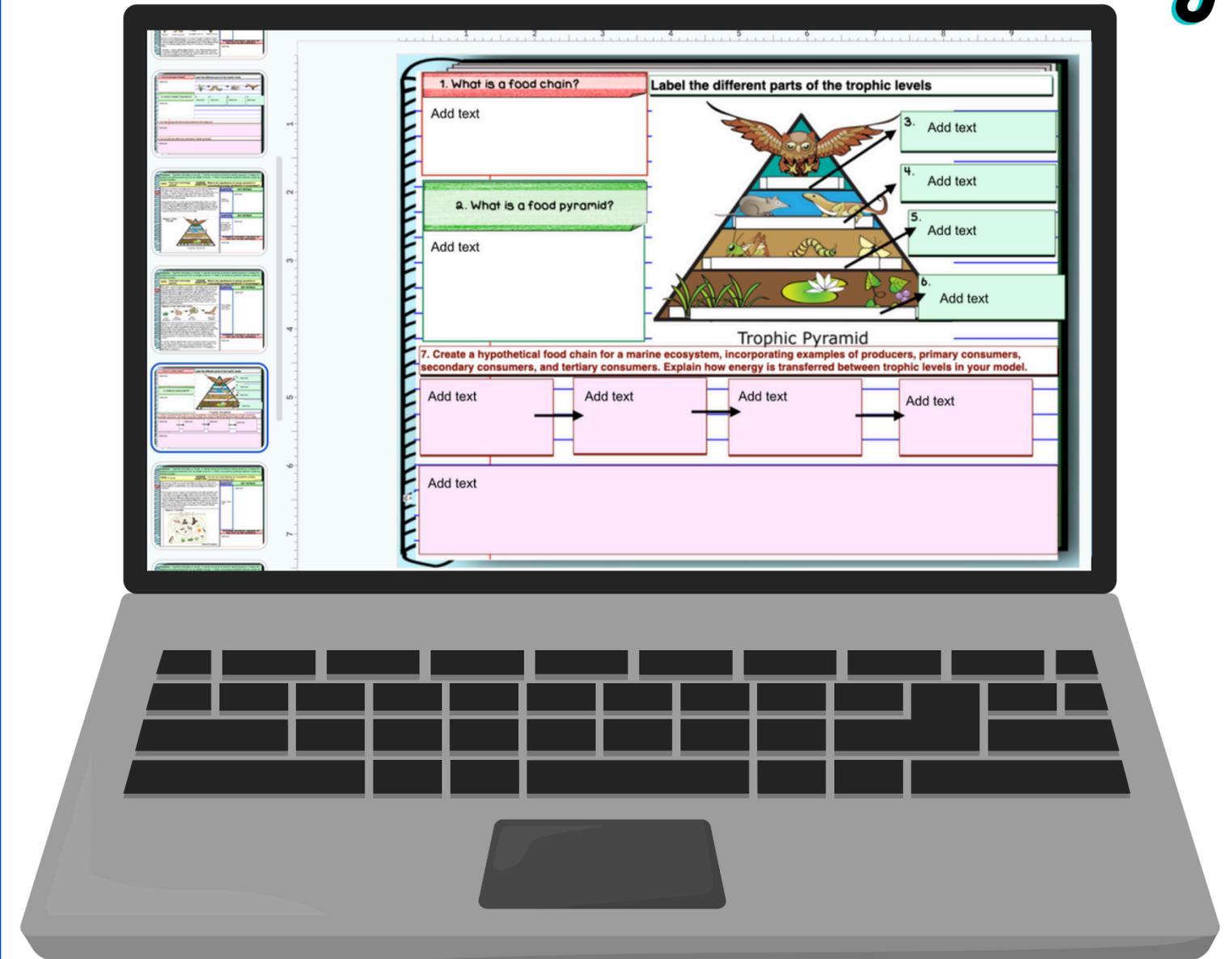
“This was a wonderful and engaging resource. My students were able to take a lot from it, and I loved how easy it was to prep it out.” – Christine

Resource *includes*

- ✓ **3 Reading Passages**
- ✓ **3 Note-taking guides**
- ✓ **3 Comprehension Worksheets**
- ✓ **4 Task cards**
- ✓ **Answer key**
- ✓ **Digital version**

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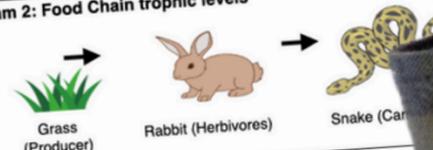
Energy pyramids (diagram 1) help organize these energy levels within a food chain. An energy pyramid is a graphical representation that shows the energy distribution among an ecosystem's different trophic levels. Producers sit at the base, holding the most energy. Each level has less energy as you move up the pyramid because some are lost as heat during bodily functions. This pyramid shape effectively shows how energy decreases as it travels through the food chain.

