Norfolk Public Schools
Science Learning in Place Plan: Science 6 Honors Lessons

Week 7: April 27 – May 1, 2020 (Air & Water Quality)

Monday	Tuesday	Wednesday	Thursday	Friday
Air and Water Quality Assignments: • **Read** the article entitled, "Dwindling Freshwater Resources" ○ **Highlight or Underline** key definitions or phrases in the passage ○ **Research and record** any words you do not know, and the definition. (dictionary, online, phone, ask family, etc.)	**Air and Water Quality** Assignments: • **Reread** the article entitled, "Dwindling Freshwater Resources" • **Answer** the quiz questions for the "Dwindling Freshwater Resources" article.	**Air and Water Quality** Assignments: • **Read** textbook pgs.520-521. • **Answer** the following: ○ Describe threats to air quality and factors that increase amounts of human made pollution. ○ Visualize it (#11)	**Air and Water Quality** Assignments: • **Review** pages 520-521. • **Write** an essay to explain the different factors in your community and surrounding areas that may affect the air quality where you live.	**Air and Water Quality** Assignments: • **Review** text pgs. 520-521. • **Answer** the Lesson Review questions 1-3.

Week 8: May 4 – 8, 2020 (Forms of Energy)

Monday	Tuesday	Wednesday	Thursday	Friday
Forms of Energy Assignments: • **Read** textbook pgs. 426-427. • **Identify** two types of energy, and examples of each from the reading. • **Answer** the following: ○ Visualize it (pp. 426, #5)	**Forms of Energy** Assignments: • **Read** textbook pgs. 426-427. • **Complete** the following: ○ Summarize (pp.427, #7) Fill in the table with an example of an object that has each form of energy.	**Forms of Energy** Assignments: • **Read** textbook pgs. 428-429. • **Complete** the following: ○ Visualize it (pp.428, #8)	**Forms of Energy** Assignments: • **Read** textbook pgs. 428-429. • **Complete** the following: ○ Visualize it (pp.429, #10)	**Forms of Energy** Assignments: • **Read** textbook pgs. 444-445. • **Complete** the following: ○ Evaluate (pp.445, #15)

Week 9: May 11 – 15, 2020 (Preventive Measures)				
Monday	Tuesday	Wednesday	Thursday	Friday
Preventive Measures Assignments: • **Read** the article entitled, "Lasting Effects of Exxon Valdez Oil Spill, 30 Years Later" • **Highlight or Underline** key definitions or phrases in the passage • **Research and Record** any words you do not know, and the definition. (dictionary, online, phone, ask family, etc.)	**Preventive Measures** Assignments: • **Reread** the article entitled, "Lasting Effects of Exxon Valdez Oil Spill, 30 Years Later" • **Answer** the quiz questions (#1-4) for the "Lasting Effects of Exxon Valdez Oil Spill, 30 Years Later" article.	**Preventive Measures** Assignments: • **Read** the article entitled, "U.N. Presents ways to slow down Problems Caused by Climate Change" • **Highlight or Underline** key definitions or phrases in the passage • **Research and Record** any words you do not know, and the definition. (dictionary, online, phone, ask family, etc.)	**Preventive Measures** Assignments: • **Reread** the article entitled, "U.N. Presents ways to slow down Problems Caused by Climate Change" • **Answer** the quiz questions (#1-4) for the "U.N. Presents ways to slow down Problems Caused by Climate Change" article.	**Preventive Measures** Assignments: • **Read** textbook pp. 472. • **Complete** the following: ○ Think Outside the Book (#18) ○ Visualize It (#19)

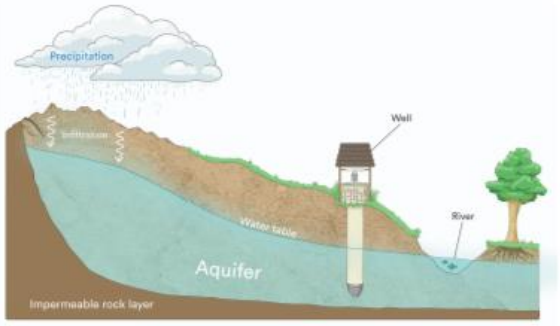
Dwindling freshwater resources

By National Geographic Society, adapted by Newsela staff on 04.24.19

In modern America, we have access to fresh water every day. Each time we turn on the tap, plumbing systems bring this important resource into our homes. Fresh water is extremely rare, though. Less than one-thirtieth of all the water found on Earth is fresh water. The remaining water is salt water, such as what is found in the ocean.

