**Hazelwood School District**  
**Barrington Fifth Grade Activities**

Directions: On the first day of school closures, students should complete activities for each day.

- Reading and math daily activities

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Reading</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Read the Read Works article Day 1. Answer the vocabulary and accompanying questions.</td>
</tr>
<tr>
<td></td>
<td>Write an explanatory paragraph explaining to a friend how to have fun at home when school is closed for the day.</td>
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<tr>
<td>Math</td>
<td>Complete Day 1 math problems. Show your thinking.</td>
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<tr>
<td>Social Studies/Science</td>
<td>Read Day 1 Science article. Use the article to answer questions.</td>
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<tr>
<th>Day 2</th>
<th>Reading</th>
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<tr>
<td></td>
<td>Read the Read Works article Day 2. Answer the vocabulary and accompanying questions.</td>
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<tr>
<td></td>
<td>Write a short essay that compares and contrasts two kinds of vegetables.</td>
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<tr>
<td>Math</td>
<td>Complete Day 2 math problems. Show your thinking.</td>
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<tr>
<td>Social Studies/Science</td>
<td>Read Day 2 Science article. Use the article to answer questions.</td>
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<tr>
<th>Day 3</th>
<th>Reading</th>
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<tbody>
<tr>
<td></td>
<td>Read the Read Works article Day 3. Answer the vocabulary and accompanying questions.</td>
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<tr>
<td></td>
<td>Think about a person you respect. Write a short essay that names the person, tells why you respect that person, and gives examples to support your respect.</td>
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<tr>
<td>Math</td>
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</table>
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<tr>
<th>Day 4</th>
<th>Reading</th>
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<tbody>
<tr>
<td></td>
<td>• Read the Read Works article Day 4. Answer the vocabulary and accompanying questions.</td>
</tr>
<tr>
<td></td>
<td>• You have been given permission to plan a party. Why are you having a party? Who will come? What will the party be like? Write a description of the party you would plan.</td>
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<table>
<thead>
<tr>
<th>Math</th>
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<tbody>
<tr>
<td>• Complete Day 4 math problems. Show your thinking.</td>
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<tr>
<th>Day 5</th>
<th>Reading</th>
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<tbody>
<tr>
<td></td>
<td>• Read the Read Works article Day 5. Answer the vocabulary and accompanying questions.</td>
</tr>
<tr>
<td></td>
<td>• Write an opinion paragraph about what animal you believe makes the best pet. Be sure to include reasons and evidence in your paragraph.</td>
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<table>
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<tr>
<th>Math</th>
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<tbody>
<tr>
<td>• Complete Day 5 math problems. Show your thinking.</td>
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<table>
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<tr>
<th>Social Studies/Science</th>
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<tr>
<td>• Read Day 5 Science article. Use the article to answer questions.</td>
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<tr>
<th>Day 6</th>
<th>Reading</th>
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<tbody>
<tr>
<td></td>
<td>• Read the Read Works article Day 6. Answer the vocabulary and accompanying questions.</td>
</tr>
<tr>
<td></td>
<td>• Your family members want to begin exercising daily. How</td>
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</table>
do you feel about this? Write a short essay that tells your opinion about daily exercise.

**Math**
- Complete Day 6 math problems. Show your thinking.

**Social Studies/Science**
- Read Day 6 Science article. Use the article to answer questions.

### Day 7
**Reading**
- Read the Read Works article Day 7. Answer the vocabulary and accompanying questions.
- Recess is most students’ favorite time of day. Write a letter to your principal that explains why you think recess should be longer.

**Math**
- Complete Day 7 math problems. Show your thinking.

**Social Studies/Science**
- Read Day 7 Science article. Use the article to answer questions.

### Day 8
**Reading**
- Read the Read Works article Day 8. Answer the vocabulary and accompanying questions.
- Your friend finds an old trunk with something interesting inside. Write a story about what happens next.

**Math**
- Complete Day 8 math problems. Show your thinking.

**Social Studies/Science**
- Read Day 8 Science article. Use the article to answer questions.

### Day 9
**Reading**
Hazelwood School District  
Barrington Fifth Grade Activities

<table>
<thead>
<tr>
<th>Day 9</th>
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</table>
| **Reading**  
- Read the Read Works article Day 9. Answer the vocabulary and accompanying questions.  
- An alien lands on Earth and comes to your house. What does the alien look like? What does the alien do? Write a story about what happens? |

| Math  
- Complete Day 9 math problems. Show your thinking. |

| Social Studies/Science  
- Read Day 9 Science article. Use the article to answer questions. |

<table>
<thead>
<tr>
<th>Day 10</th>
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</table>
| **Reading**  
- Read the Read Works article Day 10. Answer the vocabulary and accompanying questions.  
- One morning, you walk into the bathroom to get ready for school and cannot see yourself in the mirror. You are invisible! Write a story about what your day would be like. |

| Math  
- Complete Day 10 math problems. Show your thinking. |

| Social Studies/Science  
- Read Day 10 Science article. Use the article to answer questions. |
A Good Night
by ReadWorks

It happens every night—bedtime. But what if you're not sleepy? Should you still go to bed if you are just going to lie there with your eyes wide open?

It's a problem that has been around as long as there have been people trying to sleep.

For many, thinking about sleeping only keeps them awake. You might be excited by everything you did that day. You might be excited for what you know you're going to do the day after.

Maybe you can't sleep because you don't like sleeping all alone in your room. Maybe you have a nightmare that keeps coming back every time you close your eyes.

All of these feelings are normal.

One thing that can help is talking to a parent about what you're thinking about. If you're nervous about taking a test or upset about being teased at school, it can really help to tell somebody. Knowing that somebody has heard you can help your thoughts rest so that you can, too.
There's not just one reason why kids can't fall asleep, though. There are also different solutions.

If there's anything near you that makes you feel uncomfortable at night, be sure to ask your parents if they can help you solve the problem. For example, if a picture looks strange in the dark or a leaky faucet's drops are noisy, maybe your parents can help move the picture or fix the leaky faucet.

It may not even make sense why something bothers you, but if it's keeping you from sleeping, it should be changed.

Another idea could be getting ready for bed earlier than usual. Try to take more time to wind down by taking a warm bath or listening to a bedtime story at least 30 minutes before you want to go to sleep.

It also helps to keep your bedtime routine and time the same every night. By keeping it the same, your body will get the message that it's almost time to sleep. Your body will know to start feeling tired.

If you don't want to wake up anyone but are still having trouble falling asleep, you can try to close your eyes and notice your breath. Are you breathing deep breaths, or are they short and shallow? If you are breathing short breaths, stay focused on your breath and remind yourself that you can control how you breathe. Concentrate on taking deep breaths.

It's important not to give up just because one solution didn't work and you're still awake. There are many different solutions you can try! It may be difficult for you to sleep some nights, but you likely also have some restful and good nights.
focus

Definition
noun
1. the area of greatest attention or activity.

*The focus of the report was changes in the economy.*

verb
1. to turn or move to make a clear image.

*Lee focused the camera lens.*

2. to direct to a central point.

*You should focus your attention on your driving.*

3. to direct your attention to something.

*She couldn't focus on her work with all the noise.*

Advanced Definition
noun
1. the point at which rays, esp. optical, come together, or from which they seem to radiate.

2. the area of greatest concentration, attention, or activity.

*Of course, others were involved, but our son was the primary focus of our concern.*

*The focus of the nature program was the dire situation of the polar bear.*

*They feel there should be a stronger focus on science in the elementary school curriculum.*

3. degree of clarity and precision, esp. in an image presented by an optical system such as a camera.

*The focus is not very sharp in this shot, so her face looks a bit fuzzy.*

4. the state of maximum visual clarity and precision.

*This is the only photograph that is truly in focus.*
5. an adjustment on an optical device that will sharpen the image viewed.

*The focus on the microscope allowed her to see every detail of the cell.*

**transitive verb**

1. to adjust (an optical device or the eyes) to produce a more distinct image.

*With this camera, you'll need to focus the lens yourself.*

2. to concentrate (attention or efforts) on a central point or task.

*The teacher needed to focus more attention on the students who were lagging behind.*

**intransitive verb**

1. to concentrate one's attention or activity (usu. fol. by "on").

*I have trouble focusing on my work when I'm tired.*

*The researchers focused on the question of causation.*

These are some examples of how the word or forms of the word are used:

1. Don't try too hard to **focus** on one eye or the other.

2. His young students learn how to stay calm and **focus** on hard moves.

3. Counselors and therapists can help each person come up with strategies to calm down and **focus**.

4. "I think [uniforms help] students **focus** on their academics and not the latest fashion," principal Megan Mannion told *WR News*.

5. *Career World* asked body language expert Patti Wood to point out the best and worst places to **focus** on the person you're talking to.

6. Returning to school is helping students **focus** on rebuilding their lives. "When a school opens in a disaster zone, everyone feels a sense of hope," said Bellamy.

7. Playing a video game can be like solving a puzzle. Many video games can help make minds stronger. They require the player to **focus** on the game.

8. "Before I took karate, I couldn't **focus** all that well," Mazzoni said. "But after I started, I learned that you have to concentrate on the teacher and yourself to get the moves right. And that just carried over into school."

9. "I take medication in the morning," says Lauren K., 12. She says it helps her **focus**. "It's enough to get me through the school day, but when I get home I get kind of crazy and have a lot of energy."
**routine**

**Definition**

noun

1. a regular course of action.

   *Brushing her teeth was part of her morning routine.*

**Advanced Definition**

noun

1. standard or customary procedure or course of action.

   *His habits interfered with the daily routine of the business.*

2. an unvarying procedure or activity, often carried out without thought or interest.

   *workers who dislike routine*

3. a set of electronic instructions for a series of computer operations, or the operations carried out under such instructions.

4. a set piece that is often or regularly performed by an entertainer such as a nightclub comedian.

5. a specific type of activity or behavior.

   *She does this not-guilty routine when someone criticizes her.*

adjective

1. in accordance with customary or standard procedure.

   *routine precautions against fire*

2. in the nature of routine; unvarying or ordinary; requiring little thought.

**Spanish cognate**

**rutina**: The Spanish word *rutina* means routine.

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**These are some examples of how the word or forms of the word are used:**

1. Doctors are highly trained medical specialists who spend their days diagnosing and treating all sorts of injuries and illnesses. Nurses provide **routine**, day-to-day care for patients who have already seen doctors.
2. Alex has a daily **routine** that might work for you even if you've never danced a step in your life. Each afternoon she takes a few minutes (five minutes on each exercise, to be exact) to do crunches and something called wall sits.

3. "Several flamingos will begin the initial behaviors. Others will join in, and they escalate and add other behaviors to the sequence." The **routines** are courtship rituals, says Arengo. Flamingos seem to be attracted to others whose movements are similar to their own.

4. "I continue to use those exercises as part of my warm-up for soccer training and soccer games. I have incorporated the exercises into my **routine**, so it doesn't feel like I'm doing extra exercises. I just know I'm doing really good exercises!"

5. As I walked down the same street almost every day for the last 23 years, stopped at the same coffee shop almost every day for the last six, and ordered the same drink I had each of those days, I marveled at how **routine** my day was.
solution

Definition

noun
1. an answer to a problem or a way to fix it.

*Mary used multiplication to find the solution.*

*The city is looking for solutions to the problem of crime.*

2. a liquid mixed with a solid or gas to make a new substance.

*Vinegar is a solution of acid and water.*

Advanced Definition

noun
1. the act or process of solving a problem or question.

*The solution of the mystery took the police several months.*

2. the result of this act or process; answer; explanation.

*The council finally agreed that the solution to the traffic problem was to build a second bridge.*

*This was a dilemma for which there was no solution.*

*The students found the solution to the problem by multiplying.*

3. the process in which one substance becomes dispersed uniformly in another.

4. the mixture that results from this dispersal.

*a salt solution*

Spanish cognate

solución: The Spanish word *solución* means solution.

These are some examples of how the word or forms of the word are used:
1. The team was looking for a **solution** to the problem of post-mining land.

2. An example of problem assessment and **solution** evaluation can be seen in the distribution of music.

3. In addition to iron, gold is often found in metal solid **solutions** with silver or with quartz.

4. Solar-powered cars have been in development for a long time, and many believe they are a viable **solution** to pollution.

5. What exactly makes for a "better mousetrap"? A quick look at the market for mousetraps reveals a great variety of **solutions**.

6. In New York, people tried to solve the problem of crossing the Verrazano Narrows by sailing boats, digging tunnels and dreaming of bridges. Figuring out a good **solution** took 440 years.

7. Hydrochloric acid, a clear **solution** of hydrogen and chlorine in water, has other uses, however, including household cleaning and food processing.

8. The idea of putting up a bridge comes from awareness of a problem: people cannot easily get from one point to another. Perhaps that is because those points are separated by water, or a road, or a valley, or a large piece of impassable land. So, instead of sailing or climbing or walking through this obstacle, the best **solution** to the problem is to build a bridge.

