

FIFTH GRADE SCIENCE STATION

How People Affect Earth

Unit Bundle

Most trash in the U.S. ends up in **landfills**.



Agriculture can be more sustainable when farmers practice **crop rotation, rotational grazing, and take care with water and chemicals**.



People have **affected** all parts of the Earth.



When mining companies close a mine, they will **clean up the chemicals and replant trees**.



To protect ocean **fisheries**, governments are limiting the amount of fish that can be caught.



Many people choose to eat only those fish that are not

Up-cycling is reusing an item in a way that gives it more value than before.



Down-cycling is when something is recycled, but

How People Affect Earth Unit BUNDLE

Big Idea Posters & Vocabulary Cards are available only with the UNIT BUNDLE.

Station & Name		Standards	Objective
Big Idea Posters & Vocabulary Cards (included with the BUNDLE)			
Watch	How to Care for the Ocean / The Importance of Forests	5-ESS3-1, 5-ESS2-2, (ELA) SL.4.2	Students will watch a video about how humans affect the oceans and can take better care of them or a video about how humans affect the forests and what they can do to protect them. They will answer questions in order to reinforce what they have learned.
Play	Board Game / Crossword or Word Search Puzzle	5-ESS2-1, 5-ESS2-2, 5-ESS3-1, (ELA) RI.5.1, RF.5.4, W.5.2, W.5.8	Students will play a game in order to reinforce what they have learned about how people affect the Earth and what can be done to help.
Investigate	How People Affect the Ocean	5-ESS2-1, 5-ESS2-2, (ELA) RI.5.1, RF.5.4, W.5.2, W.5.8	Students will read about how people affect the ocean. They will conduct an investigation to find out the best way to clean up after an oil spill in the ocean.
Diagram	Reduce, Reuse, and Recycle	5-ESS3-1, (ELA) RI.5.1, RI.5.2, RI.5.4, RI.5.7, RF.5.4, W.5.2, W.5.8	Students will read about how people impact the Earth with the trash and pollution they generate. They will research how certain materials are recycled. They will then create a diagram to show the process of this recycling. Students will then answer questions in order to reinforce what they have learned.
Read	How People Affect the Different Spheres	5-ESS2-1, 5-ESS3-1, (ELA) RI.5.1, RI.5.2, RI.5.4, RI.5.7, RF.5.4, W.5.2, W.5.8	Students will read about Earth's four spheres, how people have affected each of the spheres, and what is being done to solve human-caused problems in each of the spheres. They will answer questions in order to reinforce what they have learned.
Model	Sustainable Agriculture	5-ESS2-1, 5-ESS3-1, (ELA) RI.5.1, RF.5.4, W.5.2, W.5.8	Students will read about agriculture and a few sustainability practices. They will model one sustainable practice by making compost bins. They will answer questions in order to reinforce what they have learned.
Explore	Water Contamination	5-ESS2-1, 5-ESS2-2, 5-ESS3-1, (ELA) RI.5.1, RI.5.2, RI.5.3, RI.5.4, RI.5.5, RI.5.8, RF.5.4, W.5.2, W.5.3, W.5.8, (Math) 5.G.A.1	Students will read about the negative impacts people have on Earth's water and what is being done to solve the problems. They will explore natural filters in a hands-on activity. They will answer questions in order to reinforce what they have learned.
Sort	Problem or Solution?	5-ESS2-1, (ELA) RI.5.1, RI.5.2, RI.5.4, RI.5.7, RF.5.4, W.5.2, W.5.8	Students will read about how people affect Earth. They will look at several pictures. They will decide whether the picture shows a problem on Earth caused by people, or whether the picture shows a solution to the problem.

Science Stations Overview

This is a general overview of all science stations in each UNIT BUNDLE.

Watch a Video

At this station, students will watch a video relevant to the topic and answer questions. You have the option of using the included worksheet with the questions or using the task cards and having students respond in their science journals.

Play a Game

Students play a game and answer questions about the experience. You have the option of using the included worksheet with the questions or using the task cards and having students respond in their science journals.

Investigate

Students use materials to investigate the science topic by following directions and recording results. Students answer questions about the investigation.

Draw a Diagram

Students draw and label a diagram specific to certain requirements. Students then explain how their diagram meets the requirements.

Read a Passage

Students read a short passage about the topic and answer questions about the information in the passage. You have the option of using the included worksheet with the questions or using the task cards and having students respond in their science journals.

Create a Model

Students use materials to illustrate the science concept and answer questions. You have the option of using the included worksheet with the questions or using the task cards and having students respond in their science journals.

Explore

Students create a sample and manipulate it using the new science concepts they have learned. Students answer questions based on the effects.

Sort

Students sort cards into groups or put them in a specific order. Students record the sort and then describe their reasoning.

Next Generation Science Standards are written to be “Three Dimensional.” The following section explains how this set of science stations addresses the three dimensions of Performance Expectation, Disciplinary Core Idea, and Science and Engineering Practices/Crosscutting Concepts.

In Fifth Grade, students are expected to demonstrate understanding in the following area:

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment. [Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.]

This correlates with the DCI 5-ESS2.C which states:

ESS3.C: Human Impacts on Earth Systems

Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments.

All stations in this set meet the DCI, helping students gain an understanding of how people have affected the Earth and its systems.

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 3– 5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.

- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.

Crosscutting Concepts

Systems and System Models

- A system can be described in terms of its components and their interactions.

Connections to Nature of Science

Science Addresses Questions About the Natural and Material World

- Science findings are limited to questions that can be answered with empirical evidence.

Specific to the How People Affect Earth Unit BUNDLE:

As a Fifth Grade Performance Expectation, students are expected to “Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.” (5-ESS3-1). This correlates with the DCI 5-ESS3.C, which states, “Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments.”

All stations in this set meet the Performance Expectation and DCI, helping students gain an understanding of how people have affected the Earth and its systems, as well as what is being done to reverse those effects.

The **Diagram Stations** meets the Science and Engineering Practice of “Obtaining, Evaluating, and Communicating Information” as students research different methods of recycling materials. They then create a display and compile their information into a presentation that will be communicated with the class.

The **Investigate Station** meets all three of the Engineering Design Standards, 5-ETSI-1, 5-ETSI-2, and 5-ETSI-3. Students identify the problems of oil spills, engineer a clean-up, and assess its effectiveness.

How People Affect Earth Unit Bundle

Materials Checklist

The following checklist is for the FULL UNIT BUNDLE.

Watch a Video

- ☐ Computer / Device
- ☐ Student Direction Card
- ☐ Response Sheet or Task Cards
- ☐ Science Journal (optional)

Play a Game

- ☐ Student Direction Card
- ☐ Board Game
- ☐ Die
- ☐ 2 Game Pieces
- ☐ Answer Key
- ☐ Word Search or Crossword Puzzle

Investigate

- ☐ Reading Passage (optional)
- ☐ Student Direction Card
- ☐ Investigate Worksheet
- ☐ Response Sheet or Task Cards
- ☐ Science Journal (optional)
- ☐ Bin or pan for the ocean (can be a large roasting pan, cat litter pan, tote box, etc.)
- ☐ Water
 - 100 ml beaker or jar
- ☐ Dark vegetable oil
- ☐ Large stone (more than 4 inches high)
- ☐ Plastic spoon
- ☐ 15 Cotton balls
- ☐ 3 Coffee filters
- ☐ Sponge
- ☐ Small square (2-4 inches) of faux animal fur or several large bird feathers
- ☐ String and scissors
- ☐ Paper towels
- ☐ Dawn dish soap (Dawn is best, but you can use another "grease-cutting" dish soap. In fact, specialists use Dawn to clean animals rescued from oil spills.)
- ☐ Bin of clean water or sink to rinse the soap off the fur or feathers
- ☐ Optional: Blue food dye; cocoa

Draw a Diagram

- ☐ Reading Passage (optional)
- ☐ Student Direction Card
- ☐ Diagram Worksheet
- ☐ Response Sheet or Task Cards
- ☐ Science Journal (optional)
- ☐ Materials for a presentation (poster paper or poster board, markers, etc.)