Most of the world's fresh water is not easily accessible to humans. About seven-tenths of Earth's freshwater is locked away in the form of ice. It is found in glaciers and polar ice caps. About three-tenths of Earth's fresh water is under the surface in the form of groundwater. Only a tiny fraction of Earth's fresh water is available for human use.

Unfortunately, the available fresh water is not equally distributed throughout the world. A small group of countries has most of the world's freshwater resources. This group includes Brazil, Russia, Canada, China and the United States. About one-fifth of the world's population lives in areas with little fresh water. This lack of water affects business and politics in different places.



Dirty Waters

Many populations do not have access to safe drinking water. In 2017, 2.1 billion people around the globe lacked access to safe drinking water. Instead, they had contaminated water. Populations drinking dirty water are more likely to become sick. Lack of access to clean water leads to more than 3 million deaths every year.

Providing clean water to poor countries is an important goal for international organizations. These groups have had much success. Between 1990 and 2015, 2.6 billion people worldwide gained access to improved water. The remaining populations still without clean water are found mostly in Africa and Asia. They represent nearly 1 billion people.

Sources Of Food

Access to fresh water is also important for business. For example, freshwater sources allow people to develop fisheries. People harvest fish from these habitats, providing food for many people worldwide. These fisheries are both a source of food and a source of income.

Fresh water is also important for other activities such as farming. About seven-tenths of the world's fresh water is used for farming. Farmers use irrigation to transport water to their fields. Agricultural activities involve over 1 billion people and generate over $2.4 trillion every year. In the future, demand for fresh water will only increase as populations grow. This will put further strain on Earth's limited supplies. It will make access to fresh water even more important.

International Politics

The fight over fresh water can already be seen today in international politics. For example, Ethiopia and Egypt have long fought over Nile water resources in Africa. The Nile River supplies nearly nine-tenths of Egypt's water. However, almost nine-tenths of the Nile's water originates in Ethiopia. Ethiopia is planning to dam part of the river to generate electricity. Egypt is concerned that it might lose access to some of the Nile's waters. The disagreement has not yet turned into open conflict. However, it is clear that securing this freshwater resource is important. Control of the river will define Ethiopian-Egyptian relations for many years to come.

Conflicts over water are common throughout the world. This is true even in the United States, where freshwater sources are relatively common. One major debate concerns the Colorado River system. It supplies water to Arizona, California, Nevada, Colorado, New Mexico, Utah and Wyoming. A recent drought has reduced water flow in this river system. As a result, these states need to decide how to reduce water usage in order to save the river. Population growth and climate change will create additional challenges. Conflicts over water will become even more common in the future.

Dwindling Freshwater Resources Quiz

Quiz

1 Which option orders water resources on Earth from the most water to the least water?

(A) water for use, saltwater, underground water, frozen water

(B) underground water, water for use, frozen water, saltwater

(C) frozen water, saltwater, water for use, underground water

(D) saltwater, frozen water, underground water, water for use

2 Which sentence from the article supports a MAIN idea from the article?

(A) In modern America, we have access to fresh water every day.

(B) Each time we turn on the tap, plumbing systems bring this important resource into our homes.

(C) The remaining water is salt water, such as what is found in the ocean.

(D) This lack of water affects business and politics in different places.

3 What is the main cause of the conflict between Ethiopia and Egypt?

(A) Ethiopia depends on water that originates in Egypt. Ethiopia is concerned that the dam will decrease the amount of water available.

(B) Egypt depends on water that originates in Ethiopia. Egypt is concerned that the dam will decrease the amount of water available.

(C) Ethiopia is constructing the dam to generate electricity. Egypt is concerned that Ethiopia will not equally share the electricity.

(D) Egypt is constructing the dam to generate electricity. Ethiopia is concerned that Egypt will not equally share the electricity.

4 Read the following paragraph from the article.

Many populations do not have access to safe drinking water. In 2017, 2.1 billion people around the globe lacked access to safe drinking water. Instead, they had contaminated water. Populations drinking dirty water are more likely to become sick. Lack of access to clean water leads to more than 3 million deaths every year.

How does this paragraph support the MAIN idea of the article?

(A) It shows serious problems that arise when people cannot get safe drinking water.

(B) It explains what groups are doing to help people get access to clean water.

(C) It describes how countries are starting to fight because of the lack of drinking water.

(D) It highlights the idea that most of the world's fresh water is stuck in ice or underground.