9. If more people rode bicycles, the roads would be less clogged with cars. Also, when you ride a bicycle, you are exercising, which makes you healthy. But how can you encourage people to ride more bikes? The city came up with an innovative **solution**.
1. What can be difficult for people at bedtime?
   A. falling asleep
   B. moving a picture
   C. talking to a parent
   D. taking a warm bath

2. A problem described in the text is being unable to fall asleep. What is one solution?
   A. not talking to anyone about something that is bothering you
   B. staring at a picture that looks strange in the dark
   C. going to bed at a different time every night
   D. taking more time to wind down before bedtime

3. Read these sentences from the text.
   
   Maybe you can't sleep because you don't like sleeping all alone in your room. Maybe you have a nightmare that keeps coming back every time you close your eyes.

   What can be concluded from this information?
   A. All kids have trouble sleeping for the same reason.
   B. There is more than one reason that kids can have trouble sleeping.
   C. Some kids like listening to stories at bedtime more than taking a warm bath.
   D. Some kids like taking a warm bath more than listening to stories at bedtime.

4. How can the problem of falling asleep be described?
   A. The problem of falling asleep is due to one reason for everyone.
   B. The problem of falling asleep happens every night at the same time.
   C. The problem of falling asleep has been around for a long time and affects many people.
   D. The problem of falling asleep only affects people who share a bedroom with someone else.
5. What is the text mostly about?
   A. why kids have trouble falling asleep and what they can do about it
   B. some different stories that parents like reading to their children before bedtime
   C. why some people get more nervous than others about tests in school
   D. different daytime activities that make kids too excited to fall asleep at night

6. Read these sentences from the text.
   It also helps to keep your bedtime \textbf{routine} and time the same every night. By keeping it the same, your body will get the message that it's almost time to sleep.

What does the word "\textbf{routine}" mean in the sentences?
   A. something done over and over
   B. something that a person has never done before
   C. something that is likely to cause harm
   D. something that people do with others

7. Choose the answer that best completes the sentence below.
   Kids can have trouble sleeping for a variety of reasons, ______ feeling excited and being alone in a room.
   A. never
   B. although
   C. including
   D. in conclusion

8. Name one thing mentioned in the text that can keep people from falling asleep at night.

9. Name one thing the text suggests that people can do to help them fall asleep at night.

10. Imagine a friend of yours is having trouble sleeping. What would you say to your friend? Use information from the text to support your answer.
1) \[ 47 \times 43 = \]

2) If \( 7 \times 2 = 14 \), then \( 7,000 \times 2 = \) 

3) Convert to a fraction.
\[
0.28 = \]

4) Convert to a decimal.
\[
\frac{7}{10} = \]

5) Use powers of ten and/or halves to solve.
\[
28 \times 90 = \]
\[
14 \times 9 = \]
\[
7 \times 9 = \]

6) Find the volume (in cm).
\[
\text{Volume} = \]

7) Find the volume (in cm).
\[
\text{Volume} = \]

8) Write in expanded form: 68,878

9) Write in expanded notation: 2.487

10) A builder needed to buy nine hundred seven nails for his latest project. If the nails he needs come in boxes of twenty, how many boxes will he need to buy?
A food web consists of all the food chains in a single ecosystem. Each living thing in an ecosystem is part of multiple food chains. Each food chain is one possible path that energy and nutrients may take as they move through the ecosystem. All of the interconnected and overlapping food chains in an ecosystem make up a food web.

**Trophic Levels**

Organisms in food webs are grouped into categories called trophic levels. Roughly speaking, these levels are divided into producers (first trophic level), consumers and decomposers (last trophic level).

**Producers**

Producers make up the first trophic level. Producers, also known as autotrophs, make their own food and do not depend on any other organism for nutrition. Most autotrophs use a process
called photosynthesis to create food (a nutrient called glucose) from sunlight, carbon dioxide and water.

Plants are the most familiar type of autotroph, but there are many other kinds. Algae, whose larger forms are known as seaweed, are autotrophic. Phytoplankton, tiny organisms that live in the ocean, are also autotrophs. Some types of bacteria are autotrophs. For example, bacteria living in active volcanoes use sulfur, not carbon dioxide, to produce their own food. This process is called chemosynthesis.

Consumers

The next trophic levels are made up of animals that eat producers. These organisms are called consumers.

Primary consumers are herbivores, who eat plants, algae and other producers. They are at the second trophic level. In a grassland ecosystem, deer, mice and even elephants are herbivores. They eat grasses, shrubs and trees. In a desert ecosystem, a mouse that eats seeds and fruits is a primary consumer. In an ocean ecosystem, many types of fish and turtles are herbivores that eat algae and seagrass. In kelp forests, seaweeds known as giant kelp provide shelter and food for an entire ecosystem. Sea urchins are powerful primary consumers in kelp forests. These small herbivores eat dozens of kilograms (pounds) of giant kelp every day.

Secondary consumers eat herbivores. They are at the third trophic level. In a desert ecosystem, a secondary consumer may be a snake that eats a mouse. In the kelp forest, sea otters are secondary consumers that hunt sea urchins as prey.

Tertiary consumers eat the secondary consumers and are at the fourth trophic level. In the desert ecosystem, an owl or eagle may prey on the snake.

There may be more levels of consumers before a chain finally reaches its top predator. Top predators, also called apex predators, eat other consumers. They may be at the fourth or fifth trophic level and have no natural enemies except people. Lions are apex predators in the grassland ecosystem. In the ocean, fish such as the great white shark are apex predators. In the desert, bobcats and mountain lions are top predators.

Consumers can be carnivores (animals that eat other animals) or omnivores (animals that eat both plants and animals). Omnivores, like people, consume many types of foods. People eat plants, such as vegetables and fruits. We also eat animals and animal products, such as meat, milk, and eggs. We eat fungi, such as mushrooms, and also algae, in edible seaweeds like nori (used to wrap sushi rolls) and sea lettuce (used in salads). Bears are omnivores, too, because they eat berries and mushrooms as well as animals such as salmon and deer.

Detritivores And Decomposers

Detritivores and decomposers make up the last part of food chains. Detritivores are organisms that eat nonliving plant and animal remains. For example, scavengers such as vultures eat dead animals while dung beetles eat animal feces.

Decomposers, like fungi and bacteria, complete the food chain by turning organic wastes, such as decaying plants, into inorganic materials, such as nutrient-rich soil. They complete the cycle of
life, returning nutrients to the soil or oceans for use by autotrophs. This starts a whole new series of food chains.

**Food Chains**

Food webs connect many different food chains, and many different trophic levels. Food webs can support food chains that are either long and complicated or very short.

For example, grass in a forest clearing produces its own food through photosynthesis. A rabbit eats the grass, and then a fox eats the rabbit. When the fox dies, decomposers such as worms and mushrooms break down its body, returning it to the soil where it provides nutrients for plants like grass.

This short food chain is one part of the forests food web. Another food chain in the same ecosystem might involve completely different organisms. A caterpillar may eat the leaves of a tree in the forest. A bird such as a sparrow may eat the caterpillar, and a snake may then prey on the sparrow. An eagle, an apex predator, may prey on the snake. Yet another bird, a vulture, consumes the body of the dead eagle. Finally, bacteria in the soil decompose the remains. Algae and plankton are the main producers in marine ecosystems. Tiny shrimp called krill eat the microscopic plankton. The largest animal on Earth, the blue whale, preys on thousands of tons of krill every day. Apex predators such as orcas prey on blue whales. As the bodies of large animals such as whales sink to the seafloor, detritivores such as worms break down the material. The nutrients released by the decaying flesh provide chemicals for algae and plankton to start a new series of food chains.

**Biomass**

Food webs are defined by their biomass — the energy in living organisms. Autotrophs, the producers in a food web, convert the sun's energy into biomass. Biomass decreases with each trophic level. There is always more biomass in lower trophic levels than in higher ones.

Because biomass decreases with each trophic level, there are always more autotrophs than herbivores in a healthy food web. There are more herbivores than carnivores. An ecosystem cannot support a large number of omnivores without supporting an even larger number of herbivores, and an even larger number of autotrophs.

A healthy food web has an abundance of autotrophs, many herbivores and few carnivores and omnivores. This balance helps the ecosystem maintain and recycle biomass.

Every link in a food web is connected to at least two others. The biomass of an ecosystem depends on how balanced and connected its food web is. When one link in the food web is threatened, some or all of the links are weakened or stressed, and the ecosystems biomass declines.

The loss of plant life usually leads to a decline in the herbivore population, for instance. Plant life can decline due to drought, disease or human activity. Forests are cut down to provide lumber for construction. Grasslands are paved over for shopping malls or parking lots.
The loss of biomass on the second or third trophic level can also put a food web out of balance. Consider what may happen if a salmon run — a river where salmon swim — is diverted. Salmon runs can be diverted by landslides and earthquakes, as well as the construction of dams and levees.

Biomass is lost as salmon are cut out of the rivers. Unable to eat salmon, omnivores like bears are forced to rely more heavily on other food sources, such as ants. The areas' ant population shrinks. Ants are usually scavengers and detritivores, so fewer nutrients are broken down in the soil. The soil is unable to support as many autotrophs, so biomass is lost. Salmon themselves are predators of insect larvae and smaller fish. Without salmon to keep their population in check, aquatic insects may devastate local plant communities. Fewer plants survive, and biomass is lost.

A loss of organisms on higher trophic levels, such as carnivores, can also disrupt a food chain. In the kelp forest, sea urchins are the primary consumer of kelp, and the sea otters prey on urchins. If the sea otter population shrinks due to disease or hunting, urchins devastate the kelp forest. Lacking a community of producers, biomass plummets. The entire kelp forest disappears. Such areas are called urchin barrens.

Human activity can reduce the number of predators. In 1986, officials in Venezuela dammed the Caroni River, creating an enormous lake about twice the size of Rhode Island. Hundreds of hilltops turned into islands in this lake. With their habitats reduced to tiny islands, many terrestrial predators weren't able to find enough food. As a result, prey animals like howler monkeys, leaf-cutter ants and iguanas flourished. The ants became so numerous that they destroyed the rain forest, killing all the trees and other plants. The food web surrounding the Caroni River was destroyed.

Bioaccumulation

Biomass declines as you move up through the trophic levels. However, some types of materials, especially toxic chemicals, increase with each trophic level in the food web, and usually collect in the fat of animals.

When an herbivore eats a plant or other autotroph that is covered in pesticides, for example, those pesticides are stored in the animal's fat. When a carnivore eats several of these herbivores, it takes in the pesticide chemicals stored in its prey. This process is called bioaccumulation.

Bioaccumulation happens in aquatic ecosystems, too. Runoff from urban areas or farms can be full of pollutants. Tiny producers such as algae, bacteria and seagrass absorb minute amounts of these pollutants. Primary consumers, such as sea turtles and fish, eat the seagrass. They use the energy and nutrients provided by the plants, but store the chemicals in their fatty tissue. Predators on the third trophic level, such as sharks or tuna, eat the fish. By the time the tuna is consumed by people, it may be storing a remarkable amount of bioaccumulated toxins.

Because of bioaccumulation, organisms in some polluted ecosystems are unsafe and not allowed to be harvested. Oysters in the harbor of New York City, for instance, are unsafe to eat. The pollutants in the harbor accumulate in oysters, a filter feeder.

In the 1940s and 1950s, a pesticide called DDT (dichloro-diphenyl-trichloroethane) was widely used to kill insects that spread diseases. During World War II, the Allies used DDT to eliminate typhus in Europe and control malaria in the South Pacific. Scientists believed they
had discovered a miracle drug. DDT was largely responsible for eliminating malaria in places like Taiwan, the Caribbean and the Balkans. Sadly, DDT bioaccumulates in an ecosystem and causes damage to the environment. DDT accumulates in soil and water, and some forms of DDT decompose slowly. Worms, grasses, algae and fish accumulate DDT. Apex predators, such as eagles, had high amount of DDT in their bodies, accumulated from the fish and small mammals they prey on.

Birds with high amounts of DDT in their bodies lay eggs with extremely thin shells. These shells would often break before the baby birds were ready to hatch.

DDT was a major reason for the decline of the bald eagle, an apex predator that feeds primarily on fish and small rodents. Today, the use of DDT has been restricted. The food webs of which it is a part have recovered in most parts of the country.

**Fast Facts:**

**Lost Energy**

Biomass shrinks with each trophic level due to the fact that 80 to 90 percent of an organism's energy, or biomass, is lost as heat or waste. A predator consumes only the remaining biomass.

**A Million To One**

Marine food webs are usually longer than terrestrial food webs. Scientists estimate that if there are a million producers, such as algae, phytoplankton and sea grass, in a food web, there may only be 10,000 herbivores. Such a food web may support 100 secondary consumers, such as tuna. All these organisms support only one apex predator, such as a person.