Read a Passage

- ☐ Reading Passage
- ☐ Response Sheet or Task Cards
- ☐ Science Journal (optional)

Create a Model

- ☐ Reading Passage (optional)
- ☐ Student Direction Card
- ☐ Model Worksheet
- ☐ Response Sheet or Task Cards
- ☐ Science Journal (optional)
- ☐ Container for making the composting bin with holes drilled (see Teacher Notes for ideas and instructions)
- ☐ Shredded paper
- ☐ Dirt (not potting soil--just dirt from outside or "top soil" from the garden center)
- ☐ Dried leaves
- ☐ Food scraps or anything from the "green" ingredients list (see Composting Guide)
- ☐ Squirt bottle (if making a small bin) or watering can (if making a large bin)
- ☐ Water

Explore

- ☐ Reading Passage (optional)
- ☐ Student Direction Card
- ☐ Explore Worksheet
- ☐ Response Sheet or Task Cards
- ☐ Science Journal (optional)
- ☐ Two 2-liter soda bottles (depending on your students, you may want to cut these in half before-hand)
- ☐ 4-5 cotton balls per bottle
- ☐ 2 150-mL beakers (or small bathroom water cup) filled with dirty water
- ☐ ~250 mL sand (or one cup) per bottle
- ☐ ~250 mL gravel (or one cup) per bottle
- ☐ Grass or sod including roots
 - needs to be big enough to span the bottle as the final layer in the water filter
 - either from a local garden center, or cut out of a grassy patch nearby
 - if you take care of the sod, you can replant it in the grassy patch
- ☐ *250 mL (or one cup) activated charcoal (optional)
 - to be used if you have no access to sod (see Teacher Instructions)
 - found at pet stores (used in aquarium filters)

Sort

- ☐ Reading Passage (optional)
- ☐ Student Direction Card
- ☐ Larger Sort Cards or Worksheet
- ☐ Scissors
- ☐ Glue
- ☐ Response Sheet or Task Cards
- ☐ Science Journal (optional)

The oceans have been harmed by **overfishing, pollution, and trash.**



To protect the **environment from chemicals**, mining companies set up treatment plants to collect and clean contaminated water.



Environmental sustainability tries to keep a balance between people and nature so that the environment stays healthy.



Most trash in the U.S. ends up in **landfills.**



Agriculture can be more sustainable when farmers practice **crop rotation, rotational grazing, and take care with water and chemicals.**



People have **affected** all parts of the Earth.



When mining companies close a mine, they will **clean up the chemicals and replant trees.**



To protect **ocean fisheries**, governments are limiting the amount of fish that can be caught.



Many people choose to eat only those fish that are not

Up-cycling is reusing an item in a way that gives it more value than before.



Down-cycling is when something is recycled, but

BIG IDEA POSTERS



down-cycle

to recycle and make a new product, but the new product has a lower quality or value than the old



glacier

a slow-moving sheet of ice formed by many years of snow



hydrosphere

part of the Earth that contains all the solid, liquid, and gaseous water; found under the surface of the geosphere and extends into the atmosphere



pesticide

a natural or chemical substance that kills organisms responsible for harming plants



aquifer

underground rock or sediment that allows water to flow through it



atmosphere

part of the Earth that contains all the air and other gases that surround the Earth; found on the surface of the Earth and extends to space



deforestation

when all the trees in an area are cut down



geosphere

part of the Earth that contains all the minerals and rocks; found on the surface of the Earth and extends to Earth's core



groundwater

water that is found under the surface of the Earth in aquifers



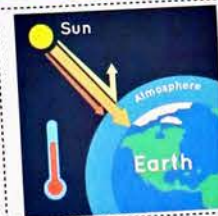
ozone layer

a layer responsible for absorbing most of the harmful radiation from the sun



environment

the natural world, including all the land, water, air, and living things



greenhouse gas

a gas that causes the greenhouse effect by absorbing radiation from the sun



marine

of the ocean



fertilizer

a natural or chemical substance that provides nutrients to the soil to help plants grow



greenhouse effect

the trapping of heat on the surface of the Earth; caused by a layer of greenhouse gases that prevent the heat from escaping



a layer of material placed on the ground to keep water in

UNIT BUNDLE ONLY

VOCABULARY CARDS

fishery

a place where fish are caught

fertilizer

a natural or chemical substance that provides nutrients to the soil to help plants grow

overfishing

the catching of too many fish in an area

greenhouse gas

a gas that causes the greenhouse effect by absorbing radiation from the sun

hydrosphere

part of the Earth that contains all the solid, liquid, and gaseous water; found under the surface of the geosphere and extends into the atmosphere

compost

a mix of decaying and animal waste used as plant fertilizer

greenhouse effect

the trapping of heat on the surface of the Earth caused by a layer of greenhouse gases

ozone layer

a layer responsible for absorbing harmful ultraviolet radiation from the sun

**UNIT
BUNDLE
ONLY**

VOCABULARY CARDS



Watch a Video The Importance of Forests

How much of Earth's forests have been cut down by humans?

#3

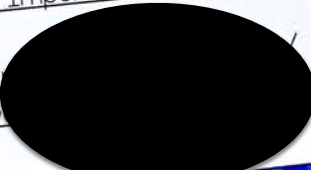
Watch a Video The Importance of Forests

How do tree roots help the soil?

#4

Watch a Video

Use your device to watch The Importance of Forests

http://
w



Watch a Video The Importance of Forests

What percentage of Earth's living things live in forests?

#1

Watch a Video The Importance of Forests

#5

Watch a Video The Importance of Forests

Name: _____

1. What percentage of Earth's living things live in forests?
91% of Earth's living things live in forests.

2. How do forests benefit the Earth?
One way forests benefit the Earth is by (choose one) protecting against erosion and landslides; giving us fresh air; cleaning river water; attracting rain that we need to grow food.

3. How much of Earth's forests have been cut down by humans?
Humans have cut down 80% of Earth's forests.

4. How do tree roots help the soil?
Tree roots help the soil because they absorb and hold on to water and help prevent floods.

5. What is a problem that happens when only one type of tree is planted, like on a palm oil plantation?
When only one type of tree is planted, like on a palm oil plantation, (choose one) other plants and animals cannot grow there; they suck all the nutrients out of the soil; they emit carbon, rather than storing it.

WATCH A VIDEO

Watch a Video

Use your device to watch
How to Care for the Ocean

<https://www.youtube.com/watch?v=...>




Watch a Video oceans

Name: _____

1. The _____ provide us with _____ abundance of life.

2. Every year since 1989 the amount of fish caught has (circle one) _____ out of the oceans. We have run out of new _____ fish _____ too many _____ sustainable _____

3. Eating _____ seafood means to eat seafood that has been caught in a way that makes sure there is plenty of that type of fish left in the ocean _____ polluting _____ the shores.

4. Plastics harm our oceans by _____ becoming trapped in large gyres, being eaten by _____ animals _____ chemicals _____ into the ocean.

5. You can use less plastic by bringing reusable _____ bags _____ to the store, buying in bulk so you use less _____ packaging _____ all plastics.

6. Something you can do to get involved with cleaning the oceans is to join a group to _____ clean up _____ a local lake, river, or shoreline; teach your _____ friends how to keep the _____ oceans _____ clean.

WATCH A VIDEO

Who What percentage of the medicines we use comes from plants found in the rainforests?

45

Why is so bad? What is the problem with runoff on most farms?

75

How What is pollution?

5

What happens as the Earth warms up?

52

How much of Earth's rainforest has been cut down in the last 100 years?

5

How much trash is composted?

22

How much of the water used to water crops becomes runoff?

74

How much of Earth's oxygen is made by marine organisms?

2

Is recycling paper up-cycling or down-cycling? Why?