5 Which of these are causes of water supply problems?

1. *increasing human population*
2. *increasing use of agriculture*
3. *development of ocean fisheries*
4. *ongoing changes in climate*

(A) 1, 2 and 3

(B) 1, 2 and 4

(C) 1, 3 and 4

(D) 2, 3 and 4

6 What is the relationship between population growth and the demand for fresh water?

(A) As the world's population stays the same, the demand for fresh water will go down.

(B) As the world's population stays the same, the demand for fresh water will go up.

(C) As the world's population increases, the demand for fresh water will go down.

(D) As the world's population increases, the demand for fresh water will go up.

7 Which of these is a practical solution to help reduce water usage?

(A) Increase the number of wells in an area to provide more clean water.

(B) Use less water for unnecessary things like washing the driveway.

(C) Find other sources of food to replace fisheries.

(D) Stop growing crops that need to be irrigated.

8 What caused Ethiopia and Egypt to recently start fighting again?

(A) Egypt is upset that nine-tenths of the water from the Nile River starts in Ethiopia now.

(B) Egypt is worried that they will have less water from the Nile if Ethiopia makes a dam.

(C) Egypt and Ethiopia have been experiencing great droughts and must figure out how to save the river.

(D) Egypt and Ethiopia are having huge population growths and there is not enough water.

How's the AIR?

What are measures of air quality?

Measuring how clean or polluted the air is tells us about **air quality**. Pollutants reduce air quality. Two major threats to air quality are vehicle exhausts and industrial pollutants. The air quality in cities can be poor. As more people move into cities, the cities get bigger. This leads to increased amounts of human-made pollution. Poor air circulation, such as a lack of wind, allows air pollution to stay in one area where it can build up. As pollution increases, air quality decreases.

Air Quality Index

The Air Quality Index (AQI) is a number used to describe the air quality of a location such as a city. The higher the AQI number, the more people are likely to have health problems that are linked to air pollution. Air quality is measured and given a value based on the level of pollution detected. The AQI values are divided into ranges. Each range is given a color code and a description. The Environmental Protection Agency (EPA) has AQIs for the pollutants that pose the greatest risk to public health, including ozone and particulates. The EPA can then issue advisories to avoid exposure to pollution that may harm health.

Indoor Air Pollution

The air inside a building can become more polluted than the air outside. This is because buildings are insulated to prevent outside air from entering the building. Some sources of indoor air pollution include chlorine and ammonia from household cleaners and formaldehyde from furniture. Harmful chemicals can be released from some paints and glues. Radon is a radioactive gas released when uranium decays. Radon can seep into buildings through gaps in their foundations. It can build up inside well-insulated buildings. *Ventilation*, or the mixing of indoor and outside air, can reduce indoor air pollution. Another way to reduce indoor air pollution is to limit the use of items that create the pollution.

Air Quality Index (AQI) values	Levels of health concern
0–50	Good
51–100	Moderate
101–150	Unhealthy for sensitive groups
151–200	Unhealthy
201–300	Very unhealthy

Source: US Environmental Protection Agency

Color codes based on the Air Quality Index show the air quality in different areas.

Visualize It!

11 Recommend If you were a weather reporter using this map, what would you recommend for people living in areas that are colored orange?

Visualize It!

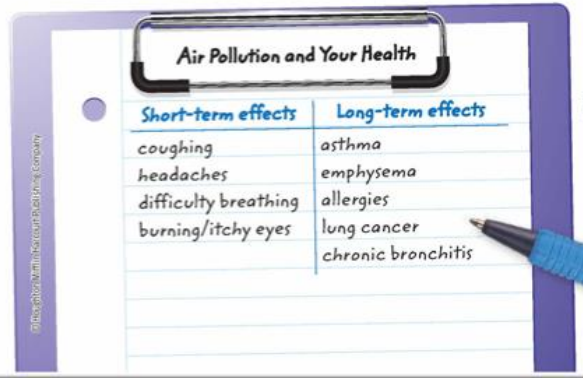
12 Apply If this was your house, how might you decrease the sources of indoor air pollution?

How can air quality affect health?

Daily exposure to small amounts of air pollution can cause serious health problems. Children, elderly people, and people with asthma, allergies, lung problems, and heart problems are especially vulnerable to the effects of air pollution. The short-term effects of air pollution include coughing, headaches, and wheezing. Long-term effects, such as lung cancer and emphysema, are dangerous because they can cause death.

Think Outside the Book Inquiry

13 Evaluate Think about the community in which you live. What different things in your community and the surrounding areas might affect the air quality where you live?



14 Identify Imagine you are walking next to a busy road where there are a lot of exhaust fumes. Circle the effects listed in the table that you are most likely to have while walking.

