

What's Included?

Unit Planning

- NGSS and APES Standards document
- Unit Pacing Guide for 50 min classes
- Differentiation ideas for honors students and virtual students ***Digital links for virtual learning found here**
- Honors assignment list

Notes

- Unit 1 PowerPoint (27 slides)
 - Spheres of the Earth
 - Ecological Organization
 - Feeding Relationships
 - Organism Relationships
- Cornell Notes Pages (4 pgs)
- Doodle Notes Pages (3 pgs)
 - Guide to Using Doodle Notes
 - Doodle Note Keys & Examples
- Web-quests (9 pgs) (Can be used as an alternative to notes)

Student Pages

- This folder contains duplicate copies of every student page. They are in order according to the pacing guide for QUICK PHOTOCOPYING if you are using the pacing guide as is.

Activities

- Spheres of the Earth Outdoor Activity (1 pg)
- Symbiosis Matching Activity (9 pgs)
- Animal Habitat & Niche Survey (3 pgs)
- Prey Adaptations Research Activity (2 pgs)
- Answer Keys for all activities

Extensions

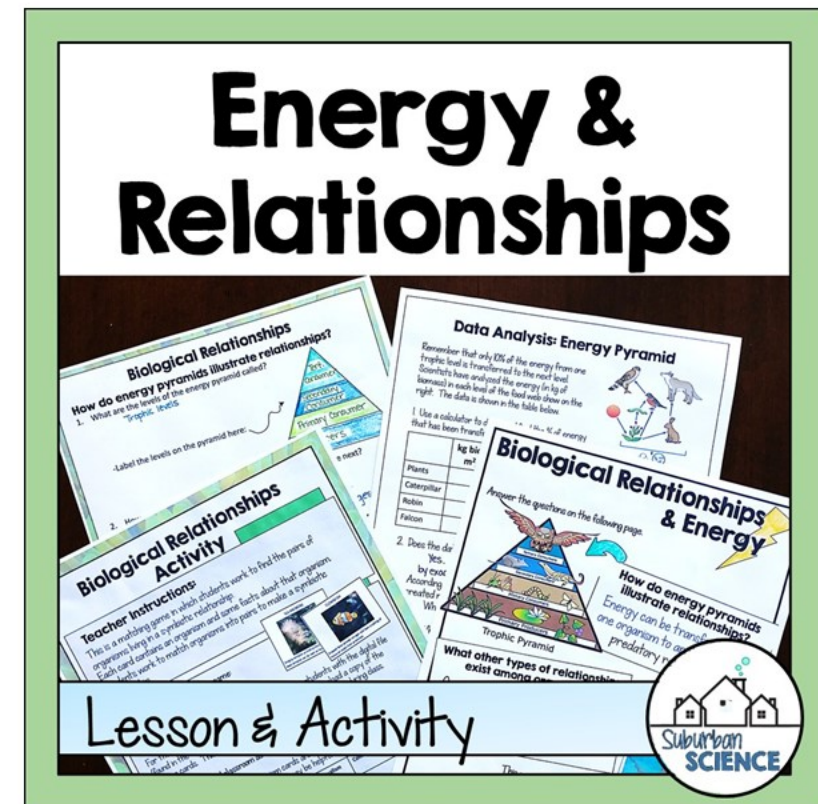
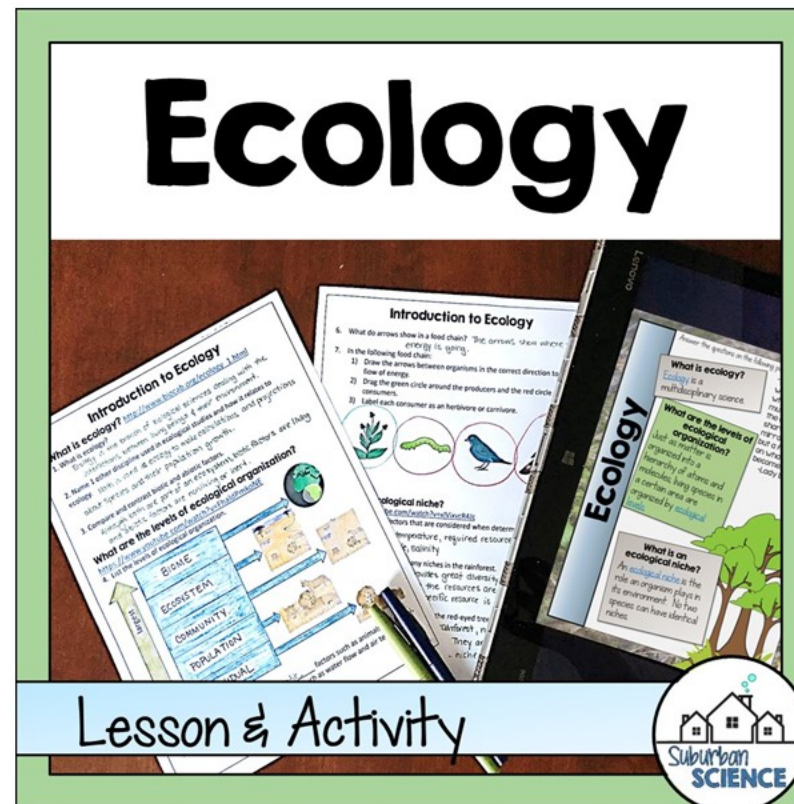
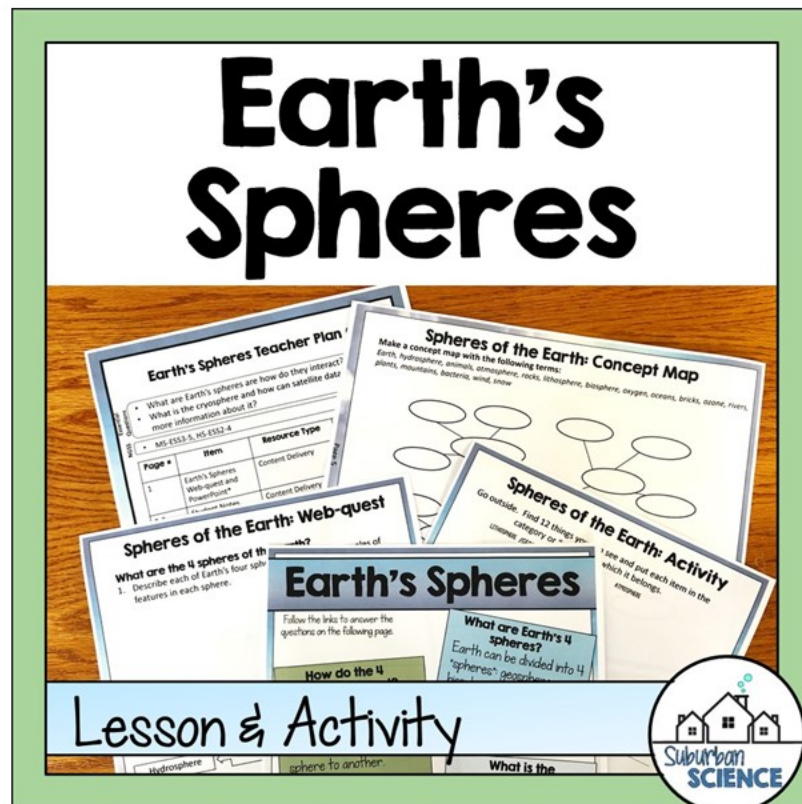
- Digging Deeper: Ecological Niches
- Digging Deeper: Animal Relationships*
- Data Analysis: Energy Pyramid