**Out For Blood**

One of the earliest descriptions of food webs was given by the scientist Al-Jahiz, working in Baghdad, Iraq, in the early 800s. Al-Jahiz wrote about mosquitoes preying on the blood of elephants and hippos. Al-Jahiz understood that although mosquitoes preyed on other animals, they were also prey to animals such as flies and small birds.
Quiz

1. What is the difference between photosynthesis and chemosynthesis?
   (A) Photosynthetic producers use carbon dioxide while chemosynthetic producers use sulfur to create glucose.
   (B) Photosynthesis is a process used by producers, while chemosynthesis is used by decomposers.
   (C) Photosynthesis happens on land, chemosynthesis happens in the ocean.
   (D) Photosynthesis is a chemical reaction that produces glucose, while chemosynthesis is a chemical reaction that produces harmful DDT.

2. Read the following paragraph from the section "Producers."

   Plants are the most familiar type of autotroph, but there are many other kinds. Algae, whose larger forms are known as seaweed, are autotrophic. Phytoplankton, tiny organisms that live in the ocean, are also autotrophs. Some types of bacteria are autotrophs. For example, bacteria living in active volcanoes use sulfur, not carbon dioxide, to produce their own food. This process is called chemosynthesis.

What conclusion is BEST supported by this paragraph?
   (A) There are many types of producers that use different chemicals in their environments to create energy.
   (B) The process of chemosynthesis creates a much more efficient energy source than photosynthesis does.
   (C) Scientists were surprised to learn that bacteria and other organisms could survive inside volcanoes.
   (D) Some types of plants have been proven to exist as both producers and consumers in the same food chain.

3. What would happen if all of the foxes (secondary consumers) were hunted until they were gone in a forest ecosystem?
   (A) The primary consumers would take their place in the food web.
   (B) Only the other secondary consumers would be affected.
   (C) The entire food web would become unbalanced.
   (D) There would not be much of an effect on the ecosystem.

4. Read the following sentences from the article.

   1. A healthy food web has an abundance of autotrophs, many herbivores and few carnivores and omnivores.
   2. When an herbivore eats a plant or other autotroph that is covered in pesticides, for example, those pesticides are stored in the animal's fat.
   3. By the time the tuna is consumed by people, it may be storing a remarkable amount of bioaccumulated toxins.
   4. Biomass shrinks with each trophic level due to the fact that 80 to 90 percent of an organism's energy, or biomass, is lost as heat or waste.

Which two sentences taken together provide the BEST evidence to support the idea that the bottom of the food chain can directly affect the top of the food chain?
   (A) 1 and 2
   (B) 2 and 3
   (C) 3 and 4
   (D) 1 and 4
5. Which answer BEST describes why apex predators are most affected by bioaccumulation?
(A) Pesticides and pollution builds up as you move up in trophic levels.
(B) Apex predators are the only trophic level that are exposed to pollution and pesticides.
(C) There are less apex predators than any other trophic level.
(D) Lower trophic levels eat a variety of prey, apex predators only eat one type of prey.

6. According to the article, what is one way that the loss of biomass on the second or third trophic level, like salmon, might affect a food web's balance?
(A) It could put the food web out of balance by eliminating apex predators that keep smaller animals like monkeys, iguanas and ants in check.
(B) It could put the food web out of balance by allowing too much photosynthesis to occur, which increases the number of producers and adds biomass to the ecosystem.
(C) It could put the food web out of balance by eliminating plants and other producers that are responsible for turning decaying matter into nutrients in the soil.
(D) It could put the food web out of balance by causing larger consumers to rely more on other food sources, which then leads to decrease of an ecosystem's biomass.

7. While mostly too small to be seen, decomposers are often considered to be the most essential part of a balanced food web or ecosystem. Why is this?
(A) Decomposers eat sick and dying organisms, keeping the ecosystem healthy.
(B) Decomposers recycle nutrients in the ecosystem by decaying and breaking down dead animals and plants.
(C) Decomposers are eaten by primary consumers when there are not enough plants.
(D) Decomposers reduce biomass of consumers if it becomes out of balance.

8. According to the article, what is one reason why the government decided to restrict the use of DDT?
(A) The number of people getting typhus and malaria from insects was growing during World War II.
(B) The population of bald eagles was declining because the toxin caused them to lay eggs with thin shells.
(C) The filter-feeding oysters in New York Harbor were becoming polluted due to the runoff of urban pesticides.
(D) The terrestrial predators surrounding the Caroni River declined because they lacked enough food.
Cool to Be Kind
by Kirsten Weir

Put yourself in somebody else's shoes.

Amanda O. was in fourth grade when her mom passed away. Amanda had been bullied before, and, incredibly, older kids at school teased her about her devastating loss. "People bullied me about how I looked, how I dressed. They bullied me about my mom," says the 14-year-old from El Paso, Texas.

Amanda told the principal, who called the bullies' parents. Amanda also confronted the kids herself. "I said, 'You didn't know my mom. She was my best friend. If you lost a best friend, how would you feel?'"

The bullies backed off, and Amanda felt good about standing up for herself. She may not have realized it at the time, but Amanda was asking her tormentors to have a little empathy.

"Empathy is a matter of learning how to understand someone else—both what they think and how they feel," says Jennifer Freed, a family therapist and codirector of a teen program called the Academy of Healing Arts.

In other words, empathy is being able to put yourself in someone else's shoes. Many people who bully others are particularly weak in that department, says Malcolm Watson, a psychologist at Brandeis University in Massachusetts. "Bullies don't tend to have a lot of empathy," he says.

Everyone is different, and levels of empathy differ from person to person. "Some people are more highly sensitive than others. They will naturally feel what other people feel," Freed says. "Others don't understand emotions in other people as well."

The good news? "Empathy is something you can learn," Freed says. In fact, she adds, teaching empathy to prevent bullying is more effective than punishing bullies after the fact. And anyone can learn it. In her teen programs, she says, "every semester we see bullies change their behavior."
You don't have to be a bully to benefit from developing empathy. Having compassion for others is a valuable skill that everyone should work to improve, she says. "I think everyone needs to develop more of it."

**Emotional Intelligence**

Last year, researchers from the University of Michigan reported that empathy among college students had dropped sharply over the past 10 years. That could be because so many people have replaced face time with screen time, the researchers said. Having empathy is about understanding other people. Today, people spend more time solo and are less likely to join groups and clubs.

Freed has another explanation. Turn on the TV, and you're bombarded with news and reality shows highlighting people fighting, competing, and generally treating one another with no respect. Humans learn by example—and most of the examples on TV are anything but empathetic.

There are good reasons not to follow those bad examples. Humans are social by nature. Having relationships with other people is an important part of being human—and having empathy is critical to those relationships. Researchers have also found that empathetic teenagers are more likely to have high self-esteem. That's not all. In a book titled *The Power of Empathy*, psychologist Arthur Ciaramicoli writes that empathy can be a cure for loneliness, depression, anxiety, and fear.
Empathy is also a sign of a good leader. In fact, Freed says, many top companies report that empathy is one of the most important things they look for in new executives. Good social skills-including empathy-are a kind of "emotional intelligence" that will help you succeed in many areas of life. "Academics are important. But if you don't have emotional intelligence, you won't be as successful in work or in your love life," she says.

What's the best way to up your empathy quotient? For starters, let down your guard and really listen to others. "One doesn't develop empathy by having a lot of opinions and doing a lot of talking," Freed says. Here are some great ways to dig beneath the surface and really get to know other people-and to boost empathy in the process:

- Volunteer at a nursing home or a hospital. Challenging yourself to care for others is a great way to learn empathy, Freed says.
- Join a club or a team that has a diverse membership. You can learn a lot from people of different ages, races, or backgrounds.
- Spend time caring for pets at an animal shelter.
- Once a week, have a "sharing circle" with your family. Take turns listening to one another talk, without interrupting.

Playing Your Part

With bullying such a big issue in schools around the country, experts are looking more closely at empathy. Many schools are teaching teens how to tune in to others' feelings. Often, kids who bully others come from homes where empathy is in short supply, says Watson. Teaching them empathy skills can help squash their aggressive behavior. Just focusing on the bullies and their victims isn't enough to stop the bullying crisis, though. To do that, everyone in school must show some empathy.

Have you ever watched a classmate being teased or pushed around, without intervening? Imagine that victim was your little brother or a close friend. How would you feel about the situation then? It takes both courage and empathy to confront a bully or to report an incident to a teacher. It may not be easy, but working together is the best way to make schools safer, Watson says.

That makes sense to Patrick K., a 16-year-old from South Carolina. He was bullied in middle school and lived in constant fear. One day one of his tormentors threatened to kill him and later threw a rock at his head during gym class.
Fortunately, Patrick's family moved to a new school district not long after that incident, and things are much better at his new school. But he wasn't content to just sit back and let other kids suffer the way he had. He became a teen ambassador for Love Our Children USA's STOMP Out Bullying campaign.

Last year, Patrick saw a classmate getting pushed around at school. He immediately reported the incident to the principal and a guidance counselor. The school called the kids in to sort out the problem, he says. Patrick doesn't think he did anything special. "I feel that everybody should be treated with respect," he says. "I just felt like it was the right thing to do."

Expressing Empathy-Creatively

If you've ever been called nasty names, you know how awful it feels. Here's your chance to help others understand what it's like to walk in your shoes. The No Name-Calling Week Creative Expression Contest wants your poems, artwork, essays, music, and videos! Tune in to your artistic side to illustrate how name-calling has affected you and your peers. No Name-Calling Week happens each year in January. (But being kind is cool any week of the year.)

Chris Price/Istock
compassion

Advanced Definition

noun

1. a feeling of sharing another's suffering, prompting a desire to relieve that suffering; commiseration; clemency.

Her compassion for the orphans led her to look for ways to help them.

The ship's captain was a brutal man with no compassion.

Spanish cognate

compasión: The Spanish word compasión means compassion.

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These are some examples of how the word or forms of the word are used:

1. Those include things like being great at telling jokes, compassion, intelligence, warmth, and creativity.

2. She said, "even if my character is really different from me, figuring out what we have in common, and actually learning how to be her in the play, teaches me compassion and understanding."

3. Having compassion for others is a valuable skill that everyone should work to improve, she says.
emotional  

Advanced Definition
adjective
1. of or relating to the feelings.
2. easily roused to subjective response; tending to experience emotion.
3. given to expressing or displaying emotion.
4. capable of stirring emotions, or tending to stir emotions.

*an emotional scene from a movie*

Spanish cognate

emocional: The Spanish word *emocional* means emotional.

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These are some examples of how the word or forms of the word are used:

1. The costs "include obesity, greater stress, higher rates of physical and emotional illnesses - and less joy in being alive and aware," says Richard Louv, author of Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder.

2. As Stuber also points out, an "injection" of humor may even be good for your emotional health.

3. The school serves kids who have emotional, behavioral, social, or learning challenges.

4. It is released not only when we're hot but also when we're in stressful and emotional situations; that is why when we're nervous, our palms become sweaty!

5. Good social skills - including empathy - are a kind of "emotional intelligence" that will help you succeed in many areas of life.

6. Stuttering is not a nervous or an emotional disorder.
empathy

Advanced Definition

noun

1. identification with or sharing of another's feelings, situation, or attitudes.

_The play didn't interest him as he could not feel empathy with characters having such great wealth and high social status._

2. the attribution of one's personal feelings or attitudes to an external object.

Spanish cognate

_empatía_: The Spanish word _empatía_ means empathy.

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These are some examples of how the word or forms of the word are used:

1. In a book titled _The Power of Empathy_, psychologist Arthur Ciaramicoli writes that empathy can be a cure for loneliness, depression, anxiety, and fear.

2. She may not have realized it at the time, but Amanda was asking her tormentors to have a little _empathy_.

3. Having relationships with other people is an important part of being human - and having _empathy_ is critical to those relationships.

4. One doesn't develop _empathy_ by having a lot of opinions and doing a lot of talking, Freed says.

5. Here are some great ways to dig beneath the surface and really get to know other people - and to boost _empathy_ in the process: Volunteer at a nursing home or a hospital.

6. Challenging yourself to care for others is a great way to learn _empathy_, Freed says.

7. Good social skills - including _empathy_ - are a kind of "emotional intelligence" that will help you succeed in many areas of life.

8. Teaching them _empathy_ skills can help squash their aggressive behavior.

9. Having _empathy_ is about understanding other people.

10. Everyone is different, and levels of _empathy_ differ from person to person.

11. _Empathy_ is a matter of learning how to understand someone else - both what they think and how they feel, says Jennifer Freed, a family therapist and codirector of a teen program called the Academy of Healing Arts.
1. What is empathy?
   A. Empathy is the ability to make other people do what you want by threatening them.
   B. Empathy is the ability to understand how other people think and feel.
   C. Empathy is the choice that many people make to spend time alone instead of joining groups.
   D. Empathy is the choice that many people make to watch TV shows full of fighting and disrespectful words.