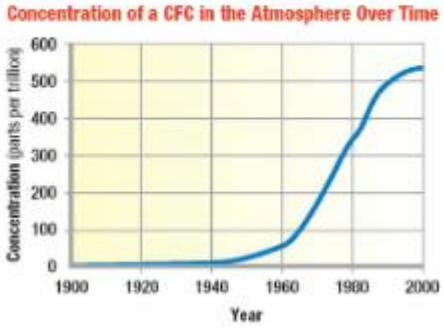
Lesson Review Questions

1. **List three effects that an increase in urbanization can have on air quality.**

2. **How can human health be affected by changes in air quality?**

Critical Thinking

Use this graph to answer the following questions.



3. **At what point in the graph did CFC's begin building up in the atmosphere?**

Energize Me!

What are two types of energy?

It takes energy to open this book, turn the pages, and scan each page with your eyes. But what exactly is energy? **Energy** is the ability to cause change. There are many forms of energy, but they can all be classified into two major types. **Kinetic energy** is energy due to an object's motion. A moving car, for example, has kinetic energy. **Potential energy** is the energy an object has because of its position, shape, or condition. A ball that you hold over your head has potential energy. If the ball is released, it has the potential to fall to the ground.

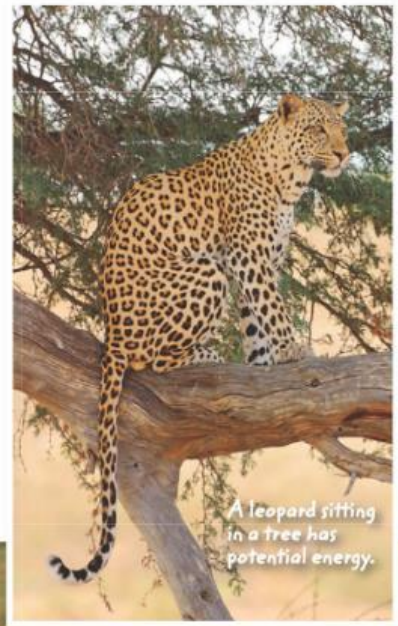
Kinetic Energy

Some forms of energy are classified as kinetic energy. All moving objects have kinetic energy. Particles that are moving have kinetic energy. And a leopard in motion has kinetic energy.

Thermal energy is the total kinetic energy of a substance's particles. Particles in a substance move faster as thermal energy increases. Sound energy is caused by vibrations in a medium, such as air. When the particles in the medium vibrate, they have kinetic energy.

Visualize It!

5 Identify Why does a running leopard have kinetic energy?



Potential Energy

What did you eat for breakfast this morning? The food that you eat contains a type of potential energy called chemical potential energy. Chemical potential energy is found in foods and fuels. There are other types of potential energy, too. Gravitational potential energy is the potential energy of an object that is acted upon by gravity. Elastic potential energy is the potential energy stored in a stretched rubber band or spring. Potential energy can be thought of as "stored energy," which makes it useful to harness as an energy resource. Electrical energy and nuclear energy are two forms of potential energy that serve as energy resources.

Active Reading

6 Identify As you read this paragraph, underline different forms of potential energy.

Can objects have kinetic energy and potential energy at the same time?

Often, objects have both kinetic energy and potential energy. Mechanical energy is the amount of work an object can do because of both its kinetic and potential energies. A ball has potential energy when you hold it above your head and kinetic energy when you release it and it falls to the floor. Its total mechanical energy is the sum of its kinetic and potential energies.

Objects can have different forms of kinetic and potential energy at the same time. A computer, for example, uses electrical energy. As the computer runs, it gives off heat, light, and sound energy. Light energy, also known as *radiant energy*, is the energy of electromagnetic waves. It includes familiar visible light as well as invisible forms of light such as microwave and ultraviolet waves.

7 Summarize Fill in the table with an example of an object that has each form of energy.

Form of Energy	Example
Chemical	Food
Electrical	
Mechanical	
Radiant	
Sound	
Thermal	

Ch-Ch-Ch-Changes

What is an energy transformation?

When you eat lunch, some chemical energy from the food is stored in your body. When you head outside for recess after lunch, your body uses some of the stored chemical energy to move. Chemical energy is transformed to mechanical energy. This is an example of an energy transformation. An **energy transformation** is the change of one form of energy to another form of energy.

When you drop a ball to the ground, some of a ball's potential energy is converted to kinetic energy, the energy of motion. When the same ball bounces upward, kinetic energy is converted to potential energy.

What happens during an energy transformation?