*Honors Options

Review and Assessment

- Spheres of the Earth Concept Map *Guided or Blank (1 pg)
- Ecology Concept Map *Guided or Blank (1 pg)
- [Ecology Quiz through Google Forms](#) (Make a copy of this file to your Drive. Do NOT assign to students using this link.)
- Editable Task Card Review (20 cards) with answer sheet
- Ecology Science Test (paper)- both Honors and Regular versions with answer sheets

Includes the following individual lessons that were previously available in my TpT store:



If you have already purchased one of these lessons and would like to purchase this unit, please contact me at support@suburbanscience.com for a discount.

Unit Planning

NGSS and APES Standards Document

If you have specific state standards, contact me by email (support@suburbanscience.com) and I'll help you figure out which ones are covered!

What's Included?

Biosphere: Unit I

Included Resources by Folder:

Unit Planning

- NGSS Standards document
- Unit Pacing Guide for 50 min classes
- Differentiation ideas for honors students and virtual students
- Honors assignment list

Notes

- Unit 1 PowerPoint (27 slides)
- Spheres of the Earth
- Ecological Organization
- Feeding Relationships
- Organism Relationships

- Cornell Notes Pages (4 pgs)
- Doodle Notes Pages (3 pgs)
- Guide to Using Doodle notes
- Doodle Notes Keys & Examples

- Web-quests (9 pgs) (Can be used as an alternative to notes)

Activities

- Spheres of the Earth Outdoor Activity (1 pg)
- Symbiosis Matching Activity (9 pgs)
- Animal Habitat & Niche Survey (3 pgs)
- Prey Adaptations Research Activity (2 pgs)
- Answer Keys for all activities

Extensions

- Digging Deeper: Ecological Niches
- Digging Deeper: Animal Relationships*
- Data Analysis: Energy Pyramid

*Honors Options

Review and Assessment

- Spheres of the Earth Concept Map *Guided or Blank (1 pg)
- Ecology Concept Map *Guided or Blank (1 pg)
- Ecology Quiz through Google Forms (Make a copy of this file to your Drive. Do NOT assign to students using this link.)
- Editable Task Card Review (20 cards) with answer sheet
- Ecology Science Test (paper)- both Honors and Regular versions with answer sheets

Student Pages

- This folder contains duplicate copies of every student page. They are in order according to the pacing guide for QUICK PHOTOCOPYING if you are using the pacing guide as is.

Supplementary Resources

- [Video simulation: Interactions in an Ecosystem](#)
- [Data Nugget: Hungry, Hungry Herbivores](#)
- [Data Nugget: How Milkweed Plants Defend Against Monarch Butterflies](#)
- [Ecological Pyramid Mapping from PSU](#)

Materials Needed

- General classroom use: computers, calculators, rulers, colored pencils, paper, scissors
- Spheres of the Earth Activity & Animal Habitat Activity: require outdoor space and observations of "wildlife"

Not included:

Unit Overview Page
plus
Supplementary Resource Ideas
and Materials Lists

Biosphere Unit I Guide

Standards:

Choosing Standards:

Although many states use NGSS, there are some states that do not. I would be glad to help you determine which of your state standards are covered in this unit. You can send me an email at support@suburbanscience.com to find out. Thank you!

The NGSS standards included in this unit are addressed multiple times throughout this course, rather than just once. As the course builds upon itself, the standards will be met with greater depth and detail further into the course.

Topic	NGSS Standard	Description	APES Topics
Spheres of the Earth	HS-LS1-6	Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.	1.1 Introduction to Ecosystems 2.4 Ecological Tolerance
	HS-ESS2-2	Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.	
Ecological Organization	HS-LS2-1	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.	1.1 Introduction to Ecosystems
Organism Relationships	HS-LS1-5	Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	1.9 Trophic Levels 1.10 Energy Flow and the 10% Rule 1.11 Food Chains and Food Webs 2.6 Adaptations
	HS-LS2-4	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	
	HS-LS2-8	Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	

*Note: NGSS is a registered trademark of Achieve. Neither Achieve nor the lead states and partners that developed the Next Generation Science Standards were involved in the production of this product, and do not endorse it.

© Suburban Science

Editable Pacing Guides

50 min
classes

	Day	Instruct	Assess	Homework
Review	6	<ul style="list-style-type: none"> Use Task Cards to review unit concepts (also copy Task Card Answer Sheet) 	<ul style="list-style-type: none"> Go over answers to task cards when students are finished Check for areas of misunderstanding 	<u>All:</u> Study for Test
Assess	7	<ul style="list-style-type: none"> Take Unit 1 Test 	<ul style="list-style-type: none"> Formal summative assessment 	