20

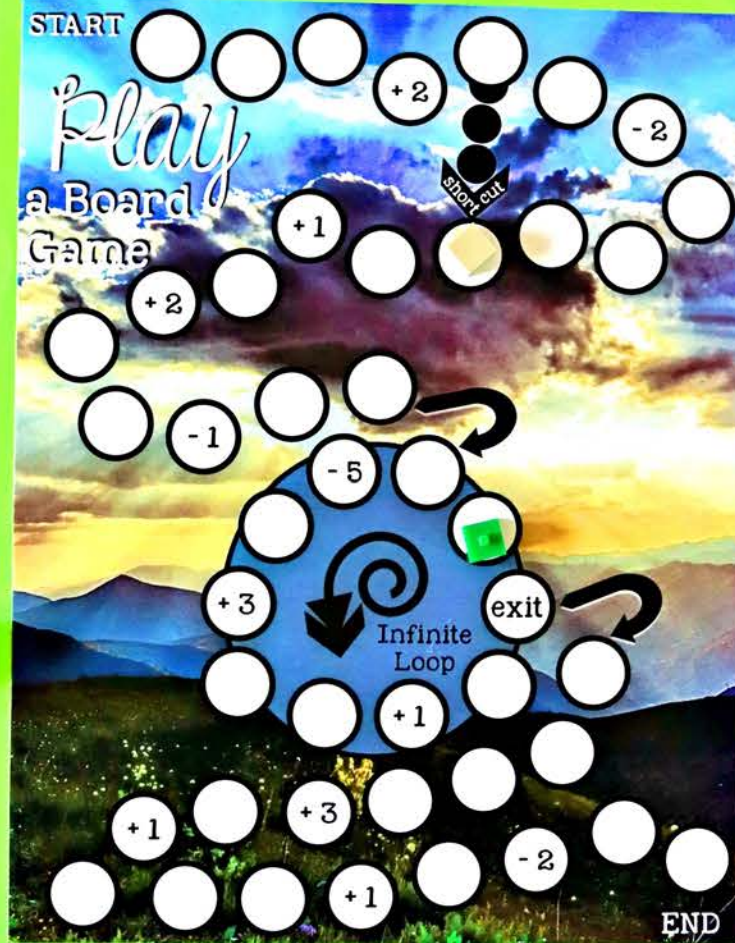
How much of Earth's oxygen is made in forests?

44

How much of Earth's surface is covered with water?

What are greenhouse gases?

What does marine mean?



What is the ozone layer?

53

What is compost?

76

What is the greenhouse effect?

50

PLAY A GAME

Play a Word Search Game

Find the words in the word search.

Name: _____

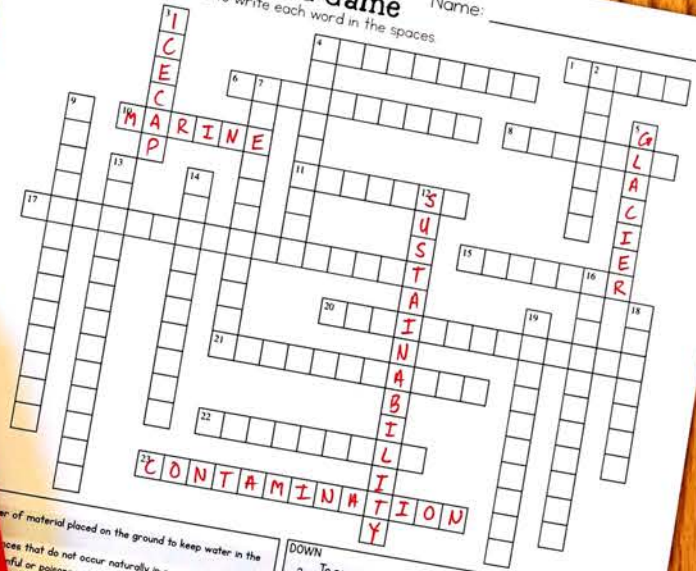
T N A B Y R E H S I F H W K U G O B N W
C C Z I I E K P M Q D **P O L L U T I O N**
R F X V H D O W N C Y C L E V G D E I N
T K S U S T A I N A B I L I T Y K B T C
G J R R G G N M F G U M E R G N R L A G
N R **P** E S R R E H O V C X E K N Q S T B
I L E D Y N E E M D S B O C I R Z A S S
H N S E K A O F E N Y S R Y L C L J E Z
S W T L N N L I I N O A I C R O T D R O
I B I C G H N E T U H R E L J N D M O Y
F V C Y E L O G N A Q O I E F I P W F F
R Z I C P N A U H O N A U V F U Y I E F
E Z D P S T I C S B Z I T S N V E P D M
V P E U F Q S R I E O O M S E E O L K W
O A S Q S F K U A E E S R A O G S D V K
E C A I K N M B O M R F R W T P A T M D
R E T A W D N U O R G Q F Q L N M S U M
I C J K G R E Z I L I T R E F I O O L J
W I T L F L H K A F M D A T C V E C C S
L N A T I V E S P E C I E S M T Q J H I

aquifer	compost	contamination	deforestation
down-cycle	environment	fertilizer	fishery
fossil fuel	glacier	groundwater	icecap
greenhouse gas	✓greenhouse effect	marine	✓mulch
native species	overfishing	ozone layer	✓pesticide
✓pollution	✓recycle	sustainability	up-cycle

Play a Cross Word Game

Use the clues to write each word in the spaces.

Name: _____



1. A layer of material placed on the ground to keep water in the soil.
2. To reuse an item that would be thrown away, often giving it more value than it started with.
3. Ice that has formed from many years of snow, covering a large area of land and/or ocean.
4. The presence of harmful and poisonous substances that do not occur naturally in an environment.
5. A slow-moving sheet of ice formed by many years of snow.
6. The catching of too many fish in an area.
7. The ability to continue at a certain level, often refers to nature.
8. A gas that causes the greenhouse effect by absorbing radiation from the sun.
9. A layer responsible for absorbing most of the harmful radiation from the sun.
10. The natural world, including all the land, water, air, and living things.
11. A place where fish are caught.
12. A natural or chemical substance that provides nutrients to the soil to help plants grow.
13. A layer of gas that traps heat in the atmosphere.
14. A layer of material that allows water to flow through it.
15. A layer of material that allows water to flow through it.
16. A layer of material that allows water to flow through it.
17. A layer of material that allows water to flow through it.
18. A layer of material that allows water to flow through it.
19. A layer of material that allows water to flow through it.
20. A layer of material that allows water to flow through it.
21. A layer of material that allows water to flow through it.
22. A layer of material that allows water to flow through it.
23. A layer of material that allows water to flow through it.

PLAY A GAME

Investigate

How People Affect the Ocean

Oceans cover about 71% of Earth's surface. In one way or another, every place on Earth is affected by them. It is estimated that one million species of organisms live in the oceans. **Marine** (ocean) organisms make more than half of the world's oxygen, and some of them are used to make important medicines. People also rely on many of these organisms for food.



Unfortunately, human activities have caused many problems to the oceans. Though threats to the health of the oceans come from several sources, people have found many solutions to save them.

Ocean Pollution

One of the biggest problems in the ocean is **pollution**, which can take on many forms. Trash sometimes ends up in the ocean. While some things like paper and food will break down and decompose in ocean water, other things will not. For example, it takes hundreds of years for plastic to decompose.



Millions of tons of plastic enters the oceans every year, and the amount grows yearly. Scientists estimate that there are more than five trillion pieces of plastic in the oceans right now. Birds, turtles, fish, and marine mammals eat plastics which can make them very sick. They can also get tangled up in plastic waste, which keeps them from moving freely.

p. 1

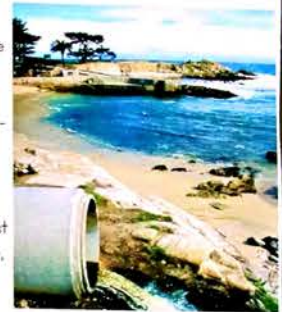
Investigate

How People Affect the Ocean

One of the biggest sources of plastic pollution is "single-use plastics." These are plastic items that are used one time and then thrown away. Water bottles, yogurt containers, grocery bags, straws, and coffee cup lids are examples of single-use plastics. Organizations and governments are working to end plastic pollution in the oceans. The hope is that by encouraging people to stop using single-use plastics and passing laws to ban the sales of certain kinds, there will be much less plastic trash entering the oceans.