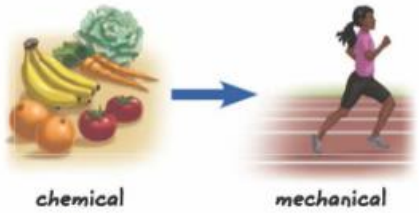
According to *the law of conservation of energy*, energy is never created or destroyed, it only changes form. The energy of a bouncing ball converts from potential energy to kinetic energy and from kinetic energy back to potential energy. The total amount of energy stays the same. But not all of the kinetic energy converts to potential energy. When the ball bounces on the ground, some of the kinetic energy converts to energy as heat and sound energy.

Every time energy changes form, some energy converts to energy as heat. For example, when you run, chemical energy converts to mechanical energy. Your body temperature rises slightly as you run, and some energy from your body is released into the environment as heat.

Also, what do you hear as your feet strike the ground? *Thump, thump, thump.* Some energy can change to sound energy during an energy transformation.

Visualize It!

8 Identify Name the energy transformation in each set of pictures below.



chemical — mechanical

radiant — A _____

B _____ — radiant

Active Reading

9 Explain How does a bouncing ball obey the law of conservation of energy?

_____

_____

_____

_____

What are some examples of energy transformations?

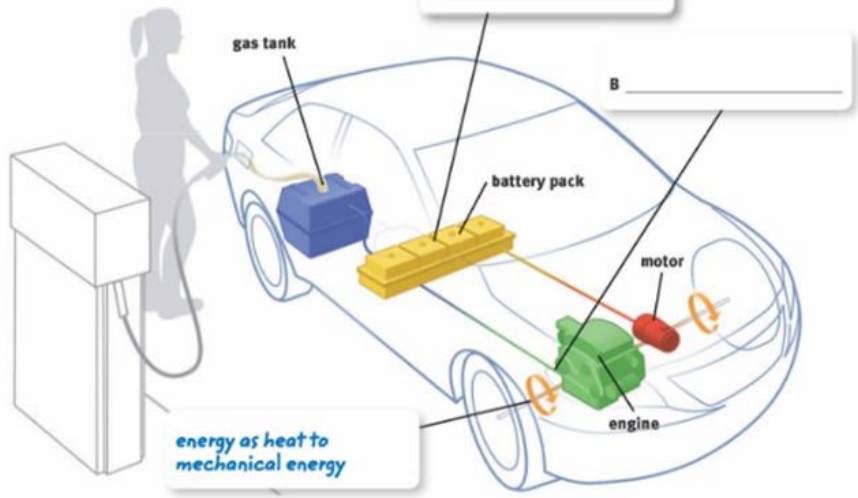
You have learned about simple energy transformations that involve one form of energy changing into another. However, energy may be transformed several times during some common processes. To see how this works, examine the diagram of the hybrid car below.

Some hybrid cars use both gasoline and batteries as energy sources. The fuel in the gas tank contains chemical energy. When the fuel burns in the engine, the chemical energy in the fuel transforms to energy as heat. Then, energy as heat is converted to mechanical energy, which turns the axles and wheels of the car. Chemical energy is also stored in the battery. This chemical energy changes to electrical energy, which runs the motor. Electrical energy converts to mechanical energy, which turns the axles.

A cell phone is another good example of multiple energy transformations. Cell phones run on batteries that store chemical energy. When you turn on the phone, the chemical energy in the batteries transforms to electrical energy. When you dial a number, some electrical energy changes to other forms of energy, such as light and sound.

Visualize It!

10 List On the lines provided, write the energy transformation that is taking place.



The Pros and Cons

How can we evaluate nonrenewable energy resources?

There are advantages and disadvantages to using nonrenewable energy resources. Nonrenewable resources provide much of the energy that humans need to power transportation, warm homes, and produce electricity relatively cheaply. But the methods of obtaining and using these resources can have negative effects on the environment.

The Pros and Cons of Nuclear Fuel

Active Reading

13 Identify As you read, underline the effects that nuclear power plants have on their surroundings.

Nuclear fission produces a large amount of energy and does not cause air pollution because no fuel is burned. Mining uranium also does not usually result in massive strip mines or large loss of habitats.

However, nuclear power does have drawbacks. Nuclear power plants produce dangerous wastes that remain radioactive for thousands of years. So the waste must be specially stored to prevent harm to anyone. Harmful radiation may also be released into the environment accidentally. Hot water released from the power plant can also be a problem. This heated water can disrupt aquatic ecosystems. So the hot water must be cooled before it is released into local bodies of water.