50 min
classes

Biosphere Unit I Pacing Guide

© Suburban Science

	Day	Instruct	Assess	Homework
Spheres of the Earth	1	<ul style="list-style-type: none"> Unit 1 PPT (Section 1) Cornell Notes (Spheres of the Earth) Spheres of the Earth Activity (materials: outdoor space) 	<ul style="list-style-type: none"> Cornell Notes summaries Informal discussion and questions 	
Ecological Organization	2	<ul style="list-style-type: none"> Intro: Spheres of the Earth Concept Map Unit 1 PPT (Section 2 & Section 3) Cornell Notes (Ecological Organization & Feeding Relationships Among Organisms) 	<ul style="list-style-type: none"> Informal check of concept map accuracy Cornell Notes summaries Informal discussion and questions 	
	3	<ul style="list-style-type: none"> Animal Habitat & Niche Activity (Materials: outdoor space, computers) Ecology Concept Map 	<ul style="list-style-type: none"> Informal questioning during activities Information check for accuracy or completion of concept map 	<u>All:</u> Digging Deeper: Ecological Niches
	4	<ul style="list-style-type: none"> Online Ecology Quiz through Google Forms Unit 1 PPT (Section 4) Cornell Notes (Organism Relationships) 	<ul style="list-style-type: none"> Summative grade from quiz 	<u>Honors:</u> Digging Deeper: Animal Relationships
	5	<ul style="list-style-type: none"> Activity: Prey Adaptations 	<ul style="list-style-type: none"> Informal questioning during activities Informal check for accuracy or completion of activity pages 	<u>All:</u> Data Analysis: Energy Pyramid
Organism Relationships	*	<ul style="list-style-type: none"> Optional Day: Use Doodle Notes to Review Concepts if Cornell Notes have been used for primary note-taking 	<ul style="list-style-type: none"> Informal assessment of understanding through doodle note completion 	

Coincide with NGSS document in Unit Planning Folder

***Bold items** must be photocopied.



This icon is found on the top right corner of Honors pages for easy identification.

The daily topic coincide with the previous standards document.

Lesson planning is now quick and easy!

Differentiation Ideas for:

- Student Interest
- Student Ability
- Teaching Pace
- Teaching Environment (Virtual, in-class, or hybrid)

Differentiation

Student Ability

- **Advanced students**
 - **Honors options** are included in the student pages. These can be given to a whole advanced class or individual students, as needed.
 - **Editable Cornell notes** (found in the Notes folder)
 - Delete the fill-in-the-blank notes on the right side leaving only questions for a more independent note-taking experience.
 - Delete the summary and allow students to come up with their own.
- **Tests:**
 - Use the "Honors" tests that include additional short answer questions.
- **Struggling students**
 - **Eliminating homework altogether** may work well for students that have trouble thinking independently or have home situations that don't allow for work outside

Honors Assignment List

Although there are no official education standards for what makes an "honors" class, honors assignments generally provide one of three options:

- Greater depth of knowledge
- Additional critical thinking
- More independent work

In this unit, you can find some additional assignments used to increase knowledge for honors students. **These can certainly be used for all students also be helpful for extra credit, homework, or sub days if you need it.** Because answers to these assignments are often less straightforward, grading for completion and then discussing the answers to make sure

Assignment	Type of work	Skills addressed
Digging Deeper: Animal Relationships	Research & writing	Critical thinking, in

All honors assignments are designated by a  in the top right corner for identification.

Differentiation

Teaching Environment

- Virtual or Hybrid students
 - Digital Options:
 - Links for PowerPoints
 - Web-quests

All found on the following page.

al Students pages using Google Slides™ or students to type on al Doodle Notes™

ons:
don't have access to an outdoor space to complete the Spheres Activity and the Animal Habitat and Niche Activity, they can be th a photograph of an environment to analyze. Be sure to use sh that has plants and animals visible in it.

ules or classes with longer periods can double up on the 50-s laid out in the Pacing Guide (in the Unit Planning folder).

chedule? Some items can be skipped, but please check your state before doing so.

is can be eliminated from the editable PPTs or Cornell Notes. he quizzes can be skipped and students only provided with a at the end of the unit.

chedule?

upplementary resources as listed on the START HERE page. e include additional lessons, web explorations, and videos to de deeper instruction for some concepts.

some honors pages, if you haven't already.

students complete the other set of notes as a review of a (if students complete Cornell notes in class, use Doodle Notes review/summary or visa versa).

is can be added to the editable PPTs or Cornell Notes.

Differentiation

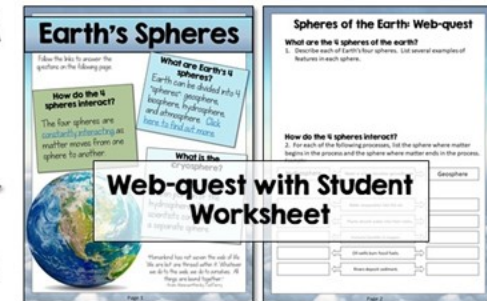
Differentiation is a key component to any unit. Here are some tips for differentiating based on student interest, ability and teaching environment.

Student Interest/Choice

- Three options for content delivery are included in this unit:
 - **Web-quests:** Students can explore content through links and answer provided questions on a worksheet. This is ideal for independent learners or sub plans. Find these web-quests on the last page of this document.
 - **Cornell Notes:** Teacher lectures with included PowerPoint and students record information in guided Cornell notes. An editable version of the Cornell notes is provided so teachers can adjust the content.
 - **Doodle Notes™:** Teacher lectures with included PowerPoint and students record information on Doodle Notes™ pages.

Student-led

Teacher-led



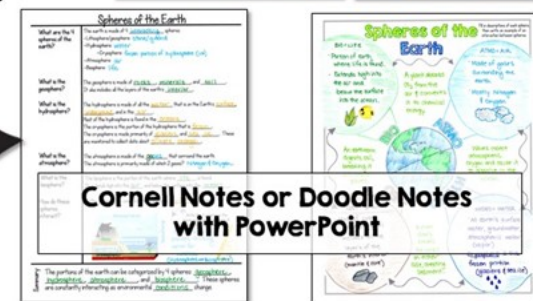
Earth's Spheres

Spheres of the Earth Web-quest

What are the 4 spheres of the earth?

How do the 4 spheres interact?

Web-quest with Student Worksheet



Spheres of the Earth

Spheres of the Earth

Cornell Notes or Doodle Notes with PowerPoint

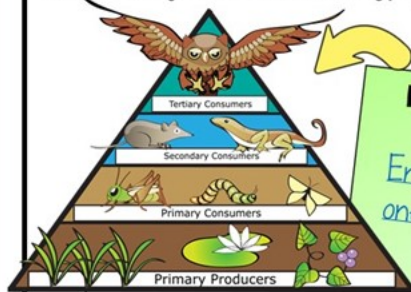
Content Delivery Option 1: Student Webquest

Live video
links for
independent
learning on
any device!



Biological Relationships & Energy

Answer the questions on the following page.



Trophic Pyramid

How do energy pyramids
illustrate relationships?
*Energy can be transferred from
one organism to another in
predatory relationships.*

What other types of relationships
exist among organisms?

Organisms can have positive,
neutral, or negative
interactions.

This remora is hitching a
ride on a sea turtle. This
is an example of
commensalism because
the remora benefits, while
the sea turtle is relatively
unaffected.