Earth's oceans are also threatened by chemical-based pollution. Oil is pumped out of deep-sea wells and shipped to places all around the world. Oil wells and tanker ships occasionally have accidents, causing oil to spill into the ocean. Most of the chemical pollution in the oceans, however, comes from land. Cars and trucks drop small amounts of oil onto roadways. Rain washes this oil into drains, which then carry it to nearby rivers. Fertilizers and pesticides from farms also wash into nearby rivers. Fertilizers and pesticides, used to kill organisms that are harmful to humans and the environment, bring all these harmful pollutants into the oceans. Some pollutants are toxic to the organisms that live there.



READING PASSAGE

Investigate

Name: _____
How People Affect the Ocean

1. Name at least two sources of ocean pollution.
Ocean pollution comes from trash and oil.

2. Why is there so much plastic in the ocean?
There is so much plastic in the ocean because it doesn't decompose, and more plastic enters the ocean every day.

3. What is one of the biggest sources of plastic pollution?
One of the biggest sources of plastic pollution is single-use plastics.

4. What is something that can be done to end plastic pollution?
To end plastic pollution in the ocean, people are encouraged to use less plastic.

5. How does most of the oil get into the ocean?
Most of the oil in the ocean comes from drops spilled by ships and drops enter rivers that empty into oceans.

6. What is one way that farmers keep fertilizers and pesticides from entering the oceans?
Farmers are keeping fertilizers and pesticides from entering the oceans by planting more grass and trees between their farms and the water.

7. What is overfishing?
Overfishing is the catching of too many fish in an area.

8. What is one thing that may happen when an area is overfished?
When an area is overfished, one thing that may happen is that the larger fish will die, or the fish population will decrease.

Investigate

Governments have been passing laws to limit how many fish can be removed from the ocean. People who fish in this area are also educating the public. Scientists are also educating the public about those who are better for people to buy. Those who are better for people to buy are those that are better to buy.



Investigate

How People Affect the Ocean

Some farmers are now working hard to keep fertilizers and pesticides from entering rivers. They use these chemicals only where they are needed. They also plant more grass and trees between their farms and the rivers, which absorbs extra chemicals and keeps them out of the rivers. Grass and trees are also planted between roads and rivers to absorb the pollution from vehicles. Many cities collect water from storm drains and send it to a treatment plant. There, the chemicals are separated from the water and safely disposed of before the water is sent to the ocean.



Overfishing

It is estimated that people eat almost 150 million tons of seafood every year. This is double the amount of seafood consumed 50 years ago. The worldwide demand for seafood increases every year, which affects the oceans. **Overfishing**, or the catching of too many fish in an area, is a problem for sea life and people. If an area is overfished, there aren't enough fish to reproduce, which can harm the entire



ocean environment. When a fish species disappears from a particular part of the ocean, other species are affected. There is less food for

INVESTIGATE: HOW PEOPLE AFFECT THE OCEAN

Investigate

How People Affect the Ocean

Student Instructions

Today, you will investigate what happens during an oil spill and how to best clean it up.

The bin represents the ocean and the stone represents the land at the edge of the ocean. The fur or feather represents an animal caught in an oil spill.

1. Place the fur or feather in the middle of the bin so it floats on the surface of the water.
2. Draw your setup on your Activity Sheet. Label the objects in your drawing.
3. You have three goals:
 - a. Clean up the oil spill.
 - b. Set up a barrier to keep the oil away from the land.
 - c. Clean the oil off the animal.
4. Dump the oil into the ocean as far from the land as possible. Watch what happens as the oil begins to spread.
5. Do not use the soap yet, but use the other materials provided by your teacher. Clean up the oil in the water. At the same time, set up a barrier to keep the oil away from the land.
6. When you have cleaned up as much of the oil as possible, draw your ocean and describe your observations on your Activity Sheet.
7. Add a few drops of the soap on the remaining oil. Describe your observations on your Activity Sheet.
8. Take the 'animal' out of the water. Draw your animal and describe your observations on your Activity Sheet.
9. Choose any method to clean your animal. Describe what you did on your Activity Sheet.

Investigate

How People Affect the Ocean

Name: _____

Activity Sheet

Oil Spill (continued)

Which materials were most effective at cleaning up the oil? Why do you think this is?

Which materials were most effective at making a barrier? Why do you think this is?

Which materials were least effective at cleaning up the oil? Why do you think this is?

Which materials were least effective at making a barrier? Why do you think this is?

What happened to the oil spill when you added soap to it?

© 2015 Science & Literacy Foundation

Investigate

How People Affect the Ocean

Name: _____

Animal Clean-Up

Draw your animal after you rescued it from the oil spill.

How did the oil affect the animal?

Investigate

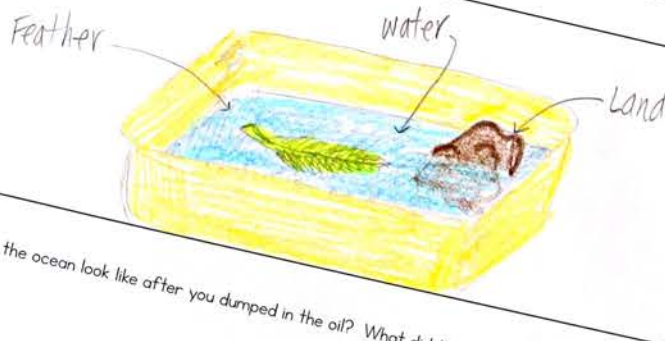
How People Affect the Ocean

Name: _____

Activity Sheet

Before the Oil Spill

Draw your setup. Label your drawing.



Oil Spill

What did the ocean look like after you dumped in the oil? What did the oil look like as it spread out?

Draw your ocean after you cleaned up the oil. Label your drawing.