Visualize It!

14 Infer Why do you think nuclear fuel rods are usually transported by train instead of by trucks?

Used nuclear fuel rods must be transported in specially built steel containers.

The Pros and Cons of Fossil Fuels

Fossil fuels are relatively inexpensive to obtain and use. However, there are problems associated with their use. Burning coal can release sulfur dioxide, which combines with moisture in the air to form acid rain. Acid rain causes damage to structures and the environment. Coal mining also disturbs habitats, lowers water tables, and pollutes water.

Environmental problems are also associated with using oil. In 2010, a blown oil well spilled an estimated 200 million gallons of crude oil in the Gulf of Mexico for 86 days. The environmental costs may continue for years.

Burning fossil fuels can cause smog, especially in cities with millions of vehicles. Smog is a brownish haze that can cause respiratory problems and contribute to acid rain. Burning fossil fuels also releases carbon dioxide into the atmosphere. Increases in atmospheric carbon dioxide can lead to global warming.

Some coal is mined by removing the tops of mountains to expose the coal. This damages habitats and can cause water pollution as well.

15 Evaluate In the chart below, list the advantages and disadvantages of using nuclear fuel and fossil fuels.

Type of fuel	Pros	Cons
nuclear fuel		
fossil fuels		

newsela

Lasting effects of Exxon Valdez oil spill, 30 years later

Image 1. The tanker Exxon Valdez is pulled across Prince William Sound, Alaska on April 5, 1989, by a tug boat, past floating ice, after having been freed from the reef it struck 13 days earlier. Photo by: Bettman/Getty Images

SEATTLE, Washington — Before sunrise on March 24, 1989, Dan Lawn stepped off a small boat. He climbed the ladder dangling from the grounded Exxon Valdez ship. The Valdez was a tanker that carried oil.

Lawn looked down into the water of Prince William Sound. He saw an ugly sight he'd never forget.

"There was a 3-foot wave of oil boiling out from under the ship," recalls Lawn, who was then working in Valdez, Alaska. His job was to keep an eye on the oil business for the state's Department of Environmental Conservation. The government-funded group works to protect the area's land and water.

"You couldn't do anything to stop it," Lawn said.

He was a first responder to the 986-foot-long Exxon Valdez. The ship had gone off course. It punctured the hull, or the main body of the ship. In March it was 30 years since the Valdez spill.

No Quick Spill Response

Back in 1989, Lawn spent a day assessing the damage as oil gushed out. There would be no quick spill response. The oil spread slowly. Some 11 million gallons of oil would leak from the Exxon Valdez in what was then the largest spill in U.S. history, and one Lawn had long warned about.

The oil would damage parts of 1,300 miles of coastline. It killed sea life, including orca whales. The accident would change how oil transportation is done in Alaska and elsewhere in the world.

Today, due to changes in the law, all oil ships crossing the oceans are double-hulled, unlike the more breech-prone single hull of the Exxon Valdez. This double-layer reduces but does not eliminate spills. Last year, a double-hulled Iranian tanker crashed into a ship in the South China Sea. It blew up and leaked oil.

New Laws

In Washington, the state government changed oil-spill laws after the Exxon Valdez spills. Now, all ships carrying oil must have double frames.

Before the Exxon Valdez, Lawn spoke out about oil spills. Lawn even explained the problem to his state Department of Environmental Conservation, saying the oil business wasn't prepared. He said they needed more equipment for rescue plans.

"They didn't want to hear it," said Lawn. He's now retired from working.

When the accident happened, some of the limited rescue equipment was buried in snow.

For three days, there was calmer weather. The oil lay thick around the ship. Cleanups should have happened then. A storm came and scattered the oil along the coastlines. For four years, crews embarked on a $2.1 billion cleanup. Yet oil can still be detected on some stretches of shoreline. Up to 10,000 workers and 1,000 boats cleaned up.

Orcas surfaced through the oil slicks to breathe. Among a group of 36 whales who lived in the area, 14 had disappeared by 1990, according to studies.

Another traveling group of whales that visited Prince William Sound was in a worse state. Before the spill, the group had 22 whales. Since then, it's down to seven whales, and there have been no new calves born.

Whales Most Affected

Craig Matkin has studied the whales since 1984. He said these whales, which eat seals, were probably the most affected. They not only breathed the fumes and oil, but also ate oiled prey.

That pod appears doomed. "It is so sad," Matkin said.

Thirty years after the spill, oil companies have expanded measures to prevent spills. Two tugboats must travel with every oil tanker that motors through Prince William Sound. If needed, they can steer the tanker.