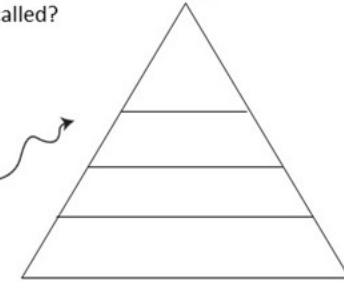


Biological Relationships

How do energy pyramids illustrate relationships?

1. What are the levels of the energy pyramid called?

-Label the levels on the pyramid here:



2. How much energy is transferred from one trophic level to the next?

3. What happens to the rest of the energy?

What other types of relationships exist among
organisms?

4. What is a symbiotic relationship?

5. Give an example of each type of symbiotic relationship:

Mutualism:

Corresponding
Comprehension Questions

Parasitism:

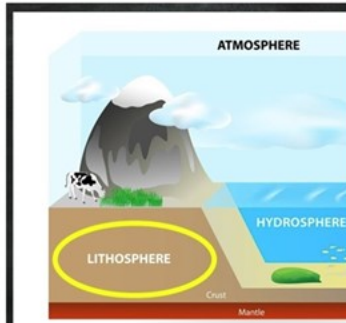
Predation:

Content Delivery Option 2: PowerPoint Presentation

27 editable, fully-animated slides

What is the geosphere?

- The geosphere is made of **rocks, minerals, and soil**.
- It also includes all the layers of the earth's **interior** (mantle & core).



How do biotic & abiotic factors differ?

- Biotic factors refer to **living organisms** that inhabit an environment
 - Ex) frog, fungi, bacteria
- Abiotic factors refer to **nonliving** parts of an environment



What do organisms spend their time?

is the **unique role** a species plays in the environment
 predator, prey, decomposer
 factors such as optimum temperature & required resources determine a niche

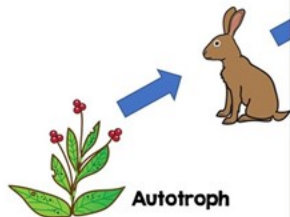


It is where an organism **lives** (can be shared by other species)

Sample Slides

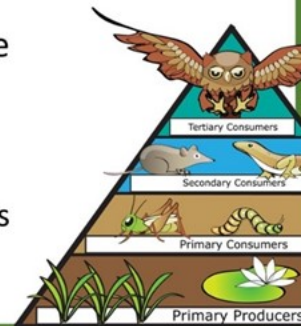
How can the feeding relationships of organisms be illustrated?

- Food chains show the **feeding relationships** of organisms
- Arrows show the transfer of **energy**



How do energy pyramids illustrate relationships?

- First Law of Thermodynamics: Energy cannot be **created** or **destroyed**
- Energy CAN be **transferred** from one organism to another in **predatory** relationships
 - **10%** of the energy is transferred
 - The rest **stays in undigested food** or is **given off as heat**



What are the types of symbiotic relationships?

Commensalism is when one organism **benefits** and the other is **unaffected**
 Tree frogs use plants as protection



Parasitism / Predation is when one organism is **harmful** and another **benefits**
 Parasitism - Fleas or ticks living off the body of a host animal
 Predation - Owls hunting mice



4 pages of Cornell Notes

Big
concept
questions

Content
summary for
each page

Feeding Relationships among Organisms

How do organisms obtain energy?

Autotrophs (producers): obtain energy from the sun or chemical compounds

Heterotrophs (consumers): depend on autotrophs for energy

- Herbivores= eat plants
- Carnivores= eat meat
- Omnivores= eat plants & meat

Scavengers: eat animals that have already died. They keep organisms from covering the ground while decomposing.

Decomposers: break down dead and decaying matter into simpler molecules that can be absorbed.

Food chains show the feeding relationships of organisms.

- What do arrows show? The transfer of energy

Food webs show many overlapping food chains.

Decomposers & scavengers are found at every point in the food web if an organism dies.

Energy transferred from plant to rabbit

Mark each organism as autotroph (A), heterotroph (H), or decomposer (D).

Which of these organisms could also be known as producers? The plant

Which would be known as consumers? All of the heterotrophs & decomposers

Summary: Autotrophs, heterotrophs, scavengers, and decomposers obtain energy in different ways. Food chains show the feeding relationships among organisms and can be overlapped into food webs.

Spheres of the Earth

What are the 4 spheres of the earth?

The earth is made of 4 interacting spheres:

- Lithosphere/geosphere: rocks/minerals
- Hydrosphere: water
- Cryosphere: frozen portion of hydrosphere (ice)
- Atmosphere: air
- Biosphere: life

What is the geosphere?

The geosphere is made of rocks, minerals, and soil. It also includes all the layers of the earth's interior.

What is the hydrosphere?

The hydrosphere is made of all the water that is on the Earth's surface, underground, and in the air.

Most of the hydrosphere is found in the oceans.

The cryosphere is the portion of the hydrosphere that is frozen.

The cryosphere is made primarily of glaciers and sea ice. These are monitored to collect data about climate change.

What is the atmosphere?

The atmosphere is made of the gases that surround the earth.

The atmosphere is primarily made of which 2 gases? Nitrogen & Oxygen.

What is the biosphere?

The biosphere is the portion of the earth where life is found. It extends high into the air and below the surface into the oceans.

How do these spheres interact?

Earth's spheres are constantly interacting as conditions change.

Summary: The portions of the earth can be categorized by 4 spheres: geosphere, hydrosphere, atmosphere, and biosphere. These spheres are constantly interacting as environmental conditions change.

Feeding Relationships among Organisms

How do organisms obtain energy?

Autotrophs (producers) obtain energy from the sun or chemical compounds

Heterotrophs (consumers) depend on autotrophs for energy

- Herbivores= eat plants
- Carnivores= eat meat
- Omnivores= eat plants & meat

Scavengers eat animals that have already died. They keep organisms from covering the ground while decomposing.

Decomposers break down dead and decaying matter into simpler molecules that can be absorbed.

Food chains show the feeding relationships of organisms.

- What do arrows show? The transfer of energy

Food webs show many overlapping food chains.

Decomposers & scavengers are found at every point in the food web if an organism dies.

Energy transferred from plant to rabbit

Mark each organism as autotroph (A), heterotroph (H), or decomposer (D).

Which of these organisms could also be known as producers? The plant

Which would be known as consumers? All of the heterotrophs & decomposers

Summary: Autotrophs, heterotrophs, scavengers, and decomposers obtain energy in different ways. Food chains show the feeding relationships among organisms and can be overlapped into food webs.