INVESTIGATE: HOW PEOPLE AFFECT THE OCEAN

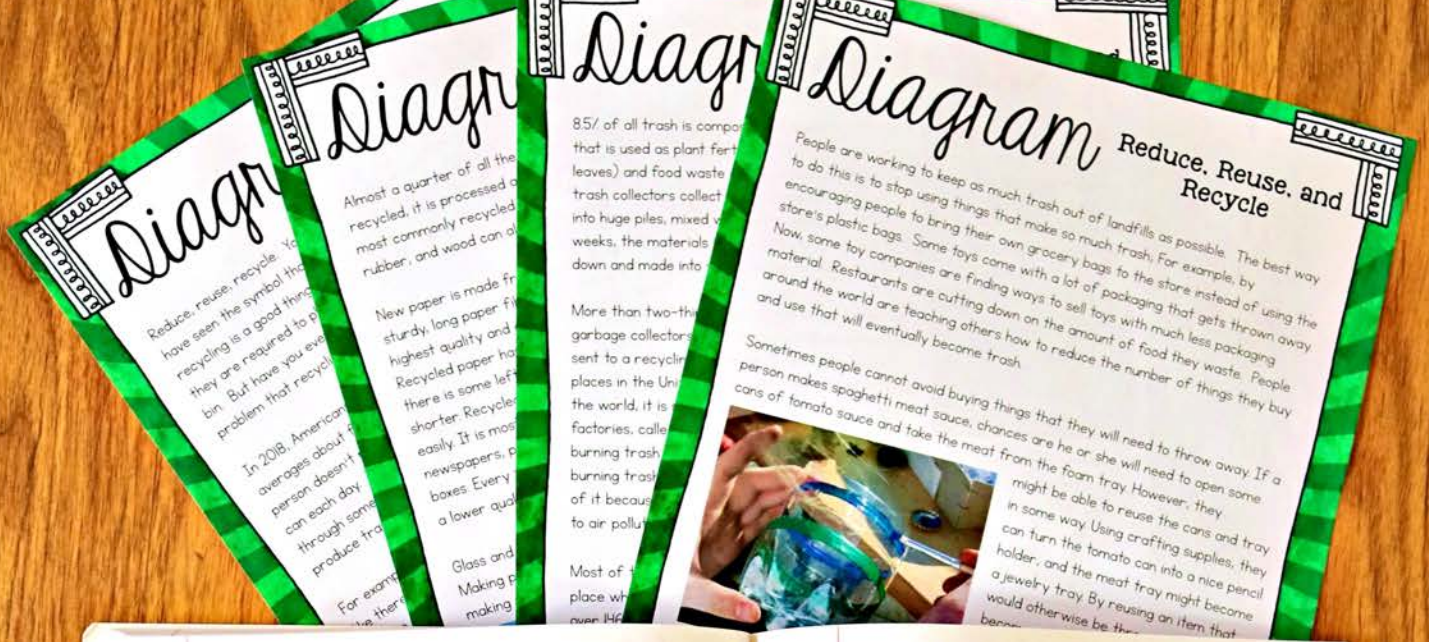


Diagram: Reduce, Reuse, Recycle.

1. C
2. B
3. D
4. A
5. A
6. D
7. B
8. A
9. C
10. B

#3 Diagram Reduce, Reuse, and Recycle

What kind of material can be recycled?

- a. Cloth
- b. Rubber
- c. Wood
- d. All of the above

#7 Diagram Reduce, Reuse, and Recycle

What happens to trash that is not composted or recycled?

- a. It is processed and turned into something new.
- b. It is incinerated or sent to a landfill.
- c. It decays and is used for plant fertilizer.
- d. It is made of the same material yet been used.

**READING
PASSAGE**

#5 Diagram Reduce, Reuse, and Recycle

What is the weight of a ton?

- a. 7 ounces
- b. 1 pound
- c. 5 pounds
- d. 2 tons

#4 Diagram Reduce, Reuse, and Recycle

What is down-cycling?

- a. Recycling material in a way that gives it a lower quality
- b. Recycling material in a way that makes it gain in value
- c. Recycling material so that it is completely burned up
- d. Recycling material so that it ends up in the landfill

#8 Diagram Reduce, Reuse, and Recycle

How can trash help make electricity?

- a. It is burned and the heat is turned into electricity.
- b. It is recycled, which makes electricity in the process.
- c. Both a and b
- d. Neither a nor b

#2 Diagram Reduce, Reuse, and Recycle

What happens when trash is recycled?

- a. Decaying plants and animal waste are mixed and used for plant fertilizer.
- b. It is processed and turned into something new.
- c. It is incinerated or sent to a landfill.
- d. It was never used by people.

**DIAGRAM:
REDUCE, REUSE & RECYCLE**

Diagram

Reduce, Reuse, and Recycle

Student Instructions

Today you will research how one type of material is recycled. You will draw a diagram to show how that material is recycled.

1. Your teacher will assign to you the type of material you will research.
2. Conduct an internet search to find out how your material is recycled. There may be more than one way!
3. Create a labeled diagram to show the way(s) your material is recycled.

ACTIVITY

Diagram

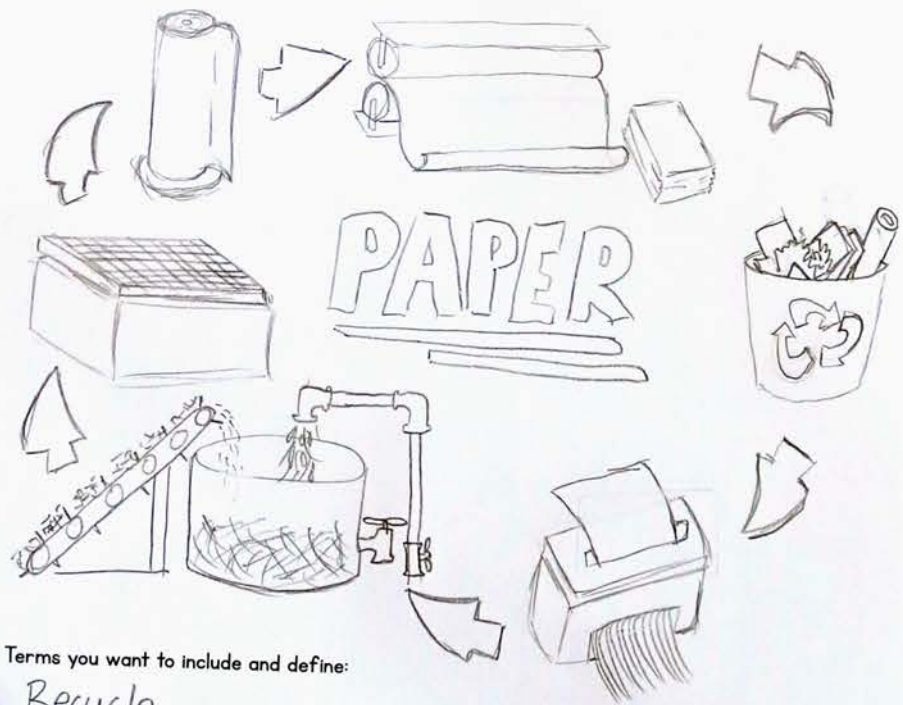
Reduce, Reuse, and Recycle

Name: _____

Activity Sheet

Name of material: _____

Rough sketch of your display:



Terms you want to include and define:

Recycle
Shred
Waste

DIAGRAM: REDUCE, REUSE & RECYCLE

Read How People Affect the Different Spheres

Name: _____



The Earth is divided into four parts, called spheres. The **hydrosphere** is the part of the Earth that contains all the solid, liquid, and gaseous water. Earth's water is found in oceans, rivers, and lakes. It is also in snow, glaciers, and ice caps. It is even found in the water vapor in the air!



The second sphere is the **biosphere**. This is the part of Earth that contains all the living things. It is made up of the five kingdoms of life: protists (including algae), bacteria, plants, animals, and fungi.



The **geosphere** is the fourth sphere of Earth. It contains all the minerals and rock. It is found on the surface of the Earth and includes soil, sand, and all the different types of rocks. It extends to Earth's core and includes deeply buried rocks and magma.

Each of these spheres is important to Earth. Living things (the biosphere) need water from the hydrosphere to live. The geosphere provides a home for many things and important minerals for them to stay healthy. Without the atmosphere, radiation from the sun would burn Earth. The atmosphere is also what is found, which land-dwelling organisms need to live.

Unfortunately, people have affected Earth, changing the conditions and causing harm. However, by studying these changes, people can understand the effects better.

© 2010

Read How People Affect the Different Spheres

Name: _____

caused, and how people can help make things better.

Humans have harmed the hydrosphere in multiple ways. Human activities on land can pollute streams, rivers, and lakes. **Pesticides** and **fertilizers** used on farms wash into waterways. Pesticides are natural or chemical substances that kill organisms responsible for harming plants. In waterways, pesticides can kill organisms. Fertilizers are natural or chemical substances that provide nutrients to the soil to help plants grow. When they enter waterways, they cause too many algae to grow, which blocks sunlight to plants living underwater. These plants die and are decomposed by bacteria. The bacteria use up all the oxygen in the water, so that fish cannot live there anymore. If too much fertilizer ends up in a waterway, most plants and animals will die or move to a new home.



Humans also affect oceans. **Pollution** occurs when rivers bring trash, pesticides, fertilizers, and oil from cars into the oceans.

It can happen when oil rigs and tankers spill oil into the oceans, too. Humans also cause problems when they **overfish** by taking too many fish from an area. When this happens, not enough adult fish are left to reproduce, and they can die out.