2. What problem does developing empathy help solve?
   A. Developing empathy helps solve the problem of unexpected death.
   B. Developing empathy helps solve the problem of homelessness.
   C. Developing empathy helps solve the problem of lung cancer.
   D. Developing empathy helps solve the problem of bullying.

3. Empathy is something people can learn.

What evidence from the passage supports this statement?
   A. Teaching empathy to prevent bullying is more effective than punishing bullies after the fact.
   B. After Amanda O.'s mom died, older kids at school teased her about her devastating loss.
   C. Patrick K.'s tormentors threatened to kill him and later threw a rock at his head during gym class.
   D. Researchers from the University of Michigan reported that empathy among college students had dropped sharply over the past 10 years.

4. What policy would most likely result in a decrease in bullying at school?
   A. a policy requiring students to spend at least three hours doing homework every night
   B. a policy requiring students to take more math and science classes but fewer arts and language classes
   C. a policy requiring students to volunteer every month at a nursing home, hospital, or animal shelter
   D. a policy discouraging students from speaking up or taking action if they notice a classmate being teased
5. What is this passage mostly about?
   A. fear and loneliness
   B. depression and anxiety
   C. poems and music
   D. empathy and bullying

6. Read the following sentences: "Have you ever watched a classmate being teased or pushed around, without intervening? Imagine that victim was your little brother or a close friend. How would you feel about the situation then? It takes both courage and empathy to confront a **bully** or to report an incident to a teacher."

   What does the word **bully** mean above?
   A. a person who naturally feels what other people feel
   B. a person who teases, threatens, or harms someone else
   C. a person who does research studies on how students behave
   D. a person who is a good leader and successful at work

7. Choose the answer that best completes the sentence below.

   There are several ways to develop empathy, ____ listening closely to others and getting to know people from many different backgrounds.
   A. such as
   B. although
   C. never
   D. before

8. How much empathy do bullies tend to have?

9. Name two benefits of empathy mentioned in the passage.

10. Therapist Jennifer Freed thinks that everyone needs to develop more empathy. Based on the information in the passage, explain whether developing more empathy is or is not a good idea.
Day 2

1) \[ \begin{array}{c}
41 \\
\times 16
\end{array} \]

2) If \( 8 \times 8 = 64 \), then \( 800 \times 8 = \) 

3) Convert to a fraction.
\[ 0.22 = \_ \_ \_ \_ \_ \_ \]

4) Convert to a decimal.
\[ \frac{56}{100} = \_ \_ \_ \_ \_ \_ \]

5) Use powers of ten and/or halves to solve.
\[ 50 \times \_ \_ \_ = 2,000 \]
\[ 5 \times \_ \_ \_ = 200 \]
\[ 5 \times \_ \_ \_ = 20 \]

6) Find the volume (in cm).

7) Find the volume (in cm).

8) Write in expanded form: 8,441

9) Write in expanded notation: 63.616

10) A machine in a candy company creates seven hundred seven pieces of candy a minute. If a small box of candy has twenty-nine pieces in it how many full boxes does the machine make in a minute?
The Earth's vast food chain under the seas

By National Geographic Society, adapted by Newsela staff on 03.13.19
Word Count 645
Level 1060L

Scientists have identified around 300,000 different marine species. Together, these make up about 15 percent of all known species on the planet. However, the sea is so vast that a million or more as yet unknown species might live in its waters. Most of these marine species are tied together through the food web.

Level One: Photoautotrophs

The foundation of the sea's food chain is largely invisible. Countless billions of one-celled organisms, called phytoplankton, fill sunlit upper-ocean waters worldwide. They are microscopic, meaning they are too small to be seen by human eyes. These tiny organisms work similarly to plants in some ways. Like plants, they take in the sun's energy and, through photosynthesis, convert nutrients and carbon dioxide into organic compounds. On the coast, seaweed and seagrasses do the same thing.
Together, these humble plants play a large role: They are the primary producers of the organic carbon that all animals in the ocean food web need to survive. They also produce more than half of the oxygen that we breathe on Earth.

**Level Two: Herbivores**

The next level of the marine food chain is made up of plant-eaters, or herbivores. Many of these herbivores are microscopic animals that drift on the ocean’s surface, grazing on whatever they come across. These creatures are known as zooplankton. They include a microscopic form of jellyfish and the larval stages of some fish, barnacles and mollusks. Larger herbivores include surgeonfish, parrotfish, green turtles and manatees.

Despite their differences in size, herbivores share a boundless appetite for ocean vegetation. Many of them also share the same fate: they become food for the carnivorous, or flesh-eating, animals of the food chain’s top two levels.

**Level Three: Carnivores**

The zooplankton of level two provides food for a large and varied group of small carnivores, such as sardines, herring and menhaden. This level of the food chain also includes larger animals, such as octopuses, and many kinds of fish. The octopuses feed on crabs and lobsters, while the fish feed on small invertebrates that live near the shore. Though these small carnivores are very successful hunters, they often fall prey to a simple fact of ocean life: big fish eat smaller fish.

**Level Four: Top Predators**

The large predators that sit at the top, or apex, of the marine food chain are a varied group. They include finned animals such as sharks, tuna and dolphins, feathered animals like pelicans and penguins, and flippered ones like seals and walruses. These apex predators tend to be large, fast and very good at catching prey. They are also long-lived and usually reproduce slowly. Compared with smaller animals, females have fewer offspring and do not give birth that often.

However, the marine food chain’s top predators are common prey for the most deadly hunters of all: humans. When populations of top predator species shrink due to overfishing, it can take years for them to recover. This is due to their slow rate of reproduction. The loss of these species can
create problems throughout the entire food web. For example, populations of smaller animals they normally feed on can become too large.

**Alternative Food Chains**

The primary marine food web, which is based on plant productivity, includes many of the sea's species — but not all of them. There are other deep-ocean ecosystems that are entirely independent of the sunlight energy that kick-starts the main marine ecosystem. At their roots, these unique ecosystems are fueled by chemical energy that enters the ocean from sources like hydrothermal vents. Hydrothermal vents are openings in the ocean floor that release heated minerals from deep within the Earth into the ocean's waters.
Quiz

Read the following description:

These organisms are large predators. They have been known to eat other carnivores and herbivores. Although these organisms are very successful, their population has been greatly threatened by humans.

Which of the following best fits the description of these organisms?

(A) level one: photoautotrophs
(B) level two: herbivores
(C) level three: carnivores
(D) level four: top predators

Which section of the article explains how species use sunlight to turn food into energy?

(A) "Level One: Photoautotrophs"
(B) "Level Two: Herbivores"
(C) "Level Three: Carnivores"
(D) "Alternative Food Chains"

Many organisms in the ocean live at depths of water not able to receive sunlight. Since the main marine food web is based on these organisms, how are deep ocean ecosystems able to survive?

(A) Many of the deep ocean animals come to the surface to consume organisms.
(B) Deep ocean animals are fueled by chemical energy rather than products of photosynthesis.
(C) These deep ocean animals rely on organisms that have died and sank to the bottom of the ocean.
(D) These deep ocean organisms are able to produce their own energy even in the absence of sunlight.

Read the following details from the article.

1. However, the sea is so vast that a million or more as yet unknown species might live in its waters.
2. Countless billions of one-celled organisms, called phytoplankton, fill sunlit upper-ocean waters worldwide.
3. These apex predators tend to be large, fast and very good at catching prey. They are also long-lived and usually reproduce slowly.
4. There are other deep-ocean ecosystems that are entirely independent of the sunlight energy that kick-starts the main marine ecosystem.

Which two details, taken together, provide the BEST evidence to support the inference that the ocean's size inhibits scientists from studying it thoroughly?

(A) 1 and 3
(B) 1 and 4
(C) 2 and 3
(D) 2 and 4
Billions of one-celled organisms called phytoplankton live in the upper part of the ocean waters. How can an organism so small in size have such an important role in the ocean?

(A) Although these organisms are mostly invisible, they play a very important role in removing waste from the ocean.

(B) Many of the plant species depend on this organism for nutrients. They are also a very important food source for plants.

(C) These organisms are the main food source for many of the carnivores.

(D) Phytoplankton use the sun's energy and turn nutrients into organic compounds that all animals in the ocean need to survive.

Read the introduction of the article [paragraph 1].

How does the introduction develop the MAIN idea?

(A) It explains what a marine food chain is and introduces the different levels that it consists of.

(B) It explains how food chains for marine species are different than food chains for other species.

(C) It explains what kinds of marine species can be found at each level of the food chain.

(D) It explains how many marine species have been identified to emphasize the complexity of ocean food chains.

What is true about the populate of top predators?

1. It can take years to recover when the population declines rapidly.
2. It has been harmed because of human activities.
3. It often falls prey to other animals in the ocean.
4. It plays an important role in keeping the ocean's food web in balance.

(A) 1 and 2

(B) 3 and 4

(C) 1, 2, and 4

(D) 2, 3, and 4

How would the article change if the section "Level Four: Top Predators" came before the sections preceding it?

(A) More emphasis would be placed on the ocean environment as a whole, not just the species that make up its food chains.

(B) More emphasis would be placed on the important roles each species plays in maintaining the delicate balance of the food chain.

(C) Less emphasis would be placed on the different marine species that make up the food chains within the ocean.

(D) Less emphasis would be placed on the sources of energy that fuel the food chains within different ocean environments.
BEING HUMAN

Humans are unlike any other animal on Earth. Our unique brains and bodies allow us to use the world's resources in ways no other animal can. No other animal can claim it's been to the bottom of the deepest ocean, to the top of the tallest mountain, and even up and out of Earth to the moon. On a simpler level, do you know of any animal that can build a two-story, single-family brick home with an attached garage?

Or just make one of the toilets in the house?

While exercising our profound abilities (like making toilet bowls), we have fundamentally changed our planet and, in many ways, we've made it our planet. We've cut down entire
forests to construct towns and cities. We’ve replaced the trees and plants with buildings, and paved over the forest floor with roads. These activities help us live, but they also create pollution that affects the air we breathe and the water we drink.

EATING FOR A HEALTHIER PLANET

Luckily, we can reduce the impact our activities have on the planet. One such activity is growing food. Think of all the land, equipment and work that go into a potato farm, an apple orchard or a cattle operation. By eating the right foods grown in the right way, we can limit the effects our farms and ranches have on the environment and eat our way to a healthier planet!

EAT LIKE SQUIRRELS

A great way to limit your impact on the planet is to follow other animals’ way of eating. Squirrels, for instance, eat nuts found close to their tree house. Elephants eat the trees and bushes that grow around them. Killer whales eat the fish swimming with (and away!) from them. What these animals are doing is eating in-season and locally. We can do the same.

EAT IN-SEASON

Most of our favorite fruits and vegetables don’t grow year-round and have their own natural season. Modern farming techniques have changed that, and we can have almost anything any time of the year. But when this produce is grown during its natural off-season, it may not taste the same. If we eat with our foods’ natural seasons, we are eating in sync with nature.

EAT LOCALLY

Eating locally means consuming produce that is grown close to your home. It will definitely limit your choices, but it will ultimately lower the impact you and your eating habits have on the environment. An easy way to get local produce is to shop at a nearby farmer’s market.

Love to eat grapes? Well, you can eat them in-season and locally...if you moved around the world a lot to follow the seasons! Grapes are a summer fruit so during the winter, many northern American supermarkets buy them from farmers in Chile, which is more than 4,000 miles away!

GROW YOUR OWN

One of the best things you can do to be a lower-impact animal is grow your own food. It may seem like a lot of work but people and communities all over the country grow some or all of their own food. There are many benefits to growing your own food.
One benefit is just learning about where your food comes from. Most produce found in your grocery store has stickers or signs that tell you where it was grown. Let's say you pick up a tomato and learn the tomato was grown hundreds of miles away before getting into your hand. If you grew a tomato in your backyard, school or local community garden, not only would you save a trip to the grocery store, you would save that tomato a long trip, and the planet a lot of resources.

Another benefit of growing your own food is that your food is fresher. It can take weeks for produce to get from the farm to your supermarket. By growing your own food, those weeks become just days, hours or even seconds. Now that's fresh!

COMMUNITY

When you buy food that is grown locally, you're also supporting your own community. The money you spend goes toward your neighbors' jobs and businesses and keeps your community strong and unique.

HEALTHY EATING, HEALTHY PLANET

Although human activities alter the planet, there are many things we can do to limit our impact. The impact of growing and raising our food on the planet is high but by eating locally, in-season, and even growing our own food, we can make the planet a better place while eating great food!
benefit

Definition

noun
1. anything that does someone good or gives an advantage.

I'm sure you will get a lot of benefit from your education.

verb
1. to gain something good.

My son benefited from the counselor's advice.

Advanced Definition

noun
1. anything that provides an advantage or produces a positive result.

Exercise provides many benefits for your health.

Cleaner air is a benefit of living in the country.

2. an object, service, or sum of money that enhances well-being; aid.

Our company provides benefits such as health insurance and paid vacations.

3. a social event to raise money for a specific cause or person.