Ecological Organization

What is ecology?

Ecology is the scientific study of interactions between organisms and their environment.

Ecologists collect qualitative data (observations of organisms) and quantitative data (measurements).

Ecology is a multidisciplinary science.

How do biotic & abiotic factors differ?

Biotic factors refer to living organisms that inhabit an environment.

Abiotic factors refer to nonliving parts of an environment.

How are living things organized?

- Organisms are individual living things.
- Population: group of organisms of one species in one place at one time.
- Community: interacting populations (many species together in one place).
- Ecosystem: all biotic & abiotic factors in a certain area.
- Biome: all the ecosystems in a portion of the world with a specific climate.
- Biosphere: the portion of the earth where life is found.

Where do organisms spend their time?

A niche is the unique role a species plays in the environment.

A habitat is where an organism lives. (can be shared with other species) A habitat includes food, shelter & resources.

How do organisms find their niches?

A fundamental niche is the role an organism can occupy without competition. A realized niche is the smaller niche an organism occupies because of competition.

Tolerance: the ability of an organism to survive in changing conditions, such as temperature.

- Specialists: organisms that have limited tolerance and can only withstand small changes in their environment.
- Generalists: organisms that adapt easily to changes in their niche due to large ranges of tolerance.

Summary: Ecology is the study of how organisms interact with their environments. Organisms are grouped into levels within the biosphere, based on their interactions with other biotic and abiotic factors. Each organism lives in a habitat and occupies a unique niche.

Organism Relationships

How do energy pyramids illustrate relationships?

Organisms are sorted into trophic levels in an energy pyramid.

- Why do the trophic levels have a pyramid shape?

Greater numbers of organisms are found at lower levels. Fewer survive at the top.

First Law of Thermodynamics: Energy can not be created nor destroyed (it just changes forms).

Energy (20%) is transferred from one organism to another in predatory relationships.

- What happens to energy that is not transferred? 90% stays in undigested food or is given off as heat

Symbiotic relationships are two species living in close contact for some or all their lives.

What are the types of symbiotic relationships?

Type of Relationship	Description
Mutualism	Both organisms benefit
Commensalism	One organism benefits, other is unaffected
Parasitism / Predation	One organism benefits if the other is harmed

Summary: Organisms are sorted into trophic levels of an energy pyramid. Energy can be transferred in trophic relationships. Symbiotic relationships are formed when two species interact closely and can be beneficial, harmful, or neutral to each organism involved.

Each page is editable.

Add and delete text, questions, and summaries to meet the needs of your students.

Every student page also comes in a **digital** version on Google Slides

Virtual, hybrid, or absent students can stay right on track!

Feeding Relationships among Organisms

How do organisms obtain energy?

Autotrophs (producers): obtain energy from the sun or chemical compounds

Heterotrophs (consumers): depend on autotrophs for energy

- Herbivores= eat plants
- Carnivores= eat meat
- Omnivores= eat plants & meat

Scavengers: eat animals that have already died. They keep organisms from covering the ground while decomposing.

Decomposers: break down dead and decaying matter into simpler molecules that can be absorbed.

How can the feeding relationships of organisms be illustrated?

Food chains show the feeding relationships of organisms.

- What do arrows show? The transfer of energy

Food webs show many overlapping food chains.

Decomposers & scavengers are found at every point in the food web if an organism dies.

Mark each organism as autotroph (A), heterotroph (H), or decomposer (D).

Which of these organisms could also be known as producers? The plant

Which would be known as consumers? All of the heterotrophs & decomposers

Summary: Autotrophs, heterotrophs, scavengers, and decomposers obtain energy in different ways. Food chains show the feeding relationships among organisms and can be overlapped into food webs.

Feeding Relationships among Organisms

How do organisms obtain energy?

Autotrophs (producers): obtain energy from the sun or chemical compounds

Heterotrophs (consumers): depend on autotrophs for energy

- Herbivores=
- Carnivores=
- Omnivores=

Scavengers: eat animals that have already _____. They keep organisms from covering the ground while _____.

Decomposers: break down dead and decaying matter into _____ that can be _____.

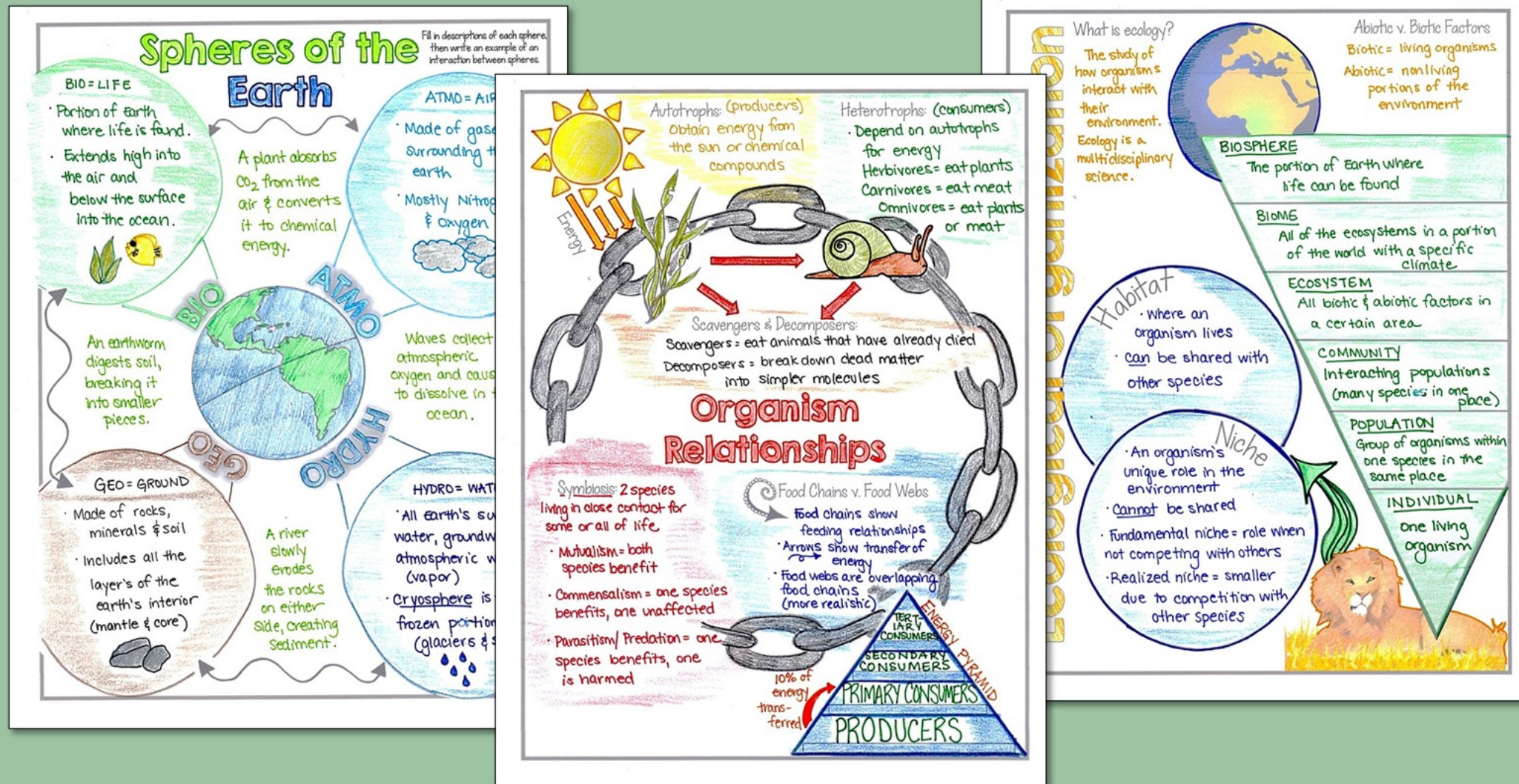
Food chains show the _____ of organisms.