Diagram 1: Food Pyramid



Trophic Pyramid shows how energy is distributed among different trophic levels. At the base, you have producers, or plants. Above them are primary consumers, or herbivores. Secondary consumers, or carnivores, eat the primary consumers. Tertiary consumers, or omnivores, eat both primary and secondary consumers. Decomposers, like fungi and bacteria, break down dead matter and recycling nutrients into the ecosystem. At the top of the pyramid, decomposers operate at all levels, breaking down waste from all trophic levels, returning vital nutrients to the soil and base.

Diagram 2: Food Chain trophic levels



Energy is lost at each trophic level due to activities like breathing and movement. This means a smaller number of organisms can be supported at higher levels. As you move up the energy pyramid, which is why ecosystems can only sustain a limited number of organisms. Maintaining a balanced food chain and energy pyramid is crucial for the health of an ecosystem. Habitat loss can upset this balance, affecting energy flow and organism survival. Adopting sustainable practices are essential for keeping ecosystems healthy.

In summary, understanding food chains and energy pyramids reveals the intricate relationships between organisms. From plants to decomposers, each organism has a role in sustaining the ecosystem. Grasping these concepts, we can contribute to conservation efforts and protect our planet's ecosystems.

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Date: _____ Class: _____

Diagrams illustrate an ecosystem's complex connections and energy flow.

Notes

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Topics Included

Energy of Organisms

Food chains and energy pyramid

Food web

HOW TO USE THE RESOURCE IN

3 simple steps

1

Print the PDF version, make copies, and hand out to students

2

Use the digital version by clicking the titles in the RED BOX to make your own copy (found at the end of the PDF)

3

Share the resource with your students using your favorite LMS (Google Classroom, Powerschool (schoolology), Canva...)

Interactive Digital Flip Book

Teachers Guide

What You Will Need To Get Started:

1. Download link for the Google Resource by clicking on the titles in the red box

Cell Energy Digital Flip Book Student

Cell Energy Digital Flip Book Teacher

2. Access to the Internet and a Google Account (Free)
3. Google accounts or Microsoft OneDrive accounts for your students to save their work
4. Open the file on your Google Drive. The link will prompt you to make a copy

5. This new copy is now yours to edit and share with your students

6. Printer access if you choose to print the finished product as an actual flip book

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Life Science Bundle

Units

- ✓ Cells
- ✓ Genetics
- ✓ Evolution
- ✓ Ecosystems

Life Science

Big Idea Question: How can Punnett squares be used to predict the probable outcomes of offspring?

Diagram 1: When mice reproduce, there is a 50% chance of having a boy and a 50% chance of having a girl. Mice are known to have six to eight babies per litter and can have multiple litters in a year. Each time they have a baby, there is a 50% chance of having a boy and a 50% chance of having a girl. This does not mean that if they have six babies that will be boys and five girls and that will be girls. They could have five boys and one girl or five girls and one boy. The more babies they have, the closer the actual results will be to the predicted outcome. You can predict the possible results they have, the process by using a tool called a Punnett Square.

Diagram 2: A Punnett square is a tool that can show possible allele combinations of a genetic trait. A cross of a brown (BB) with a white (bb) will result in: BB - 100% brown - 100%.

Diagram 3: To make things easier, geneticists use two terms to describe the genotype of an organism. Diagram 3 shows a cross between two hybrid dominant allele and a recessive allele.

Labels: Digital and Print

- ✓ Reading Passages
- ✓ Notes
- ✓ Worksheets
- ✓ Task Cards

Science Reading Comprehension questions and Worksheets

Adventures in ISTEM

Basic Types of Cells

Big Idea Question: What is the difference between prokaryotes and eukaryotes?

Diagram 1: Cells are the basic unit of living things. There are many different types of cells: blood cells, nerve cells, plant cells, bacteria, animal cells, just to name a few (diagram 1). All of the cells, however, fall into two main categories: prokaryote and eukaryote.

Diagram 2: Prokaryotes are the simplest and oldest of cells. The name prokaryote means no nucleus. Pro=before and kary=nucleus, so prokaryote means before nucleus. Even though they don't have a nucleus, they do have circular DNA, the genetic material that holds the blueprints for making more cells. Prokaryotes also have cell walls to protect them, ribosomes, and cytoplasm (diagram 2). Prokaryotic organisms are single-celled and extremely small. Examples of prokaryotes are bacteria and archaea.