There is more room on barges and floating equipment to store cleaned-up oil. There's more than 50 times more room than in 1989.

"The technology has changed immensely," said Andres Morales, who leads an oil organization's emergency preparation team. He said they have about 300 people to prevent and respond to spills.

Scientists and the Washington Department of Fish and Wildlife have also practiced a plan to help whales. They bang on pipes underwater, believing the loud noise will keep orcas away from an oil spill.

Quiz

1 Which sentence from the article supports a main idea of the article?

(A) His job was to keep an eye on the oil business for the state's Department of Environmental Conservation.

(B) The accident would change how oil transportation is done in Alaska and elsewhere in the world.

(C) Last year, a double-hulled Iranian tanker crashed into a ship in the South China Sea.

(D) When the accident happened, some of the limited rescue equipment was buried in snow.

2 Read the paragraph from the section "No Quick Spill Response."

> *Back in 1989, Lawn spent a day assessing the damage as oil gushed out. There would be no quick spill response. The oil spread slowly. Some 11 million gallons of oil would leak from the Exxon Valdez in what was then the largest spill in U.S. history, and one Lawn had long warned about.*

How does this paragraph support the main idea of the article?

(A) It explains how sea life was affected by the Exxon Valdez oil spill.

(B) It shows just how big the Exxon Valdez oil spill grew to be.

(C) It describes how the Exxon Valdez oil spill was cleaned up.

(D) It highlights how laws changed after the Exxon Valdez oil spill.

3 What effect did the Exxon Valdez oil spill have on the measures that oil companies now take?

(A) Companies have to get rid of the extra room on their ships for cleaned-up oil.

(B) Companies are now forced to bang pipes underwater to keep whales away.

(C) Companies can no longer take oil ships near Prince William Sound.

(D) Companies began assigning two tugboats to each tanker to steer them if needed.

4 According to the section "New Laws," how did Dan Lawn try to help prevent oil spills before the Exxon Valdez accident?

(A) He talked to the people on the Exxon Valdez before they entered Prince William Sound.

(B) He was the person who first suggested that oil ships should be double-hulled tankers.

(C) He warned the Department of Environmental Conservation that it did not have enough equipment.

(D) He came up with new technology that helps states and companies stop oil spills before they happen.

U.N. presents ways to slow down problems caused by climate change

By Associated Press, adapted by Newsela staff on 08.15.19

Rows of soybean plants in a field near Bennington, Nebraska. A report by the United Nations released on Thursday, August 8, 2019, says that human-caused climate change is dramatically degrading the planet's land, while the way people use the Earth is making global warming worse. Photo by: Nati Harnik/AP Photo

GENEVA, Switzerland — Human-caused climate change is badly hurting the Earth's land. A new United Nations (U.N.) report provides the proof. It says people's poor use of the damaged land is also causing more harm.

These land problems make food more expensive and scarce. The food also becomes lower in healthy nutrients.

The problem is becoming worse fast, said NASA climate scientist Cynthia Rosenzweig. NASA is the U.S. space agency. Rosenzweig was a co-author of the U.N. report. The report was released on August 8.

Rosenzweig said climate change could start making it harder for people to put food on the dinner table.

However, there are ways to slow down this problem. People can change the way they eat. They can also change how they farm and manage forests. These steps could help save the planet from a far warmer future, scientists said.

Earth's land is only 30 percent of the globe. Yet the land is warming twice as fast as the planet as a whole. Many know that heat-trapping gases, such as carbon dioxide, are polluting the Earth's air. Yet there hasn't been a discussion about the damage to the land.

Report Issues Serious Warnings

The U.N. special report was created by more than 100 scientists. It was approved by diplomats from nations around the world. It was presented at an August 8 meeting in Geneva, Switzerland. The report proposed fixes as well as serious warnings.

"The way we use land is both part of the problem and also part of the solution," said Valerie Masson-Delmotte. She's a French climate scientist who helped with the study. "Land management can help secure a future that is comfortable."

Scientists in Geneva emphasized the need to make changes soon.

"We want to get across the message that every action makes a difference," said Jim Skea. He's a professor in London, England, who also worked on the report.

Still, the message hit home hard for some of the authors.

"I've lost a lot of sleep about what the science is saying. As a person, it's pretty scary," said Koko Warner. She helped write the U.N. report. "We need to act urgently."

Extreme Weather Means Less Food

The report said climate change has already caused deserts to grow. The Earth's permafrost is melting. Permafrost is a frozen layer beneath the Earth's surface. The report also blamed climate change for making forests more at risk to drought, fire, pests and disease.