- What do arrows show?

How can the feeding relationships of organisms be

Can be used in Google Classroom, Microsoft OneDrive or many other platforms!

3 pages of Doodle Notes for Summarizing & Review



Doodle Notes™ increase student focus and memory-
and they're great fun!

A guide for using them in your classroom is included.

Includes 4 Activities

- Spheres of the Earth Outdoor Activity
- Symbiosis Matching Activity
- Animal Habitat & Niche Survey
- Prey Adaptations Research Activity

Spheres of the Earth: Activity

Go outside. Find 12 things you can see and put each item in the category or "sphere" in which it belongs.

LITHOSPHERE /GEOSPHERE

ATMOSPHERE

HYDROSPHERE

EARTH'S
SPHERES

Spheres of the Earth Activity
Sample Page

Biological Relationships Activity

Teacher Instructions:

This is a matching game in which students work to find the pairs of organisms living in a symbiotic relationship. Each card contains an organism and some facts about that organism. Students work to match organisms into pairs to make a symbiotic relationship.

Directions:

1. Print out the sets of organism cards and cut out. If you use these cards more than once, it may be helpful to print on cardstock.
2. On the board draw this chart:

Mutualism	Commensalism	Parasitism

When pairs have been matched, students place their pair of cards on the board in the correct column. Tape or pushpins can be used to attach them to the board.

Symbiosis Matching
Activity
Sample Pages

SEA ANEMONE



GOBY FISH

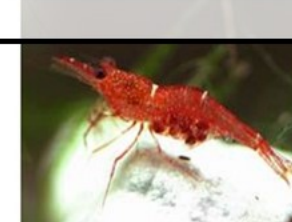


CLOWNFISH



Dropped feces provide nitrogen and have a coating of mucus on scales for protection.

SHRIMP



Nearly blind, but creates burrows in sand.

Student Data

Organism:

Habitat:

Niche:

Organism:

Habitat:

Niche:

Organism:

Habitat:

Niche:

Organism:

Habitat:

Niche:

Organism:

Habitat:

Niche:

Organism:

Habitat:

Niche:

Animal Habitat & Niche Survey Lab

Define the following terms:

• Habitat=

• Niche=

Describe your habitat:

Describe your niche:

In the area instructed by your teacher, find any organism that you can (birds, mushrooms, plants, etc.). For each organism, list its habitat and niche. If you have trouble finding the habitat, if you might need to look harder about the niche. If you don't know a habitat or niche, just list the organism and you can research it later.



Example: Blue Jay

Habitat: Forests of the Great Lakes & Atlantic coasts. Habitats can change based on season because blue jays migrate during winter. They are often found in oak trees near the edges of the forest.

Niche: Blue jays eat insects, nuts, and seeds. They also eat dead or injured animals or raid other birds' nests for eggs. They are often primary consumers but can be secondary consumers when eating other animals. They make nests from plants and mud. They are avid singers, though their singing is often loud and aggressive.

Activity: Prey Adaptations

Create an imaginary organism (plant, animal, or otherwise) that has 2 of these defense mechanisms. Provide a description of the organism and draw a picture of it.

You must include its appropriate trophic level and explain what predators it is deterring. If it is a consumer, list its prey.

Activity: Prey Adaptations



One of the relationships that is most familiar in the animal world is the predator/prey relationship. Many animals that are typical prey species have specific adaptations to protect themselves from predators.

Using your own online research, briefly describe each adaptation below and give an example of an organism that uses it.

Prey adaptations:

• Camouflage-

• Batesian mimicry-

• Mullerian mimicry-

• Chemical toxins-

• Speed-

• Thanatosis-

• Physical structures (quills, shells, etc.)-

• Warning calls-

• Mobbing or group behavior-

• Autotomy-

Animal Habitat & Niche Survey Sample Pages

Prey Adaptations Research Activity Sample Pages

Extension Pages

Math skills check!
(great for standardized
test prep)

Digging Deeper: Animal Relationships

Research the relationship between the ox pecker and large animals such as the rhinoceros and bison. The status of this relationship is under debate from scientists. What kind of relationship do you think exists between these animals?



Optional: Use the **claim, evidence, reasoning method** to explain your answer.

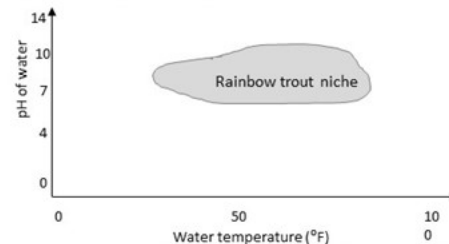
- Claim- Give an answer to the question
- Evidence- Provide information/facts that support your claim
- Reasoning- Explain how the evidence fits your claim

Possible research links:

<http://animals.mom.me/relationship-between-oxpecker-4>
<https://en.wikipedia.org/wiki/Oxpecker>
<http://beheco.oxfordjournals.org/content/11/2/154.full>

Digging Deeper: Ecological Ni

An organism's niche is based on its tolerance. **Tolerance** is the ability of an survive in changing conditions such as temperature, salinity, pH, etc. Some to withstand only small changes in their environment. Organisms with the are called **specialists** because their range of tolerance is very limited. Orga ranges of tolerance are called **generalists** and can adapt easily to changes i When an organism is forced out of its range of tolerance, it either learns to Below, you can see how the niche of a rainbow trout is based on its toleran both the pH and the temperature of the water.