We're having a benefit to raise money for the children's hospital.

transitive verb
1. to cause positive results for; be helpful to.

The new public swimming pool will benefit the entire community.

A healthy diet would benefit you greatly.

I hope this advice benefits you in some way.

intransitive verb
1. to gain or derive favorable results (usu. fol. by from).

You will certainly benefit from getting a college education.
I benefited a good deal from the experience of living abroad.

Spanish cognate

beneficio: The Spanish word beneficio means benefit.

These are some examples of how the word or forms of the word are used:

1. Many scientific studies have shown that dogs, cats, rabbits, gerbils, snakes, lizards, fish, ferrets, and birds, among other pets, help relieve stress. They bring many other health (and happiness) benefits too.

2. Studies on apples are still being done. We already know a lot about their benefits. In the future, we'll know even more, including how to combine them with other foods for the maximum nutritional wallop. Until then, eat as much of this healthy grab-and-go food as you can!

3. Well ... that depends. To make sure you're getting the full benefits of juice, you have to act like a detective. You need to ask the right questions and understand how to read labels. Read on to learn more than you ever thought there was to know about your favorite beverage!

4. Nowadays, almost every kind of cancer seems to have its own public awareness campaign urging people to get tested— even if they have no sign of disease. Catching cancer early saves lives, the campaigns tell us. So here's a surprise: Those warnings might not be true. The benefits of early cancer screening are being oversold, say critics.

5. Freddie Fu agrees. Fu is head of the department of orthopedic surgery at the University of Pittsburgh School of Medicine. "Bone marrow is a good source of stem cells, but I don't think there is any definitive evidence to show that stem cells will benefit a condition like [Colón's]," Fu says.

6. That ancestor was probably a creature similar to today's nurse shark, a 135-kilogram (300-pound) species that often rests on the seabed and feeds on fish and other marine animals there. Huetter guesses that the whale shark's ancestor originally ate fish eggs but eventually took advantage of the nutritional benefits of zooplankton in the open sea.

7. The research on improving cows' digestion might have other benefits too. Jess Miner, an animal nutritionist at the University of Nebraska, says it could help the animals get more energy from their food. That would mean cows wouldn't have to eat as much. "We could produce more cows with the same amount of feed," Miner told WR News. "Agriculture will be made more efficient."
impact

**Definition**

noun

1. the coming together of objects with great force.

   *The impact of the bus against the tree cracked the windshield.*

2. a strong and powerful effect.

   *The senator's speech on gun control had a great impact on voters.*

**Advanced Definition**

noun

1. a forceful coming together of two objects or bodies.

   *The impact of the crash was strong enough to shake the building.*

2. effect or influence.

   *His stirring speech had a great impact on the audience.*

   *My professor's impact on my thinking was deep and lasting.*

**transitive verb**

1. to force or press closely into something.

   *Here is where the meteorite impacted the earth.*

2. to affect directly.

   *The scientists are studying how the dam has impacted the ecosystem of the river.*

   *The tragedy has impacted all our lives.*

**Spanish cognate**

*impacto*: The Spanish word *impacto* means impact.

---

These are some examples of how the word or forms of the word are used:
1. At 20,000 feet, of course, the amount of kinetic energy generated by a falling skydiver poses a risk to his life. A parachute, which slows the skydivers fall by creating air resistance, is required to reduce the kinetic energy the skydiver generates as he falls. Consequently, once the parachute has opened, the skydiver makes a gentle impact with the ground when he lands.

2. Some drugs are grown or manufactured in the United States. But just because they're not connected to terrorism or trafficking doesn't mean they don't have a harmful impact on society. Drug users are more likely to commit crimes such as theft or assault. And drug-related gang rivalries contribute to violence in cities across the country.

3. An athlete should never return to a sport before a concussion has fully healed, says Mihalik. The process takes at least a week, often longer. If a second head injury occurs before the first one has healed, a condition called second-impact syndrome can result. It can have serious, long-lasting consequences: amnesia, loss of mental ability, and even sudden death.

4. However, by carefully planning the locations of renewable energy power plants, their harmful impact to the planet can be minimized and their renewable and sustainable benefits maximized.

5. "Livestock's contribution to environmental problems is on a massive scale," U.N. officials wrote in a recent report. "The impact is so significant that it needs to be addressed with urgency."

6. Mercury has an unexpectedly small mantle. The mantle is the layer of a rocky planet that exists between the crust and the core. "One theory is that a giant impact blew off most of the mantle," says scientist Sarah Stewart.

7. The friend crashed the truck. Although the friend and a third teen walked away, Bollier, now 27, wasn't so lucky. The impact not only crushed his jaw, nose, and right eye but also snapped his neck, leaving him paralyzed from the neck down.
resource

Definition

noun
1. a source of help or support.

   The library is a good resource for information.

2. a source of wealth.

   Oil is an important natural resource for some countries.

Advanced Definition

noun
1. a source of aid, support, or other reinforcement.

   The library is a good resource for information.

2. (plural) a nation's wealth and assets, both monetary and nonmonetary.

   Forests are one of Canada's greatest natural resources.

3. (usually plural) available money, property, or other assets.

   My parents did not have the resources to pay for my college education.

4. (often plural) personal talents and capabilities.

   She has the resources to succeed in difficult jobs.

These are some examples of how the word or forms of the word are used:

1. Being green means protecting the world and its resources.

2. The Civilian Conservation Corps was a group of young men between the ages of 18 and 25 who were responsible for helping to keep safe and cultivate certain natural resources across the United States.

3. Henderson now believes Gates's enthusiasm and commitment are powerful enough to overcome the remaining challenges. "It's going to take heroic measures to be able to stop [polio]," he admits. "But they have the motivation, the people, and the resources. With enough of a push, they might just make it."

4. Males that sport outsize weapons tend to live in places with limited resources, says Emlen.
And those resources are usually in distinct locations that are easy to defend, such as cozy burrows or tasty sap-producing trees.

5. Even if Congo remains the center of the world's coltan operations, there are possibilities for reform there, Carney says. His group's mission is to help end the war and help Congo's people regain control of their nation's resources.

6. Recycling also helps protect natural resources, or materials from Earth. To make an aluminum can from scratch, for example, the metal needs to be mined from the ground. That process harms the land and pollutes the air and water.
Name: ___________________________ Date: ______________

1. Why are humans unlike other animals?
   A. because we only eat in-season and local food
   B. because we do not use the earth's resources as much as other animals
   C. because we can use the earth's resources in ways other animals cannot
   D. because we do not have to grow our own food

2. The author tries to persuade the reader of what?
   A. Eating locally and in-season is good for the planet.
   B. Eating locally and in-season is dangerous for the planet.
   C. Humans are the most resourceful animal on earth.
   D. Humans should mimic killer whales and only eat fish.

3. We are able to eat many foods year-round thanks to modern farming techniques. What evidence supports this conclusion?
   A. When produce is grown during its natural off-season, it may not taste the same.
   B. If we eat with our foods' natural seasons, we are eating in sync with nature.
   C. Most fruits and vegetables don't grow year-round and have their own natural season.
   D. Many fruits and vegetables can be made to grow during their natural off-season.

4. Read the following sentence: "Grapes are a summer fruit so during the winter, many northern American supermarkets buy them from farmers in Chile, which is more than 4,000 miles away!"

Based on this evidence, what conclusion can be made about grapes that are bought in the winter?
   A. American supermarket owners must travel to Chile to buy the grapes in the winter.
   B. The grapes bought in the winter must be shipped from Chile to America.
   C. The grapes bought in the winter are less expensive than the grapes bought in the summer.
   D. The grapes bought in the winter taste better than the grapes bought in the summer.
5. What is this passage mostly about?
   A. how humans can help the planet by growing food in big, industrial farms
   B. the importance of shopping at your local farmer's market
   C. how we can help the planet by growing our own food and eating locally and in-season
   D. the ways in which humans are hurting the earth with their farming practices

6. Read the following sentences: "We've replaced the trees and plants with buildings, and paved over the forest floor with roads. These activities help us live, but they also create pollution that affects the air we breathe and the water we drink. Luckily, we can reduce the impact our activities have on the planet."

What does "impact" mean as used in the passage?
   A. an effect
   B. a type of food
   C. a cause
   D. a natural resource

7. Choose the answer that best completes the sentence below.

Humans alter the planet more than any other animal; __________, we should do our best to lessen our impact and keep the planet healthy.
   A. especially
   B. finally
   C. on the other hand
   D. therefore

8. What does "eating locally" mean? Give an example of one way to eat locally.

9. What are the benefits of growing your own food? List two benefits from the passage.

10. What might happen to us, our communities, and the planet if we did not eat locally or in-season? Support your answer with details from the passage.
Day 3

1) \[ \begin{array}{c}
59 \\
\times \\
73 \\
\end{array} \]

2) If \( 6 \times 8 = 48 \), then \( 600 \times 8 = \) __________

3) Convert to a fraction.

\[ \frac{0.03}{1} = \] __________

4) Convert to a decimal.

\[ \frac{29}{100} = \] __________

5) Use powers of ten and/or halves to solve.

\[ 900 \times 30 = \] __________

\[ 90 \times 3 = \] __________

\[ 9 \times 3 = \] __________

6) Find the volume (in cm).

\[ \text{Volume} = 3 \times 9 \times 9 = \] __________

7) Find the volume (in cm).

8) Write in expanded form: 27,900

\[ 27,900 = \] __________

9) Write in expanded notation: 512.599

\[ 512.599 = \] __________

10) A container can hold forty-four orange slices. If a company had two hundred nineteen orange slices to put into containers, how many more slices would they need to fill up the last container?
The food chain: who eats who in the wild

By National Geographic Society on 05.09.19
Word Count 655
Level MAX

Image 1. An American alligator chews down on a blue crab. Photo by: Gareth Rasberry/Wikimedia Commons

The food chain describes who eats whom in the wild. Every living thing — from one-celled algae to giant blue whales — needs food to survive. Each food chain is a possible pathway that energy and nutrients can follow through the ecosystem.

For example, grass produces its own food from sunlight. A rabbit eats the grass, then a fox eats the rabbit. When the fox dies, bacteria break down its body, returning it to the soil where it provides nutrients for plants, like grass.

Of course, many different animals eat grass, and rabbits can eat other plants besides grass. Foxes, in turn, can eat many types of animals and plants. Each of these living things can be a part of multiple food chains. All of the interconnected and overlapping food chains in an ecosystem make up a food web.

Trophic Levels

Organisms in food chains are grouped into categories called trophic levels. Roughly speaking, these levels are divided into producers (first trophic level), consumers (second, third and fourth
Producers, also known as autotrophs, make their own food. They make up the first level of every food chain. Autotrophs are usually plants or one-celled organisms. Nearly all autotrophs use a process called photosynthesis to create "food" (a nutrient called glucose) from sunlight, carbon dioxide and water.

Plants are the most familiar type of autotroph, but there are many other kinds. Algae, whose larger forms are known as seaweed, are autotrophic. Phytoplankton, tiny organisms that live in the ocean, are also autotrophs. Some types of bacteria are autotrophs. For example, bacteria living in active volcanoes use sulfur compounds to produce their own food. This process is called chemosynthesis.

The second trophic level consists of organisms that eat the producers. These are called primary consumers, or herbivores. Deer, turtles and many types of birds are herbivores. Secondary consumers eat the herbivores. Tertiary consumers eat the secondary consumers. There may be more levels of consumers before a chain finally reaches its top predator. Top predators, also called apex predators, eat other consumers.

Consumers can be carnivores (animals that eat other animals) or omnivores (animals that eat both plants and animals). Omnivores, like people, consume many types of foods. People eat plants, such as vegetables and fruits. We also eat animals and animal products, such as meat, milk and eggs. We eat fungi, such as mushrooms. We also eat algae, in edible seaweeds like nori (used to wrap sushi rolls) and sea lettuce (used in salads).

Detritivores and decomposers are the final part of food chains. Detritivores are organisms that eat nonliving plant and animal remains. For example, scavengers, such as vultures, eat dead animals. Dung beetles eat animal feces.

 Decomposers like fungi and bacteria complete the food chain. They turn organic wastes, such as decaying plants, into inorganic materials, such as nutrient-rich soil. Decomposers complete the cycle of life, returning nutrients to the soil or oceans for use by autotrophs. This starts a whole new food chain.

**Food Chains**

Different habitats and ecosystems provide many possible food chains that make up a food web.

In one marine food chain, single-celled organisms called phytoplankton provide food for tiny shrimp called krill. Krill provide the main food source for the blue whale, an animal on the third trophic level.

In a grassland ecosystem, a grasshopper might eat grass, a producer. The grasshopper might get eaten by
a rat, which in turn is consumed by a snake. Finally, a hawk — an apex predator — swoops down and snatches up the snake.