The report said food is likely to decrease with more extreme weather events, such as flooding or drought. Drought is a long period of low rainfall. It results in a water shortage. Extreme weather can harm animals and crops, which in turn hurts the natural food chains and supplies.

NASA's Rosenzweig said there's a danger to many crops. She said the amount of crops in Europe fell just in the last two weeks.

Scientists had long believed higher levels of carbon dioxide had at least a few benefits. One was making the world greener, Rosenzweig said. More plants would grow. However, many studies show high levels of carbon dioxide cause a bigger problem in crops. It reduces protein and nutrients in many crops.

Rosenzweig gave the example of wheat. She pointed out experiments showing high levels of carbon dioxide in the air. In the tests, wheat has 6 to 13 percent less protein, 4 to 7 percent less zinc and 5 to 8 percent less iron.

Less Meat Will Help The Planet And Our Bodies

Yet better farming practices can be used to fight climate change. One example is smarter fertilizer use for crops. Farming changes could reduce carbon dioxide pollution by 18 percent by 2050, the report said.

People changing their diets could help, too. Decreasing how much red meat is eaten and increasing the amount of fruits and vegetables would help. The world can save as much as another 15 percent of current carbon dioxide emissions by 2050. People would also be more healthy, Rosenzweig said.

Reducing food waste can better fight climate change, too. The report said between 2010 and 2016, food waste accounted for 8 to 10 percent of the world's heat-trapping emissions.

"Currently 25 to 30 percent of total food produced is lost or wasted," the report said.

Quiz

1 Which sentence from the article supports the MAIN idea of the article?

(A) Rosenzweig said climate change could start making it harder for people to put food on the dinner table.

(B) It was presented at an August 8 meeting in Geneva, Switzerland.

(C) Scientists had long believed higher levels of carbon dioxide had at least a few benefits.

(D) In the tests, wheat has 6 to 13 percent less protein, 4 to 7 percent less zinc and 5 to 8 percent less iron.

2 Read the paragraph from the article.

> *Yet better farming practices can be used to fight climate change. One example is smarter fertilizer use for crops. Farming changes could reduce carbon dioxide pollution by 18 percent by 2050, the report said.*

How does this paragraph support the MAIN idea of the article?

(A) It explains what climate change is and when it first started.

(B) It explains that the amount of food has gone down over the years.

(C) It shows a change that could be made to help slow climate change.

(D) It shows how weather changes can cause problems for many crops.

3 What is the relationship between food waste and heat-trapping emissions?

(A) An increase in heat-trapping emissions leads to less food waste.

(B) An increase in heat-trapping emissions leads to more food waste.

(C) An increase in food waste leads to less heat-trapping emissions.

(D) An increase in food waste leads to more heat-trapping emissions.

4 What effect does carbon dioxide levels in the air have on protein and nutrients in plants?

(A) Small amounts of carbon dioxide in the air causes more protein and less nutrients in plants.

(B) Small amounts of carbon dioxide in the air causes less protein and more nutrients in plants.

(C) Large amounts of carbon dioxide in the air causes higher amounts of protein and nutrients in plants.

(D) Large amounts of carbon dioxide in the air causes lower amounts of protein and nutrients in plants.

What kinds of changes can we make to manage resources?

Managing natural resources takes place on global, national, state, local, and individual levels. On the global level, countries make agreements to help manage international resources. For example, countries agreed to stop using chemicals called CFCs after scientists discovered that CFCs were causing damage to the ozone layer. The ozone layer is a resource that protects Earth from harmful radiation. Ending the use of CFCs has slowed the breakdown of the ozone layer.

Think Outside the Book Inquiry

18 Apply With a partner, suggest laws that could be enacted in your community to protect resources.

Change Laws

On the national level, countries pass laws to manage resources. For example, many nations have laws that determine where, when, and how many trees can be harvested for timber. Laws also govern how materials must be disposed of to prevent and reduce harm to land and water. States also pass laws and work to protect air, water, and land resources. Cities coordinate recycling programs and promote local conservation efforts. In addition, government funding helps researchers find new ways to conserve resources.

Visualize It!

19 List What are some of the ways these students are conserving resources in their school lunchroom?

Change Habits

Think about all the things you do every day. Changing some of your habits can help to conserve resources. For example, at school, you can reuse lunch containers and recycle as much as possible. At home, you can conserve water by taking shorter showers and turning off the faucet while brushing your teeth. You and your family can save energy by turning off lights or TV sets when they are not being used. Families can buy energy-efficient appliances to save even more energy.