The niche in the chart above is called the **fundamental niche** because it is

habitat with many other species including the brown trout. Because of th the rainbow trout is not able to occupy its full niche. Instead, it occupies

Check For Understanding:

1. Consider the raccoon and koala. Which is a specialist, and which is a g Why?

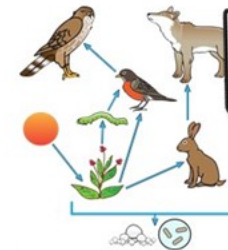
A raccoon is a generalist because it can eat many different types of food. A koala is a specialist because it only eats eucalyptus leaves.

Before even getting out scientific equipment, what can you hypothesize about the pH of the water?

3. Power plants often create very hot water during their production processes. Why do regulations exist to reduce the water temperature prior to returning it to the river?

Data Analysis: Energy Pyramid

Remember that only 10% of the energy from one trophic level is transferred to the next level. Scientists have analyzed the energy (in kg of biomass) in each level of the food web show on the right. The data is shown in the table below.



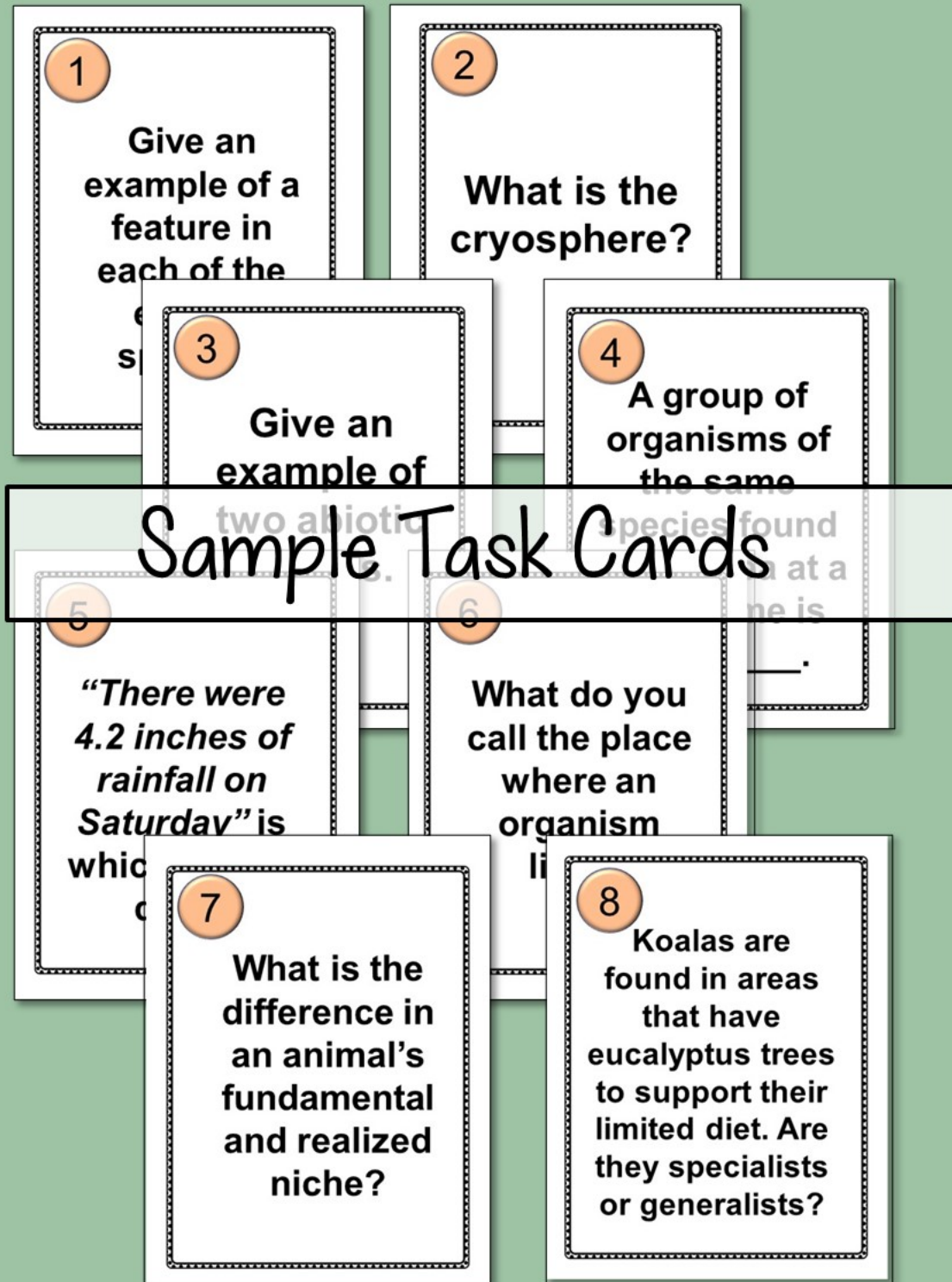
1. Use a calculator to divide and find the % of energy that has been transferred from each level.

	kg biomass/ m ² /year	% of energy transferred	Trophic Level
Plants	180		Producers
Caterpillar	17.3		
Robin	1.9		
Falcon	.18		

2. Does the data support the 10% rule? Why or why not?
3. According to the first principle of thermodynamics, energy is never created nor destroyed.
 - a. What type of energy is coming into the food web?
 - b. What type of energy is being lost during the organism's life?
 - c. What type of energy is being transferred during predation?

Greater depth of knowledge, scientific literacy, & critical thinking

20 Editable Task Cards for Review



Sample Task Cards

Using Editable Task Cards

How to set-up:

1. Print the cards on cardstock or paper.
2. Cut the pages so that each card is separate. If you'd like to use them in future years, it may be worth laminating them to protect them from student writing and other damage.
3. Place each task card at a seat around the room.

Students will rotate to each seat until all cards are finished. Answers are recorded on their "Task Card Answer Sheet" or notebook paper.

*TIP: It is important to let students know that usually a timer is appropriate. Without a timer, students will get backed up while rotating and chaos will ensue. 😊

Teacher Tips

Modifications:

- These task cards are editable so you can change the text on any card.
- There are additional cards at the end of the document for adding questions. Be sure to add the correct number, as well!
- Each card has an icon in the bottom right corner.