To help fix some of the problems in the hydrosphere, people are learning how to keep the water cleaner. They are planting grassy barriers and trees alongside rivers, streams, and lakes, which keeps oil, fertilizers, and pesticides from entering the waterways. Engineers are designing cars and trucks that use less fuel. Scientists are teaching farmers how to grow crops with fewer harmful fertilizers and pesticides and how to keep these chemicals from entering waterways.



The biosphere is also affected by people. Pollution in rivers and oceans affects the plants and animals that live there. Animals can eat or get tangled up in the trash, especially single-use plastics. These are

© 2010 Jessica Boehm & Jill Stapp, School of Education

Read How People Affect the Different Spheres

water. They can leave it for decades after the mine closes.

People also affect the hydrosphere by changing their land, which means they change the climate. This can lead to problems, like the wind blowing away. Farmers use fertilizers in their fields year after year. This can cause the soil to become too rich, so fertilizers end up in streams and water sources.



B

People have been releasing chemicals into the atmosphere, which harms the **climate layer**. The climate layer is a part of the atmosphere that is closest to the Earth's surface. It is the layer where most of the weather happens. People can affect the climate layer by releasing chemicals into the air.

Read How People Affect the Different Spheres



As the Earth warms up, the climate changes. The climate changes the climate, and the climate changes the climate. This can lead to problems, like the wind blowing away. Farmers use fertilizers in their fields year after year. This can cause the soil to become too rich, so fertilizers end up in streams and water sources.

Read How People Affect the Different Spheres



Things made out of plastic that get used one time before being thrown out. Plastic bottles, straws, yogurt containers, and water bottles are examples of single-use plastics. Chemical pollution (oil, fertilizers, and pesticides) kills living things in the water and often takes decades to be removed from lakes and oceans.

Another major problem caused by people is **deforestation**, which is the cutting down of all trees in a large area. Eighty percent of all known plants and animals live in the rainforests. Most of these species live in the rainforests. Forests produce one-third of Earth's oxygen, so they are important to help us have clean fresh air. Twenty-five percent of the medicines we use come from plants in the rainforests. Scientists think that many more medicines and cures for diseases are waiting to be found there. The problem is that half of the world's rainforests have been cut down in the last 100 years.

Pe to i doxi burni gas). T hover in They obsi heat close gardener's t environment

Read How People Affect the Different Spheres

1. What are Earth's four spheres?

2. In which sphere are living things found?

3. What is a way that humans can affect oceans?

4. What is a way that people are fixing problems in the hydrosphere?

5. Why is deforestation so harmful?

6. What problems are caused by the greenhouse effect?

7. What is a way that people can help fix the problems caused by the greenhouse effect?

READING PASSAGE

READ: HOW PEOPLE AFFECT THE DIFFERENT SPHERES

Products and less pollution and by reusing the resources.

Model Sustainable Agriculture

chemicals that are harmful to humans and the environment. The chemicals enter the local waterways (rivers, lakes, and groundwater), causing water pollution. Pollution is caused by substances that do not occur naturally in an environment and are harmful or poisonous to it. Ranch animals produce a lot of waste, which pollutes the air and water. Machinery and vehicles used to grow food for the farm animals and transport them around the country cause pollution, too.



Fruit and vegetable crops also require land space, water, fertilizers, and pesticides to grow. Machinery and vehicles help the plants grow and transport them around the world. These vehicles cause air and water pollution that is harmful to people and the planet.



Sometimes, farming harms native plants and animals. When land is changed to grow food crops or let animals graze, **native species**, which are plants and animals that are natural to an area, are pushed out. They either lose their land or the food they eat. For example, monarch butterflies need nectar from flowers as fuel for their thousand-mile migration between the United States and Mexico. Many of the places where these flowers once grew are now farmland, and the flowers no longer grow there. This has caused a decline in the number of monarch butterflies because they cannot find enough food.

p. 2

Model Sustainable Agriculture

If you had to guess how much food the average American adult eats, what would you guess? A pound per day? Two pounds?



Would you be surprised to learn that the average American adult eats almost 5½ pounds of food every day? Over the span of a year, this adds up to a little less than one ton of food. That's a pickup truck's worth of food—just for one person!



There are many different kinds of food Americans eat, and most of this food comes from farms and ranches. Meat, including poultry (chicken and turkey), beef, and pork, comes from animals raised on ranches. Ranchers raise and take care of the animals. They provide food and medical care for them, as well as a place to live. The food that these animals eat requires land, water, machinery and vehicles, and fertilizers and pesticides.

Most of the meat that is raised all around the world negatively affects the environment. It takes a lot of water to grow the corn, soy, and wheat crops that become food for cattle, poultry, and hogs. These crops also need **fertilizers** and **pesticides**. Fertilizers are natural or chemical substances that provide nutrients to the soil to help plants grow. Pesticides are natural or chemical substances that kill organisms responsible for harming plants. Fertilizers and pesticides can also harm the environment.

**READING
PASSAGE**

Model Sustainable Agriculture

Ranchers do not have to ship their food by trucks or planes across the country or around the world. Second, food sold locally does not have to sit in boxes and on shelves for a long time. Fewer pesticides and other chemicals are used. Fewer pesticides and other chemicals are used.

Model Sustainable Agriculture

The good news is that there are ways to raise the food we eat that are less harmful to the environment. Many farmers and ranchers use a practice called **sustainability**. This means "being able to continue at a certain level." When it refers to the environment, it means being able to use resources in a way that does not harm the environment.

Model Sustainable Agriculture

Name: _____

- _____ **pollution** is the presence of harmful and poisonous substances that do not occur naturally in an environment.
- One type of pollution that comes from farms and ranches is runoff water containing _____ **fertilizers** and _____ **pesticides**.
- _____ **Native species** are plants and animals that are natural to an area.
- When land is changed to grow food crops or let animals graze, native species can lose their _____ **land** or the _____ **food** they eat.
- Environmental sustainability is keeping a balance between _____ **people** and _____ **nature**.

Model Sustainable Agriculture

Ranchers, farmers who raise animals for meat, can also practice a type of rotation called "rotational grazing." By doing this, farmers keep their animals from eating all the grass and plants in an area. It also prevents the animals from trampling the soil, which would make it hard-packed and unable to grow new plants. Rotational grazing allows a pasture to grow new grass and plants for the animals in future years.

On most farms, crops only use about 65% of the water they receive. More than a third of all the water applied to crops drains from the field. This runoff carries pesticides, fertilizers, and other chemicals into local rivers, causing water pollution. Farmers who want to practice sustainability need to use different ways to use water. They can keep careful track of the farm's water use and which crops are less likely to over-water. The plants can be watered more carefully. Compost is a mix of dead plant material that improves the soil. It also improves the soil's ability to hold water, which helps plants grow better.



**MODEL: SUSTAINABLE
AGRICULTURE**

Model Sustainable Agriculture

Student Instructions

Today, you will make a compost bin. You will observe what happens to the ingredients inside your bin over the course of a month.

1. Get your compost bin and remove the lid.
2. Place your "brown" ingredients in the container:
 - a. Two inches of shredded paper on the bottom of the bin
 - b. Two inches of dirt on the shredded paper
 - c. Two inches of dried leaves on the dirt
3. Place two inches of food scraps cut into one- to two-inch pieces on the dried leaves.
4. Using a squirt bottle (for small compost bins) or a watering can (for large compost bins), water your ingredients. Do not make it sopping wet, just damp.
5. Place your compost bin in a sunny location.
6. Every four to five days, check your bin.
 - a. Draw and describe what you see.
 - b. If the compost is dry, add water.
 - c. Roll the bin around or use a shovel to mix the compost around.
7. After one month has passed, you can add more "green" and "brown" ingredients to your bin. Remember to continue to care for your bin by watering and mixing the contents. When the ingredients have broken down into compost, you can use this in your garden to help your plants grow healthy.
8. Use the guide to know what to add to your garden.