In a pond, the autotroph might be algae. A mosquito larva eats the algae, and then perhaps a dragonfly larva eats the young mosquito. The dragonfly larva becomes food for a fish, which provides a tasty meal for a raccoon.
Quiz

1. Which BEST describes why autotrophs begin every food chain?
   (A) There are more of them than primary consumers.
   (B) They are the only trophic level that can use the sun's energy to create glucose.
   (C) They get their nutrients from detritivores and decomposers.
   (D) They can reproduce faster than consumers.

2. Which paragraph from the article is BEST illustrated by Image 2?
   (A) For example, grass produces its own food from sunlight. A rabbit eats the grass, then a fox eats the rabbit. When the fox dies, bacteria break down its body, returning it to the soil where it provides nutrients for plants, like grass.
   (B) In one marine food chain, single-celled organisms called phytoplankton provide food for tiny shrimp called krill. Krill provide the main food source for the blue whale, an animal on the third trophic level.
   (C) In a grassland ecosystem, a grasshopper might eat grass, a producer. The grasshopper might get eaten by a rat, which in turn is consumed by a snake. Finally, a hawk — an apex predator — swoops down and snatches up the snake.
   (D) In a pond, the autotroph might be algae. A mosquito larva eats the algae, and then perhaps a dragonfly larva eats the young mosquito. The dragonfly larva becomes food for a fish, which provides a tasty meal for a raccoon.

3. Which animal in a pond food chain would be on the same trophic level as a snake in a grassland ecosystem?
   (A) algae
   (B) mosquito larva
   (C) fish
   (D) raccoon

4. How does Image 1 develop an understanding of trophic levels?
   (A) It shows a detritivore consuming animal remains.
   (B) It shows a consumer eating a producer.
   (C) It shows a producer making its own food.
   (D) It shows a carnivore eating a consumer.

5. Which is an example of an apex predator?
   (A) lion
   (B) giraffe
   (C) mouse
   (D) fox
6 How does the author build an understanding of food chains?
   (A) by describing the categories of organisms found within food chains and then giving examples of food chains
   (B) by describing how individual food chains work and then giving examples of complex food webs within ecosystems
   (C) by showing the reader how each trophic level in a food chain works, starting with the "top" of the food chain
   (D) by showing the reader how food webs can be disrupted if food chains do not work properly

7 How are food webs more complex than food chains?
   (A) Food webs are found in more ecosystems than food chains.
   (B) Food webs are made of many food chains.
   (C) Decomposers are only found in food webs, not in food chains.
   (D) Food chains are made of many food webs.

8 Which sentence from the introduction [paragraphs 1-3] introduces a primary consumer to the reader?
   (A) Every living thing — from one-celled algae to giant blue whales — needs food to survive.
   (B) For example, grass produces its own food from sunlight.
   (C) A rabbit eats the grass, then a fox eats the rabbit.
   (D) When the fox dies, bacteria break down its body, returning it to the soil where it provides nutrients for plants, like grass.
Protecting the Platypus

It was cold at Camp Platypus. The residents of the makeshift encampment huddled, drink steaming cups of tea, and warmed themselves over a wood fire.

Twin Platypuses

It was here, along the Obi Obi Creek in Australia, that protesters tried to stop builders from digging up a platypus habitat to build a supermarket. A habitat is the environment in which an animal lives.

For several years the protesters battled with police, construction workers, and officials from the supermarket chain. In summer 2005 the situation grew more intense as workers began clearing the land.

"We're not moving until we save this place," protester John Woodlands told a reporter.

Odd Duck

Why all the fuss about the platypus? Although the platypus is far from rare, it lives only on the continent of Australia. The animal is an endangered species and is protected under Australian law. It is also a weird-looking critter.

When European explorers reached Australia in the 1600s and 1700s, they first saw this animal with a furry coat, a duck-like bill, four webbed feet, and a flat tail like a paddle. The animal uses its front limbs for swimming. Its tail functions as a rudder.

The platypus acts like an amphibian, at home both on land and in the water. But the platypus is not an amphibian. It is a mammal. Mammals are warm-blooded animals. Most mammals,
such as humans, produce milk. Specifically, the platypus is a mammal known as a monotreme. Unlike most mammals, monotremes lay eggs and provide milk to their young directly through the skin. Only two monotremes exist: the platypus and the echidna (ih-KID-nah), or spiny anteater.

The platypus lives along the banks of eastern Australia's lakes, rivers, ponds, and streams. It uses its bill and its nose to sniff out food at the bottom of the waterways. Its large, flat, furry tail stores fat for the long winters.

Pollution is killing off the species, and the construction of homes and commercial buildings is destroying its habitat.

Construction Proceeds

At Camp Platypus, protesters hoped the supermarket chain would rethink its decision to build the store, but that proved unlikely. Construction was completed. Many protesters promised never to shop at the store.

Nevertheless, although the platypus is an odd-looking creature, it still has a lot of friends around the world.

Platypus Fast Facts

Scientific name: Ornithorhynchus anatinus

Habitat: Streams, rivers, and lakes near the east coast of Australia

Description: Short, dense dark-brown fur; 2-inch-wide bill; hairless, webbed feet; flat, furry tail; 1- to 2-foot-long body

Defense: Males have spurs on their hind feet that contain poisonous venom. The animal's sting can kill a dog.

Reproduction: Females generally lay two eggs at a time. Babies attach themselves to the fur under a mother's belly to drink her milk.
Name: __________________________ Date: ______________

1. The platypus is unusual in many ways. Which of the following statements about the platypus is not true?

   A. The platypus only has three webbed feet.
   B. The platypus lives in Australia.
   C. The platypus lays eggs.
   D. The platypus provides milk to its young directly through the skin.

2. How does the author organize the information in this passage?

   A. The author lists events of a platypus' life in chronological order.
   B. The author identifies the problems facing the platypus and provides some solutions.
   C. The author compares the viewpoints of those who want to save the platypus with those who want to destroy its habitats.
   D. The author describes an effort to save the platypus and then describes the animal in detail.

3. Read the sentences:

   1. "In summer 2005 the situation grew more intense as workers began clearing the land."

   2. "We're not moving until we save this place,' protester John Woodlands told a reporter."

   How does sentence 2 relate to sentence 1?

   A. Sentence 2 supports sentence 1's claim that the situation grew more intense.
   B. Sentence 1 supports sentence 2's claim that John Woodlands would not move.
   C. Sentence 2 contrasts with sentence 1, giving an opposite opinion.
   D. Sentence 2 provides details about the summer of 2005, mentioned in sentence 1.
4. Read the sentences:

"...and a flat tail like a paddle. The animal uses its front limbs for swimming. Its tail functions as a rudder."

The author uses words in these sentences to compare the platypus to a

A. dolphin
B. wooden beam
C. human
D. boat

5. What is this passage mostly about?

A. the effects of platypus protection
B. the difference between Australian and other continents' animals
C. the platypus's unique features and efforts to save them
D. differing viewpoints on the importance of saving the platypus

6. Read the sentence:

"'We're not moving until we save this place,' protester John Woodlands told a reporter."

What does John Woodlands mean? Use evidence from the text to support your answer.

7. Read the sentence:

"Nevertheless, although the platypus is an odd-looking creature, it still has a lot of friends around the world."

What does the author mean? Use evidence from the text to support your answer.
8. The question below is an incomplete sentence. Choose the answer that best completes the sentence.

Many people are trying to save the platypus _________ the supermarket will probably be built anyway.

A. even though
B. while
C. because
D. after
Day 4

1) \[74 \times 25\]

2) If \(4 \times 8 = 32\), then \(400 \times 8 = \_\_\_\_

3) Convert to a fraction.

\[0.4 = \_\_\_\_\_\_

4) Convert to a decimal.

\[\frac{3}{100} = \_\_\_\_\_\_

5) Use powers of ten and/or halves to solve.

\[\_\_\_\_ \times 70 = 2,100\]

\[\_\_\_\_ \times 7 = 210\]

\[\_\_\_\_ \times 7 = 21\]

6) Find the volume (in cm).

7) Find the volume (in cm).

8) Write in expanded form: 459,084

9) Write in expanded notation: 757.167

10) Joshua bought two hundred thirty-three pieces of candy to give to thirty-two of his friends. If he wants to give each friend the same amount, how many pieces would he have left over?
Unlike omnivores and carnivores, autotrophs make their own food

By National Geographic Society, adapted by Newsela staff on 05.09.19
Word Count 717
Level MAX

Venus fly traps are often confused for carnivores, but they are also autotrophs. The bugs they "eat" they mostly use as supplemental nutrition. Their main nutrients are from the sun, water and soil like any other plant. Photo by: Selena NBH/Flickr

An autotroph is an organism that can produce its own food using light, water, carbon dioxide or other chemicals. Because autotrophs produce their own food, they are sometimes called producers.

Plants are the most familiar type of autotroph, but there are many different kinds of autotrophic organisms. Algae, which live in water and whose larger forms are known as seaweed, is autotrophic. Phytoplankton, tiny organisms that live in the ocean, are autotrophs. Some types of bacteria are autotrophs.

Most autotrophs use a process called photosynthesis to make their food. In photosynthesis, autotrophs use energy from the sun to convert water from the soil and carbon dioxide from the air into a nutrient called glucose. Glucose is a type of sugar. The glucose gives plants energy. Plants also use glucose to make cellulose, a substance they use to grow and build cell walls.
All plants with green leaves, from the tiniest mosses to towering fir trees, synthesize, or create, their own food. They do this through photosynthesis. Algae, phytoplankton and some bacteria also perform photosynthesis.

Some rare autotrophs produce food through a process called chemosynthesis, rather than through photosynthesis. Autotrophs that perform chemosynthesis do not use energy from the sun to produce food. Instead, they make food using energy from chemical reactions, often combining hydrogen sulfide or methane with oxygen.

Organisms that use chemosynthesis live in extreme environments, where the toxic chemicals needed for oxidation are found. For example, bacteria living in active volcanoes oxidize sulfur to produce their own food. At Yellowstone National Park in the U.S. states of Wyoming, Idaho and Montana, bacteria capable of chemosynthesis have been found in hot springs.

Bacteria that live in the deep ocean, near hydrothermal vents, also produce food through chemosynthesis. A hydrothermal vent is a narrow crack in the seafloor. Seawater seeps down through the crack into hot, partly melted rock below. The boiling-hot water then circulates back up into the ocean, loaded with minerals from the hot rock. These minerals include hydrogen sulfide, which the bacteria use in chemosynthesis.

Autotrophic bacteria that produce food through chemosynthesis have also been found at places on the seafloor called cold seeps. At cold seeps, hydrogen sulfide and methane seep up from beneath the seafloor and mix with the ocean water and dissolved carbon dioxide. The autotrophic bacteria oxidize these chemicals to produce energy.

**Autotrophs In The Food Chain**
To explain a food chain — a description of which organisms eat which other organisms in the wild — scientists group organisms into trophic, or nutritional, levels. There are three trophic levels. Because autotrophs do not consume other organisms, they are the first trophic level.

Autotrophs are eaten by herbivores, organisms that consume plants. Herbivores are the second trophic level. Carnivores, creatures that eat meat, and omnivores, creatures that eat all types of organisms, are the third trophic level.

Herbivores, carnivores and omnivores are all consumers. They consume nutrients rather than making their own. Herbivores are primary consumers. Carnivores and omnivores are secondary consumers.

All food chains start with some type of autotroph (producer). For example, autotrophs such as grasses grow in the Rocky Mountains. Mule deer are herbivores (primary consumers), which feed on the autotrophic grasses. Carnivores (secondary consumers) such as mountain lions hunt and consume mule deer.

In hydrothermal vents, the food chain's producer is autotrophic bacteria. Primary consumers such as snails and mussels consume the autotrophs. Carnivores such as octopus consume the snails and mussels.

An increase in the number of autotrophs will usually lead to an increase in the number of animals that eat them. However, a decrease in the number and variety of autotrophs in an area can devastate the entire food chain. If a wooded area burns in a forest fire or is cleared to build a shopping mall, herbivores such as rabbits can no longer find food. Some of the rabbits may move to a better habitat. Some may die. Without the rabbits, foxes and other meat-eaters that feed on them also lose their food source. They, too, must move to survive.
Quiz

1. Which statement is true?
   (A) All autotrophs use energy from sun to make food.
   (B) All autotrophs need a source of energy to survive.
   (C) All autotrophs manufacture their own energy.
   (D) All autotrophs use chemical energy to make food.

2. What does the phrase “extreme environments” suggest as it is used in the sentence below?

   Organisms that use chemosynthesis live in extreme environments, where the toxic chemicals needed for oxidation are found.

   (A) that the organisms live in places where toxins are scarce
   (B) that the organisms live off the high heat of the sun
   (C) that the organisms live far away and by themselves
   (D) that the organisms live in harsh conditions

3. Which resources MAY be used by autotrophs to make their food?

   1. oxygen
   2. glucose
   3. soil
   4. carbon dioxide
   5. hydrogen sulfide

   (A) 1 and 2
   (B) 2 and 3
   (C) 3 and 4
   (D) 4 and 5

4. Read the sentence from the section “Autotrophs In The Food Chain.”

   An increase in the number of autotrophs will usually lead to an increase in the number of animals that eat them. However, a decrease in the number and variety of autotrophs in an area can devastate the entire food chain.