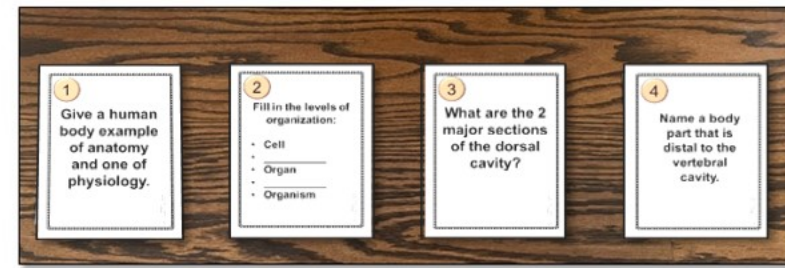
Questions about anatomical language



Questions about cellular processes

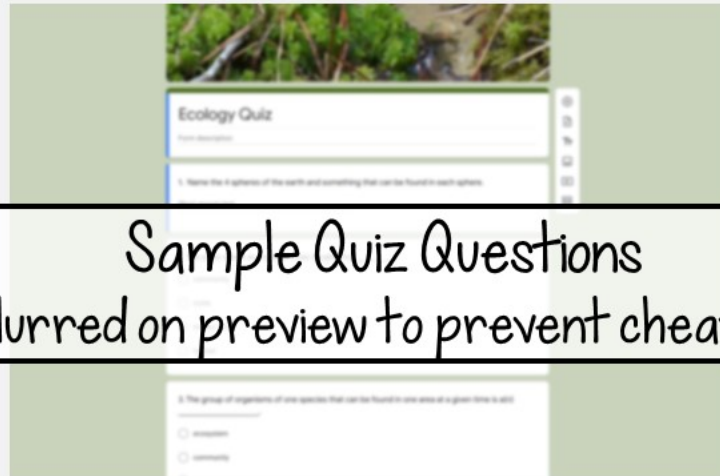
If you'd prefer to divide the unit, you can use the anatomical language task cards only, then use the cellular processes questions later.

- If moving around your room isn't possible, you can have students pass the cards in one direction.
- Other options:
 - Students can use notes or not depending on the level of memorization you expect prior to reviewing.
 - Students can work in pairs, which adds confidence.



Assessments

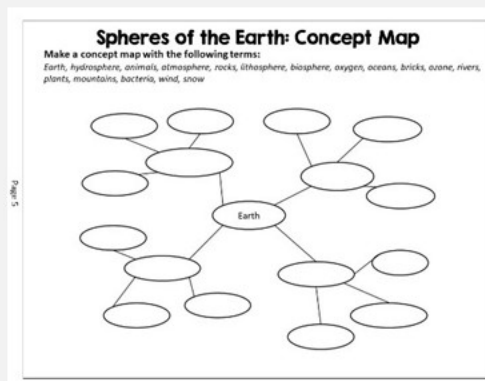
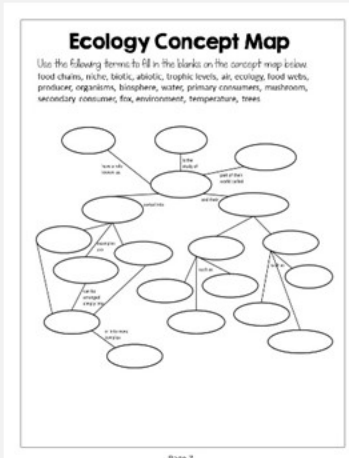
Editable Online Quiz through Google Forms



Sample Quiz Questions
(blurred on preview to prevent cheating)

- 11 multi-part questions
- Fully editable
- Answer key included for automatic grading

Concept Maps



Editable Unit Test

- 18 multiple choice questions
- 6 free response questions

Two Versions: Honors & Regular



Sample Test Pages
(blurred on preview to prevent cheating)

A sample student answer sheet for the "BIOSPHERE UNIT 1 TEST-HONORS". It includes a section for "Multiple Choice" with 18 numbered lines for answers, and a section for "Free Response" with 6 numbered lines for answers.

Student answer
sheet & answer keys
included
(both fully editable)

I'd love to hear from you!

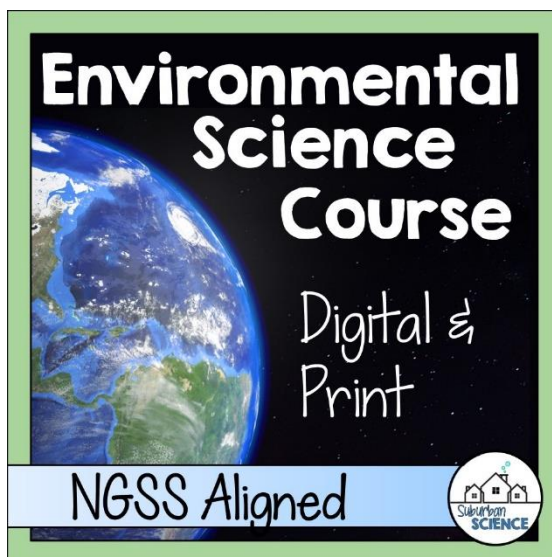
Like this resource?

You can **leave feedback** on your "My Purchases" section of TpT. Feedback also allows you to **earn credits** towards future purchases.

Didn't meet your needs?

Please email me (support@suburbanscience.com) so I can **respond directly** to your concerns. Your satisfaction is my goal.

This unit is part of my Full Environmental Science Curriculum.



The full course includes resources for a full year of high school Environmental Science. If you **choose to purchase this full curriculum** after purchasing this unit, you can **receive a refund for the duplicate** unit. See the TpT return policy for details.

This resource is the copyright property of Suburban Science. It is provided as a **single user license for classroom or personal use only**. If you have questions about the use of this resource, please contact me at support@suburbanscience.com.

Want to earn credits for future purchases?

By leaving **feedback** for this purchase, you can **earn money for future purchases**. You'll earn 1 credit for every \$1 you spend on TpT.

Here's how...

1. Go to your "My Purchases" page.
2. Click the "Leave a Review" button.
3. Answer each question about your experience with this resource.

Then simply **redeem your credits** the next time you check out!

Want to connect?

I sincerely hope this resource will make your school year easier and more fun.

For more teaching tips and ideas, [subscribe](#) to my email list or [check out my blog](#).

You can also follow me on TpT or social media:



Sincerely,
Anne from Suburban Science