Model Sustainable Agriculture

Composting Guide

Green Ingredients (rich in nitrogen)

Fresh leaves
Fresh grass
Flowers (not dried)
Food scraps (fruits and vegetables)
Herbivore manure (from rabbits, chickens, cows, horses)
Alfalfa hay
Coffee grounds
Tea leaves
Egg shells
Seaweed

Brown Ingredients (rich in carbon)

Dead leaves
Dead grass
Dead pine needles
Wood chips, sawdust, etc.
Shredded paper
Tea bags
Coffee filters
Corn cobs
Cotton and wool fabric (no synthetic fibers)
Peat moss
Straw or hay (except alfalfa)

Never Include these ingredients:

Animal products including meat, bones, fat
Cheese, milk, and yogurt
Oils, margarine, and shortening
Waste from meat-eating animals, including pets
Diseased plants or flowers (these diseases can stay with the compost and spread disease to your plants)

Model Sustainable Agriculture

Name: _____

Activity Sheet

To be completed every four to five days for one month:

Date	Draw what you see in your compost bin. Label any identifiable ingredients.
2/19	

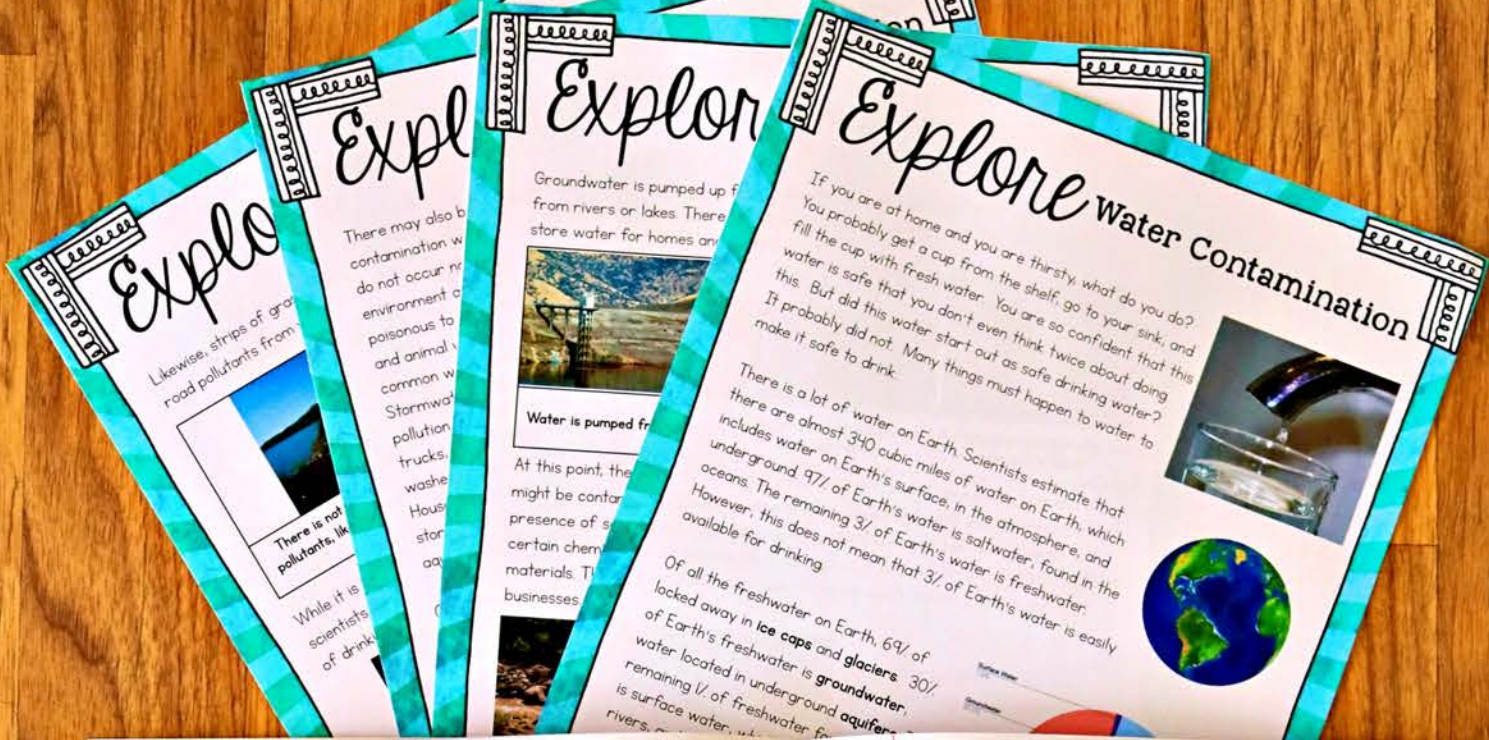
Model Sustainable Agriculture

To be completed every four to five days for one month:

Date	Draw what you see in your compost bin. Label any identifiable ingredients.

ACTIVITY

MODEL: SUSTAINABLE AGRICULTURE



#2 Explore Water Contamination

Why can we not use all of Earth's fresh water for drinking?

- Most of it is found in glaciers and ice caps and is frozen.
- Most of it is found in the oceans.
- The human body needs salt water to live.
- None of it has enough pollution for people to drink.

#3 Explore Water Contamination

What is groundwater?

- Water frozen in ice caps and glaciers
- Surface water, found in lakes and rivers
- Puddles that form after a rain
- Water found in aquifers

Explore: Water Contamination

- B
- A
- D
- C
- C
- A
- D
- D
- A

#5 Explore Water Contamination

How is water cleaned?

- Adding chemicals
- Filtering
- Both a and b
- Neither

#1 Explore Water Contamination

How much of Earth's fresh water is available for drinking?

**READING
PASSAGE**

#9 Explore Water Contamination

#4 Explore Water Contamination

#8 Explore Water Contamination

**EXPLORE: WATER
CONTAMINATION**

Explore Water Contamination

Student Instructions

In this activity, you are going to explore what happens as water seeps into the ground.

Instructions:

- Set up your two water filtration systems.
 - Discard the lid from the soda bottles and cut the bottles in half.
 - Insert the top half of the soda bottle upside down into the bottom half. Do this for each bottle.
 - Place the materials in each bottle in the following order, from bottom to top, packing them down:
 - Cotton balls (stuffed into the mouth)
 - Sand
 - Gravel
- In one of the bottles, place the grass on top of the gravel, packing it in there.
- Slowly trickle the dirty water on the entire surface of the top layer in each bottle. Do not just dump it in one spot.
- Answer the questions on your Activity Sheet.



ACTIVITY

Explore Water Contamination

Name: _____ Activity Sheet

Filter With Grass:

Using colored pencils, draw your set up, labeling each layer in your filter:



As the dirty water was moving through the filter, what did you notice?

As dirty water flows through the layers of the bottle I noticed that the sand got darker, the layers settled, the cotton balls got darker.

Using colored pencils, draw the filter. Include the filtered water that is sitting in the bottle. Label each layer:

How does the water look after it has been filtered?

Explore Water Contamination

Name: _____

Activity Sheet

Filter Without Grass:

Using colored pencils, draw your set up, labeling each layer in your filter:



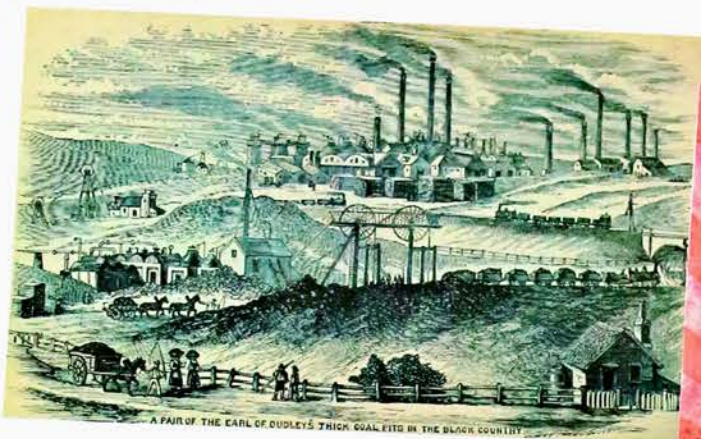
As the dirty water was moving through the filter, what did you notice?