   Which of the following words, if it replaced the word “devastate” in the sentence above, would change the meaning of the sentence?

   (A) ruin
   (B) destroy
   (C) wreck
   (D) attack
Which BEST describes trophic relationships in ecosystems?

(A) A primary consumer can make its own food, while a producer cannot.
(B) A primary consumer eats other organisms, while a secondary consumer eats it.
(C) A secondary consumer can make its own food, while a primary consumer cannot.
(D) A producer can make its own food, while a primary consumer cannot.

Which selection from the article is BEST illustrated by Image 3?

(A) Most autotrophs use a process called photosynthesis to make their food.
(B) In photosynthesis, autotrophs use energy from the sun to convert water from the soil and carbon dioxide from the air into a nutrient called glucose.
(C) Plants also use glucose to make cellulose, a substance they use to grow and build cell walls.
(D) Some rare autotrophs produce food through a process called chemosynthesis, rather than through photosynthesis.

Which of the following BEST explains how matter and energy cycle through ecosystems?

(A) Animals manufacture energy from sunlight by eating plants.
(B) Animals grow larger by soaking in energy from sunlight.
(C) Animals use sunlight to boost up their energy levels.
(D) Animals eat plants that have used energy from sunlight.

Based on the images and the article, what conclusion can be made?

(A) Autotrophs can perform both photosynthesis and chemosynthesis.
(B) There are various types of autotrophs that can be found in many places.
(C) Autotrophs use the glucose that they produce as energy to grow.
(D) There are various types of autotrophs that can make food without the sun.
Flu Frenzy

What is a three-letter word for trouble? Flu! That is short for influenza (in-floo-EN-zah). The flu is caused by a virus that can be passed easily from person to person. People who catch the virus often have fevers, sore muscles, and coughs.

Doctors say the best way to keep from getting the virus is to get a flu shot. However, in 2004 there weren't enough flu shots for everyone. Health experts found that one company's flu shots weren't safe. That company was supposed to supply the United States with half of the 100 million doses needed.

This year [2004], there were not enough flu shots for everyone. The people at highest risk received a flu shot first.

Hang in there! The flu strikes the United States for only part of the year. Flu season usually runs from November to March.

Germs! Ick!

Despite the short supply of flu shots, there are ways to stay flu-free. To keep the virus away, practice healthful habits.

Wash your hands often with soap and water.

Avoid touching your eyes, nose, and mouth. Germs can easily enter your body there.

Don't share your drinks or eating utensils.

Get plenty of sleep.
1. When the author writes that flu is a "three-letter word for trouble," what does the author probably mean?  
   A. Your parents might punish you for getting the flu.  
   B. You could be suspended from school for having the flu.  
   C. The flu is something that causes problems.  
   D. "Flu" is a bad word.

2. Read these sentences from the text:

"Hang in there! The flu strikes the United States for only part of the year. Flu season usually runs from November to March."

Based on these sentences, what does the phrase "hang in there" probably mean?  
   A. Don't lose hope and give up!  
   B. Hang up a picture!  
   C. Just do what everybody else is doing!  
   D. Help other people out!

3. Read these sentences from the text:

"Hang in there! The flu strikes the United States for only part of the year. Flu season usually runs from November to March."

Based on these sentences, what does the phrase "the flu strikes the United States" probably mean?  
   A. The flu plans an attack against the United States.  
   B. People in the United States get the flu.  
   C. The flu aims for the United States but misses.  
   D. People in the United States do not notice the flu.
4. How many shots was the company that made unsafe flu shots supposed to give out?
   A. 100 million shots.
   B. 50 million shots.
   C. 50 shots.
   D. 1 million shots.

5. Based on the information in the article, what is influenza?
Day 5

1) \[ \begin{array}{c} 25 \\ \times \ 57 \end{array} \]

2) If \( 1 \times 3 = 3 \), then \( 10 \times 3 = \) __________

3) Convert to a fraction.
   \[ 0.16 = \] __________

4) Convert to a decimal.
   \[ \frac{23}{100} = \] __________

5) Use powers of ten and/or halves to solve.
   \[ \underline{\phantom{0}} \times 90 = 3,600 \]
   \[ \underline{\phantom{0}} \times 9 = 360 \]
   \[ \underline{\phantom{0}} \times 9 = 36 \]

6) Find the volume (in cm).
   \[ \begin{array}{c} \text{9} \\ \swarrow \end{array} \]

7) Find the volume (in cm).
   \[ \begin{array}{c} \text{2} \\ \swarrow \end{array} \]

8) Write in expanded form: 47,066
   __________

9) Write in expanded notation: 36.31
   __________

10) At the carnival, thirty-one friends bought three hundred seventy-seven tickets. If they wanted to split all the tickets so each person got the same amount, how many more tickets would they need to buy?
The ocean's conveyor belt moves underwater currents

By National Geographic Society on 04.19.19
Word Count 1,262
Level MAX

The Antarctic Circumpolar Current and overturning make the waters around Antarctica an ideal habitat for many marine mammals. Many types of whales, for instance, migrate to the waters around Antarctica every year to feed on phytoplankton and other tiny sea creatures churned up by overturning waters. Here is a humpback whale in Antarctica. They dive deep for food. Photo from Getty Images.

The ocean is in constant motion. You can see this for yourself when you watch waves crash onto shore. If you go swimming, you may even feel an ocean current pulling you along. Surface currents, such as the Gulf Stream, move water across the globe like mighty rivers. Surface currents are powered by the Earth's various wind patterns. The ocean also has deep underwater currents. These are more massive but move more slowly than surface currents. Underwater currents mix the ocean's waters on a global scale. A process known as thermohaline circulation, or the ocean conveyor belt, drives these deep underwater currents.

Thermohaline Circulation
Thermohaline circulation moves a massive current of water around the globe, from northern oceans to southern oceans, and back again. Currents slowly turn over water in the entire ocean, from top to bottom. It is somewhat like a giant conveyor belt, moving warm surface waters downward and forcing cold, nutrient-rich waters upward.

The term thermohaline combines the words thermo (heat) and haline (salt), both factors that influence the density of seawater. The ocean is constantly shifting and moving in reaction to changes in water density. To best understand ocean water dynamics, or how water moves, there are a few simple principles to keep in mind:

- Water always flows down toward the lowest point.
- Water's density is determined by the water's temperature and salinity (amount of salt).
- Cold water is denser than warm water.
- Water with high salinity is denser than water with low salinity.
- Ocean water always moves toward an equilibrium, or balance. For example, if surface water cools and becomes denser, it will sink. The warmer water below will rise to balance out the missing surface water.

**Ocean Layers**

The ocean can be divided into several layers. The top layer of the ocean collects the warmth and energy of sunlight, while the bottom layers collect the rich, nutrient-filled sediment of decayed plant and animal matter.

The top ocean layer is about 100 meters (330 feet) deep. Enough sunlight reaches that depth for organisms, such as phytoplankton, to carry out photosynthesis. Phytoplankton makes up the first part of the marine food chain and is essential to all ocean life.

The middle, or barrier, layer is called the thermocline. The ocean's temperature and density change very quickly at this layer. The barrier layer is about 200 to 1,000 meters (1,600 to 3,300 feet) deep.

Below the barrier layer is the bottom layer, referred to as the deep ocean. It averages about 3 kilometers (2 miles) in depth.

**The Conveyor Belt**

Scientists have long understood how nutrients move from the ocean's surface to its depths. As phytoplankton die, they sink and collect on the ocean floor. But if nutrients are continually sinking to the depths of the ocean, how are surface waters replenished with nutrients? Scientists discovered that in certain regions of the ocean, the nutrient-rich deep water was upwelling, or rising to the surface.

Scientists realized that the ocean was slowly turning over from top to bottom in a continuous global loop. Like a conveyor belt, thermohaline circulation moves nutrients from one part of the
Let's start in the northern Atlantic Ocean and follow the conveyor belt as it moves water around the Earth.

In the seas near Greenland and Norway, the water is cold. Some of it freezes, leaving salt behind. The cold, salty water becomes dense and sinks to the ocean floor. This water is known as the North Atlantic Deep Water, and it is one of the primary driving forces of the conveyor belt.

The force of the sinking cold water pushes the existing North Atlantic Deep Water south, toward Antarctica, in a slow-moving underwater current. When it reaches Antarctica, the water flows east with the Antarctic Circumpolar Current, a massive and powerful current that circles the continent.

Parts of the Antarctic Circumpolar Current flow northward and move into the Indian and Pacific Oceans. As the deep, cold water travels through the oceans, it mixes with warmer water. The water eventually becomes warm enough to rise, creating a slow upwelling that brings nutrients to the surface.

In the Pacific, the surface water flows through the Indonesian islands into the Indian Ocean, around southern Africa, and back into the Atlantic. The warm waters eventually travel back to the North Atlantic Deep Water, completing the global loop.

It takes about 500 years for the conveyor belt to turn over the ocean's waters and make one complete trip around the Earth.

**The North Atlantic Deep Water**

The deep water in the Greenland Sea flows along toward the lowest point on the floor of the North Atlantic Ocean. The water collects in a basin, the same way river water flows into a lake or pond. The basin is the North Atlantic Deep Water.

Other seas feed their cool ocean waters into the North Atlantic Deep Water. In the Labrador Sea, off the coast of northeastern Canada, the cold water sinks to depths of 3,000 meters (9,900 feet) at a rate of 10 centimeters (about 4 inches) per second.

Another source of the North Atlantic Deep Water is the Mediterranean Sea. As the warm surface water of the Mediterranean evaporates, the water grows saltier and denser. This water exits the Mediterranean through the Strait of Gibraltar, the narrow channel between Spain and Morocco that connects the sea to the Atlantic Ocean. The Mediterranean's deepwater pours into the Atlantic at a rate of 2 meters (about 6.5 feet) per second and helps raise the overall salinity of the Atlantic Ocean.

**The Antarctic Circumpolar Current**

When the conveyor belt reaches the southern part of the globe, it is driven back to the northern oceans by the Antarctic Circumpolar Current.

Western winds are very strong in the Antarctic. They help create the intensely powerful Antarctic Circumpolar Current. The current moves a lot of water very quickly around the continent of Antarctica — about 140 million cubic meters (4.9 billion cubic feet) of water per second.
Overturning occurs in the waters around Antarctica. Overturning happens when the extremely frigid Antarctic surface water sinks. This forces the nutrient-rich deep water to rise. Overturning moves massive amounts of water. An estimated 35 to 45 million cubic meters (between 1.2 and 1.6 billion cubic feet) of water per second are continually moved from the ocean bottom to the surface.

The Antarctic Circumpolar Current and overturning make the waters around Antarctica an ideal habitat for many marine mammals. Many types of whales, for instance, migrate to the waters around Antarctica every year to feed on phytoplankton and other tiny sea creatures churned up by overturning waters.

**Climate Change**

Ocean temperature plays a key role in the conveyor belt, so a change in the Earth’s climate might have drastic effects on the system. If one part of the conveyor belt were to break down — if cold water is not lifted to the surface in upwelling, for instance — nutrients will not be distributed to start the food chain. Organisms, such as phytoplankton, need those nutrients to thrive. Severe climate change slows phytoplankton from forming the first link in the marine food chain. If the first link is threatened, all life in the oceans is threatened.

URL: https://www.nationalgeographic.org/encyclopedia/ocean-conveyor-belt/
1. According to the article, how does the North Atlantic Ocean feed the thermohaline circulation?
   (A) It is fueled by strong western winds that force surface currents to mix with underwater currents, which sink and move southward.
   (B) Its denser water moves from the top layer of the ocean toward the bottom layer as it flows west toward the Pacific Ocean.
   (C) Its geographic position in the Northern Hemisphere provides the cooler temperatures that are required for the process.
   (D) It is home to a deep basin that collects cold water before it is forced southward in a continuous cycle around the globe.

2. Which of the following MOST DIRECTLY influences the maintenance of the marine food chain?
   (A) the supply of phytoplankton
   (B) the force of moving water
   (C) the density of seawater
   (D) the ocean's salinity

3. Read the following paragraph from the section "The Conveyor Belt."

   Scientists have long understood how nutrients move from the ocean's surface to its depths. As phytoplankton die, they sink and collect on the ocean floor. But if nutrients are continually sinking to the depths of the ocean, how are surface waters replenished with nutrients? Scientists discovered that in certain regions of the ocean, the nutrient-rich deep water was upwelling, or rising to the surface.

   Which phrase from the paragraph helps you to understand that ocean health involves steady restoration?
   (A) move from the ocean's surface
   (B) collect on the ocean floor
   (C) replenished with nutrients
   (D) nutrient-rich deep water

4. Read the following selection from the section "The North Atlantic Deep Water."

   As the warm surface water of the Mediterranean evaporates, the water grows saltier and denser. This water exits the Mediterranean through the Strait of Gibraltar, the narrow channel between Spain and Morocco that connects the sea to the Atlantic Ocean.