Diagram 3: Eukaryotes are larger and more complex than prokaryotes. They have a nucleus that protects their DNA. In fact, the name eukaryote means after nucleus. Unlike prokaryotes, which have circular DNA, eukaryotes have linear DNA. Eukaryotes also have cell walls. However, eukaryotes also have organelles that perform specific functions. Examples of eukaryotes are plants, animals, and fungi.

Fossils

Fossils are like Earth's time capsules, preserving the remains or traces of ancient plants, animals, and other organisms. They give us valuable insights into life forms that existed long before humans, helping scientists reconstruct Earth's history. Fossil evidence supports evolution, the process by which different kinds of living organisms develop and diversify from earlier forms.

Fossils form through a process called fossilization (diagram 1). When an organism dies, its remains may be buried in mud, sand, or volcanic ash. Over time, more sediment layers pile on top, pressing down on the remains. Minerals from the sediment seep into the organic material, gradually turning it into rock, a process that can take thousands or even millions of years.

Diagram 1: How fossils are formed

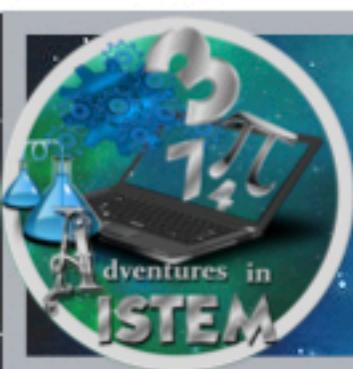
There are different types of fossils (diagram 2). Body fossils are the preserved physical parts of an organism, such as bones, teeth, shells, or even impressions of skin or feathers. These give us direct evidence of what ancient creatures looked like. Trace fossils are signs left behind by the behavior and activities of organisms. Petrified fossils occur when organic material in the remains gets replaced by minerals, turning the remains into stone-like structures and preserving intricate details of plants and animals. Mold and cast fossils are formed when the complex parts of an organism leave an impression in the surrounding material. Amber fossils occur when organisms are trapped in tree resin that hardens into amber. These fossils can preserve incredibly detailed and accurate features.

Diagram 2: Types of fossils

They help scientists study extinct species. For example, fossils of ocean giants we know no longer exist tell us about mass extinctions. From ancient times to the present, the Earth continues to change.

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“Our biology teacher and I share a lot of the same students this semester, so finding reading activities I can sprinkle into my English classes is a blessing! We discuss the passages together as a class and talk through any confusion students may have on the science concepts, as well as discussing the writing elements of the passage. Highly recommend!- Laura”



Free Sample

You can print the following pages for a free sample of what a science reading looks like and how you could use it in your classroom. Click the title in the red box for the digital version of the reading.

What You Will Need To Get Started:

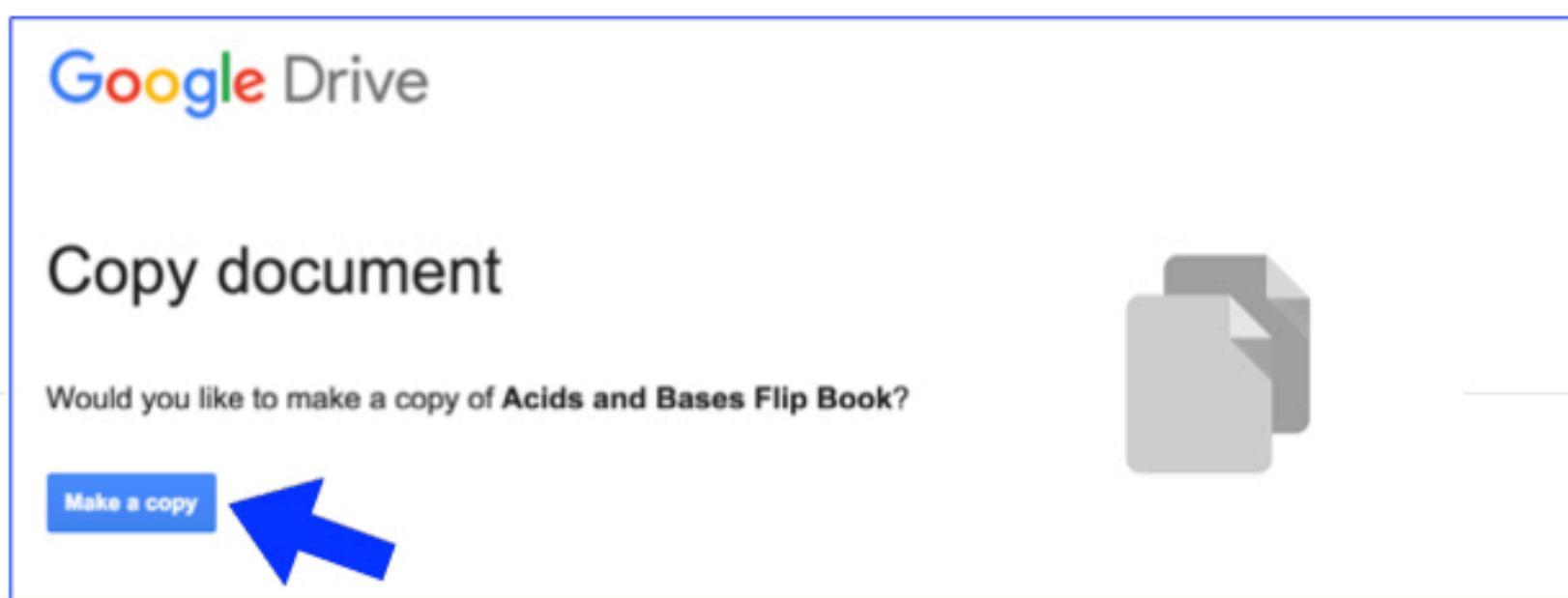
1. Download link for the Google Resource by clicking on the titles in the red box

Outer Planets Guided Reading Digital Notes

2. Access to the Internet and a Google Account (Free)

3. Google accounts or Microsoft OneDrive accounts for your students to save their work

4. Open the file on your Google Drive. The link will prompt you to make a copy



5. This new copy is now yours to edit and share with your students

6. Printer access if you choose to print the finished product as an actual flip book

Outer Planets

Big Idea Question: Why are they called gas giants? What are some key characteristics?

The outer solar system is made up of four gas giants. They are Jupiter, Saturn, Uranus, and Neptune. Since they are so far away from the Sun, they are able to hold onto their gas atmospheres and are made up mostly of gas but have solid rocky cores. Because they are so massive, they have a greater gravity than the terrestrial planets. They are also much colder than the terrestrial planets since they are so far away from the Sun. They also all have rings, and many planetary satellites.

Basic facts:

Jupiter: Largest planet in our solar system. Its mass is twice as much as the other seven planets combined. Now that's massive! It is made up mostly of hydrogen gas, and it is known for its massive storm—which is more like a hurricane that is the size of three Earths put together. Since it is made up of mostly gas, it is able to spin around pretty quickly. In one Earth day, Jupiter will have had three days. Now that's fast! It also has the most planetary satellites. To date, the number is at 67. It has the most gravity of all the planets.

Saturn: This planet is known for its many rings that circle it which are made of gas and ice. It is the least dense of all planets. In fact, if you put Saturn in a tub of water, it would actually float. It's amazing that something that massive could actually float. Crazy. Its atmosphere is mostly helium and hydrogen and its gravity pull could tear a comet apart if one got close enough.

Uranus: This planet does not reflect much light since it is so far from the sun. We know about it from our space probes that we sent out into space. The methane gas in its atmosphere is what gives it its greenish color. The rotation of Uranus is unique because it is so tilted it actually spins on its side. Its poles would be found in the same location as our equator, weird. This rotation causes one pole to be in complete darkness for half of its revolution. Could you imagine having night last half a year and a day lasting the other half?

Neptune: The outermost planet in the solar system. Its blue color is caused by its methane gas in its atmosphere. There is a hurricane-like storm that is the size of Earth. It has the fastest winds of any of the planets moving at more than 1,000 km/h (a high wind on Earth is considered 100km/hr).