Using colored pencils, draw the filter. Include the filtered water that is sitting in the bottle. Label each layer:

EXPLORE: WATER CONTAMINATION

Sort

Problem or Solution?



A PAIR OF THE EARL OF DUDLEY'S THICK COAL FIRES IN THE BLACK COUNTRY

By the 1800s, people began to notice **pollution**. Pollution is the presence of harmful and poisonous substances that do not occur naturally in an environment. Air, water and land are all places that can be polluted, and the organisms that live there are often affected. They can become sick and die as a result.

In the 1900s, the environmental movement started. Scientists and other people began to study and write about the problems caused by pollution. By educating the public and working with governments, they hope to stop pollution and fix the damage on Earth. They are focusing on **sustainability**. Sustainability means keeping a balance between people and nature by doing things in a way that does not damage the environment.

Sort

Problem or Solution?

If you were an astronaut on the International Space Station looking down on Earth, our planet would look like a peaceful, beautiful sphere. It would be difficult to tell whether any problems are happening down there.



A closer look, however, shows that there are problems on Earth. Almost everything that people do affects the **environment** in one way or another. The environment includes all parts of the natural world, including all the land, water, air, and living things.



Throughout history, people have changed the Earth in small ways. They cut down trees in neighborhoods to build houses for a village. They grew food on small family farms. They mined metals like copper and iron out of the ground to make tools. While these changes affected the surrounding air, land, and water, the changes were small and did not affect the environment for more than a few square miles.

The Industrial Revolution began, and with the development of new technologies, factories were built and sent goods all over the world. Factories were able to make things cheaper so more people could afford them. The amount of trash increased. The steam engine was invented, and it changed the world.

Sort

Problem or Solution?

1. What is the environment?

The environment includes all parts of the natural world, including all the land, water, air, and living things.

2. What happened during the Industrial Revolution?

During the Industrial Revolution, new technology was developed and factories were built that caused pollution.

3. What is pollution?

Pollution is the presence of harmful and poisonous substances that do not occur naturally in an environment.

4. What can happen to organisms when the environment is polluted?

When the environment is polluted, organisms can become sick and die.

5. What is the environmental movement?

The environmental movement is made up of scientists and other people who study the problems caused by pollution. They educate the public about the problems and how to fix the environment.

READING
PASSAGE

SORT: PROBLEM OR SOLUTION?

Sort

Problem

Sort

Solution



Half of the trees in the rainforest have been cut down in the last 100 years. Deforestation is the cutting down of all trees in a large area.

Sort Problem or Solution?



Selective harvesting happens when loggers choose only certain trees to cut down. This allows the forest to grow back quickly.

Sort Problem or Solution?



Logging companies plant new trees to replace the trees they cut down. This allows the forest to grow back again.

Sort Problem or Solution?



People use so many things that end up as trash. This trash can end up in landfills or in nature.

Sort Problem or Solution?



Some governments have banned the use of some plastic items, like bags and straws, that are only used one time. By using fewer single-use plastics, people hope to make less trash.

Sort Problem or Solution?



These shoe boxes were recycled, or made into useful storage boxes, rather than thrown away.

Sort Problem or Solution?



Glass can be recycled and made into new glass products, rather than be thrown into the trash.

Sort Problem or Solution?



Many farmers only plant one type of crop every year, causing nutrients to be removed from the soil. They also plow their fields in such a way that the soil can easily be eroded. Wind and water can carry the soil away.

Sort Problem or Solution?



A windbreak is a row of trees planted on the edges of farms. This keeps the wind from blowing the good soil away.

Sort Problem or Solution?



On hillsides, farmers can make step-like areas called terraces. This helps keep the soil in the fields, so farmers can keep growing crops.

Sort Problem or Solution?



This farmer rotates his crops, planting a different crop in the same area every year. This practice prevents all the nutrients from being taken out of the soil and puts them back in instead.

Sort Problem or Solution?

ACTIVITY



Scientists keep track of how many of each type of fish are in the ocean and let people know which fish are better to eat based on how many of them there are.

Sort Problem or Solution?



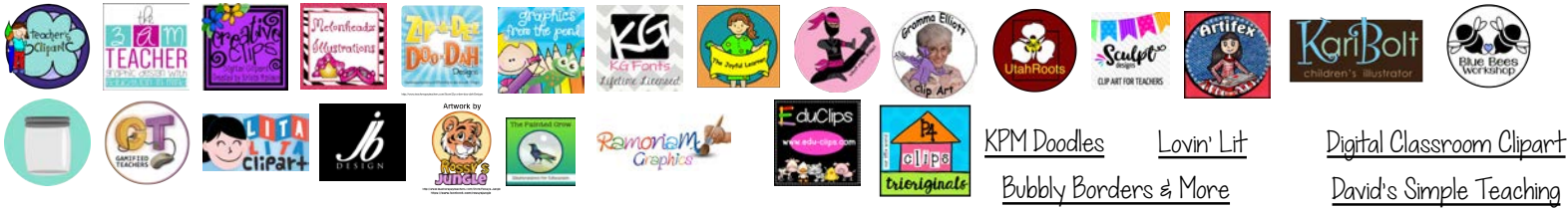
Governments have made "fishing seasons," certain months during which fishermen can only catch certain fish. This way, there are enough fish left to reproduce.

Sort Problem or Solution?

SORT: PROBLEM OR SOLUTION?

THANK YOU

Thank you to these artists for allowing me to use their copyrighted work in my resources. Click the button or link to learn more about them.



TERMS OF USE

@ Jessica Boschen • What I Have Learned 2020

By purchasing and/or downloading this document, you agree to the terms of use stated below. All rights reserved. For use in one classroom only. This document cannot be redistributed without permission. No part of this document may be distributed, posted on the internet, copied, sold, or edited without the direct permission from the author. Violations are subject to the penalties of the Digital Millennium Act. To purchase additional licenses, please visit What I Have Learned on Teachers Pay Teachers. All content of the document is copyrighted, including all text, graphics, content, and fonts. All graphics and fonts are also protected by copyright by their original authors.

If you have any questions, please email jessica@whathavelearnedteaching.com. I'm happy to help.

CONNECT WITH ME

Join the What I Have Learned email list and receive exclusive information, updates, and free resources to enhance your classroom. Click [here](#) or the picture on the right to sign up.

WHAT I have
LEARNED



WORD PROBLEMS	CURRICULUM MAP TEMPLATE	ADDITION & SUBTRACTION
<p>This is perfect for teachers whose students struggle solving word problems. Have you ever thought of removing the numbers from word problems? Great for first and second grades.</p>	<p>Do you struggle with long range planning? This curriculum map template will get you started on planning for your whole year!</p>	<p>Two-digit addition and subtraction can be tricky for students. Here is a sample of resources to help them explore different models and strategies.</p>
<p>Name: <input type="text"/></p> <p>Email*: <input type="text"/></p> <p>Grade (choose the best fit): <input type="text"/></p> <p><input type="button" value="YES! I WANT IT!"/></p>	<p>Name: <input type="text"/></p> <p>Email*: <input type="text"/></p> <p>What Grade Do You Teach?*: <input type="text"/></p> <p><input type="button" value="YES! I WANT IT!"/></p>	<p>Name: <input type="text"/></p> <p>Email*: <input type="text"/></p> <p>Grade (choose the best fit): <input type="text"/></p> <p><input type="button" value="YES! I WANT IT!"/></p>

YOU MIGHT ALSO LIKE

HOLIDAY

MATH

SOCIAL STUDIES

SCIENCE

ELA