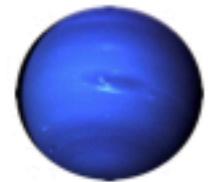
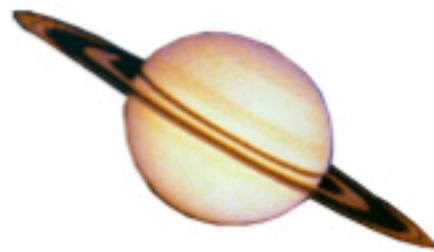
				
Distance from Sun	5 AU	9 AU	19 AU	30 AU
Rotation (day/night)	9 hours	10 hours	17 hours	16 hours
Revolution (year)	11 Earth years	29 Earth years	83 Earth years	163 Earth years
Diameter (size)	142,984 km	120,536 km	51,118 km	49,528 km
Density	1.33 g/cm ³	0.69 g/cm ³	1.27 g/cm ³	1.64 g/cm ³
Gravity	236% of Earth's	92% of Earth's	89% of Earth's	112% of Earth's
Planetary Satellites	67	62	27	14

The planet information is current as of April 2015

Outer Planets

1. Comparing the planets: Fill in the data table

	1	2	3	4
place the planets in order from closest to the Sun to furthest from the Sun				
place the planets in order from shortest day to longest day				
place the planets in order from shortest year to longest year				
place the planets in order from smallest size to largest size				
place the planets in order from least dense to most dense				
place the planets in order from least amount of planetary satellites to most amount of planetary satellites				



2. **Using Patterns:** Compare the number of planetary satellites to the diameter, location from the Sun, and the density. Which characteristic do you think has the most influence on how many planetary satellites an outer planet will have?

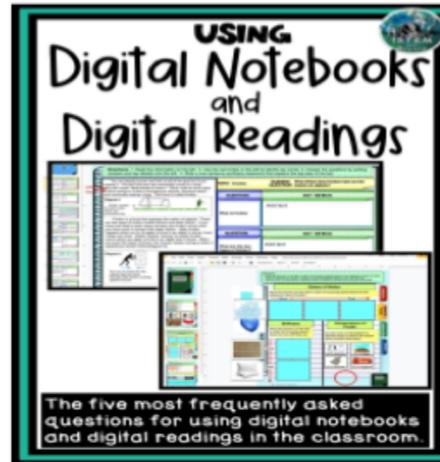
3. Why do you think the characteristic you choose in question 2 has more influence on the number of planetary satellites than the other characteristics? Explain.

4. Thinking beyond the table, what is another factor that could be influencing the number of planetary satellites the outer planets have? Explain.

Digital Resources

Using Digital Products?

If you are new to using digital lessons than I recommend to check out my blog post that contains the most frequently asked questions. Click the picture for the link.



I would also recommend checking out my Google Slide videos that demonstrate how to drag and drop pieces, write in the text boxes, add objects, and more. These are short videos that can easily be shared with students and parents. Click the picture for the link



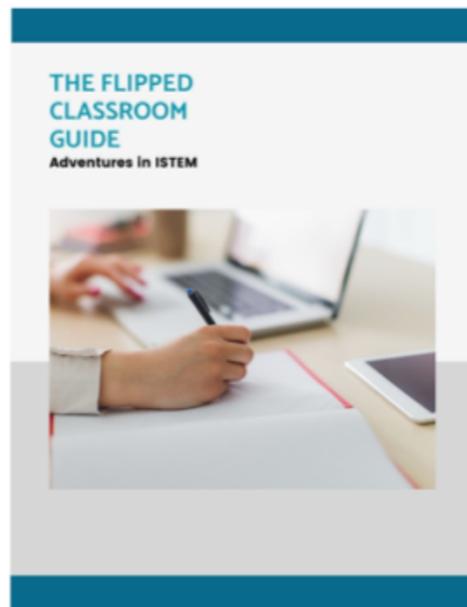
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Thank You for taking the time to visit my store and downloading one of my products. I hope you find this resource a useful tool for your classroom. I appreciate your support and look forward to your feedback.

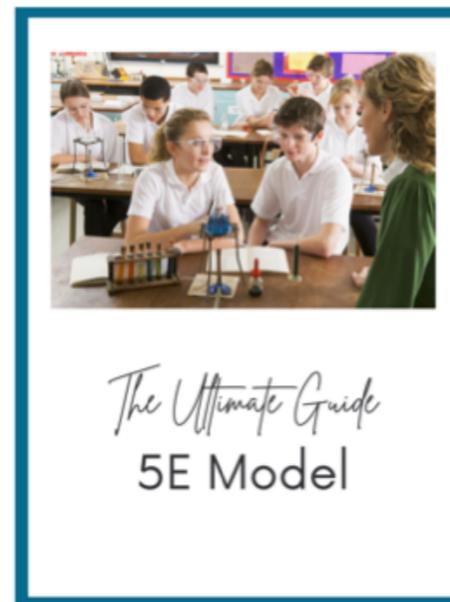
Giving Back

Cancer affects not only the person but everyone they know. A portion of the proceeds of this product are going to the organization LLS which helps to fund treatments and find a cure.

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