   Which answer choice is the BEST definition of the word "evaporates" as used in the selection?
   (A) to become saltier
   (B) to lose moisture
   (C) to condense
   (D) to dissolve
Directions: On the first day of school closures, students should complete activities for each day.

- Reading and math daily activities

<table>
<thead>
<tr>
<th>Day</th>
<th>Reading</th>
</tr>
</thead>
</table>
| Day 1 | - Read the Read Works article Day 1. Answer the vocabulary and accompanying questions.  
|       | - Write an explanatory paragraph explaining to a friend how to have fun at home when school is closed for the day. |

<table>
<thead>
<tr>
<th>Math</th>
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<tbody>
<tr>
<td>- Complete Day 1 math problems. Show your thinking.</td>
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<tr>
<th>Social Studies/Science</th>
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<tbody>
<tr>
<td>- Read Day 1 Science article. Use the article to answer questions.</td>
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<tr>
<th>Day 2</th>
<th>Reading</th>
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|       | - Read the Read Works article Day 2. Answer the vocabulary and accompanying questions.  
|       | - Write a short essay that compares and contrasts two kinds of vegetables. |

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<td>- Complete Day 2 math problems. Show your thinking.</td>
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<td>- Read Day 2 Science article. Use the article to answer questions.</td>
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<thead>
<tr>
<th>Day 3</th>
<th>Reading</th>
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</table>
|       | - Read the Read Works article Day 3. Answer the vocabulary and accompanying questions.  
|       | - Think about a person you respect. Write a short essay that names the person, tells why you respect that person, and gives examples to support your respect. |

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<th>Math</th>
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<tr>
<td>Day 4</td>
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<tr>
<td>• Read the Read Works article Day 4. Answer the vocabulary and accompanying questions.</td>
</tr>
<tr>
<td>• You have been given permission to plan a party. Why are you having a party? Who will come? What will the party be like? Write a description of the party you would plan.</td>
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<td>• Complete Day 4 math problems. Show your thinking.</td>
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<thead>
<tr>
<th>Day 5</th>
<th>Reading</th>
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<tbody>
<tr>
<td>• Read the Read Works article Day 5. Answer the vocabulary and accompanying questions.</td>
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<tr>
<td>• Write an opinion paragraph about what animal you believe makes the best pet. Be sure to include reasons and evidence in your paragraph.</td>
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<tr>
<td>• Complete Day 5 math problems. Show your thinking.</td>
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<thead>
<tr>
<th>Day 6</th>
<th>Reading</th>
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<tbody>
<tr>
<td>• Read the Read Works article Day 6. Answer the vocabulary and accompanying questions.</td>
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<tr>
<td>• Your family members want to begin exercising daily. How</td>
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do you feel about this? Write a short essay that tells your opinion about daily exercise.

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<th>Math</th>
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<td>• Complete Day 6 math problems. Show your thinking.</td>
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<th>Social Studies/Science</th>
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<tr>
<td>• Read Day 6 Science article. Use the article to answer questions.</td>
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<tr>
<td>• Complete Day 7 math problems. Show your thinking.</td>
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<th>Social Studies/Science</th>
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<tr>
<td>• Read Day 7 Science article. Use the article to answer questions.</td>
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<th>Math</th>
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<tr>
<td>• Complete Day 8 math problems. Show your thinking.</td>
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<th>Social Studies/Science</th>
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<tr>
<td>• Read Day 8 Science article. Use the article to answer questions.</td>
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<th>Day 9</th>
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<tr>
<td>Day 10</td>
<td>Reading</td>
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<tr>
<td>- Read the Read Works article Day 10. Answer the vocabulary and accompanying questions.</td>
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<tr>
<td>- One morning, you walk into the bathroom to get ready for school and cannot see yourself in the mirror. You are invisible! Write a story about what your day would be like.</td>
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<tr>
<td>- Complete Day 10 math problems. Show your thinking.</td>
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<th>Social Studies/Science</th>
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<tr>
<td>- Read Day 10 Science article. Use the article to answer questions.</td>
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Couch Potato Central

In 2007, a report highlighted a "big" problem in the United States. People had been gaining weight—and they were getting larger at an alarming rate. According to the U.S. Centers for Disease Control and Prevention, approximately 100 million adults in the United States were obese, or severely overweight.

It wasn't just adults who had expanding waistlines. Over the previous 20 years, the percentage of overweight kids in the United States had doubled. When the report was released, about 25 million kids were overweight. That was one out of every three kids.

Being overweight can lead to serious health problems, such as heart disease and diabetes, later in life. "Obesity...is now the most serious dietary problem affecting the health of American children," said nutrition expert Marion Nestle.

Tipping the Scales

So why were so many people packing on the pounds? People gain weight when they take in more calories than they use up through activity. A calorie is a measure of the amount of energy from food.
Exercise burns calories, but kids weren't moving as much as kids did in the past. Studies showed that kids were spending more time than ever before watching television, playing video games, and sitting at computers.

Some schools had also dropped recess in favor of more classroom time. Other schools had cut back on their physical education programs.

At the same time, portions at many fast-food restaurants had become supersized. In 1957, the average hamburger weighed 1 ounce and had 210 calories. In 2007, it had grown to 6 ounces and contained 618 calories.

Many people couldn't resist the larger portion sizes and had included more fries, burgers, and other fast foods in their diets. On average, it was estimated that an American kid ate a fast-food meal once every three days.

Megameals can't take all the blame. Kids are exposed to more than 10,000 television ads for candy, soft drinks, and other sugary snacks. Very few television ads promote healthful foods, such as fruits and vegetables.

Battling the Bulge

To help fight the problem, the U.S. government has issued new guidelines for healthful eating. The guidelines recommend that kids exercise for at least 60 minutes a day and eat more fruits, vegetables, and whole grains.

Parents, schools, and health officials have also started to help kids battle the bulge. Even some fast-food restaurants have been working to make their meals more healthful.

Schools in California, Texas, and New York toughened their junk food policies. They
have banned soft drinks and other junk food. Candy and other sugary snacks in school vending machines have been replaced with more healthful choices, such as nuts, bottled water, and granola bars. Schools have also reworked their lunch programs to include more fruits and vegetables.

In addition, some schools have been motivating couch potatoes to get up and move. Those schools have found new ways of encouraging physical activity in students. In Hortonville, Wisconsin, gym classes have been teaching kids that exercise can be fun. Kids go in-line skating and dance to videos. One Hortonville school even raised money for a rock-climbing wall.

Are these fun programs working? Eleven-year-old Logan Beck from Wisconsin thinks so. He says that the mix of fun things makes him "more active."

Many schools have changed their lunch programs to include more fruits and vegetables.
1. According to the passage, about how many kids were overweight in the United States in 2007?
   A. 100 million
   B. 25 million
   C. 20 million
   D. 10,000

2. Being severely overweight can lead to serious health problems for kids later in life. Which of the following does the passage suggest as a solution to kids for keeping their bodies fit?
   A. eat more fruits, vegetables, and whole grains
   B. get at least 60 minutes of exercise each day
   C. remove soft drinks and junk food from school vending machines
   D. all of the above

3. Which of the following conclusions about the obesity problem is supported by this passage?
   A. Many factors contribute to the obesity problem.
   B. Supersized portions at fast-food restaurants are completely to blame.
   C. American kids don't eat that much fast food.
   D. Ads on TV will start promoting healthy foods.

4. Read the following sentence from the passage: "Many people couldn't resist the larger portion sizes and had included more fries, burgers, and other fast foods in their diets."
   In this sentence, the word resist means
   A. taste
   B. stay away from
   C. widely accept
   D. cook
5. Which statement best describes the central idea of this passage?
   A. Some schools have toughened their junk food policies.
   B. Obesity has been a growing problem in the United States.
   C. Portions at many fast-food restaurants have gotten bigger.
   D. The U.S. government issued guidelines for healthful eating.

6. Why had obesity become such a big problem in the United States?

7. How might schools that find ways to encourage fun physical activity help kids lead more active lives in the future? Cite evidence from the text to support your answer.

8. The question below is an incomplete sentence. Choose the word that best completes the sentence.
   The percentage of overweight kids in America had doubled between 1987 and 2007, ____ the U.S. government issued guidelines for healthful eating and exercise.
   A. before
   B. so
   C. after
   D. next
Day 6

1) Write as a mixed number.
\[
\frac{49}{8} = \quad \text{3.91} \quad \text{3.98}
\]

2) Use <, > or = to compare.

3) Which number sentence is true?
   A. 0.96 < 0.69
   B. 3.91 > 3.19
   C. 3.64 < 3.46
   D. 1.39 > 1.93

4) Fill in the blank to complete the pattern.
   \[
   \frac{2}{9} = \frac{4}{18} = \frac{8}{36} = \frac{10}{45} = \frac{12}{54}
   \]

5) Answer as a mixed number (if possible).
   \[
   \frac{1}{2} + \frac{2}{3} =
   \]

6) Which option shows the numbers ordered smallest to largest?
   A. 9.92, 10, 9.9, 9.04
   B. 5, 5.1, 5.52, 5.13
   C. 2.8, 2.81, 2.01, 2.39
   D. 2, 2.35, 2.4, 2.43

7) \(\frac{2}{6} \times 4 = \)

8) Which choice best shows the shaded amount?
   - A. 900
   - B. 9
   - C. 90
   - D. 0.9

9) A scientist was measuring the daily sodium values of different foods. If a soda has 36.44% the daily value and fries have 40.6% the daily value, how much would they have together?

10) A recipe called for using \(10 \frac{3}{7}\) cups of flour before baking and another \(9 \frac{2}{3}\) cups after baking. What is the total amount of flour needed in the recipe? Answer as a mixed number.
How energy transfers and transforms

By National Geographic Society, adapted by Newsela staff on 09.12.19

Word Count 670
Level 730L

Image 1. Newton's cradle is a device that demonstrates the transfer of kinetic energy. Photo from: Wikimedia Commons

Energy, or the power to do work, cannot be created or destroyed. However, energy can change form. It can also move between objects.

A common example of energy moving between objects, called energy transfer, is the transfer of kinetic energy from a moving object to a motionless object. Kinetic energy is the energy of motion. When a bat hits a ball on a tee, some of the bat's kinetic energy transfers to the ball. However, the energy stays in the same form. The ball now has kinetic energy and begins moving.

Thermal energy, or heat, is related to energy from temperature. When something is heated, its temperature rises. That's because its molecules move faster. Temperature measures the "hotness" or "coldness" of an object. "Heat" refers to thermal energy moving from a hotter system to a cooler one. Thermal energy transfers in three ways: conduction, convection and radiation.

Conduction is when thermal energy moves between molecules that are touching each other. If you place a metal spoon in boiling water, the end not touching the water gets hot. This happens because metal is an excellent conductor. Heat travels through it easily. Some materials, such as
wood, are poor conductors. Heat does not travel through them easily. They are known as insulators.

**Energy Can Change Form**

Convection only happens in liquids and gases. When water is boiled on a stove, molecules at the bottom of the pot are closest to the heat. They get thermal energy first. They move faster and spread out. This means there are fewer molecules at the bottom of the pot. These molecules rise. They are replaced at the bottom by cooler, denser water. These steps repeat. They create a current of molecules sinking, heating up, rising, cooling down and sinking again.

The third type of heat transfer is called radiation. It is very important to life on Earth. With radiation, a heat source does not have to touch the object being heated. Radiation can even move heat through the emptiness of space. Nearly all thermal energy on Earth comes from the sun. It travels in the form of energy waves, such as light. Materials on Earth take in these waves. They use them for energy or reflect them into space.

Energy can also change form. This is called transformation. For example, a ball on a hill has stored energy because of its position. This energy is called gravitational potential energy. It is the ability of an object to do work because of its position in a gravitational field. The higher on the hill this ball is, the more gravitational potential energy it has. When it rolls down the hill, that potential energy changes into kinetic energy.

The ball's kinetic energy is changed into heat by the opposing force of friction. Friction is the force resisting objects sliding against each other. The ball stops at the bottom of the hill because friction transforms all its kinetic energy into heat. As with energy transfers, the amount of energy stays the same in transformations.

**Energy On A Sand Dune**

In nature, energy transfers and transformations happen constantly. Look at sand dunes in a coastal environment.

Thermal energy shines from the sun. It heats the land and ocean. However, water heats more slowly than land. The temperature difference creates a convection current. This current appears as wind.

This wind has kinetic energy. It transfers kinetic energy to sand by carrying it short distances. If the moving sand hits something, it stops because of the friction created. Its kinetic energy is changed into heat energy. As sand builds up, these impacts can create dunes.

Sand dunes provide a special environment. Plants grow there. They use light energy to change water and carbon dioxide into energy. That energy is stored in sugar. When an animal eats the plant, it uses the stored energy to heat its body and move around. This transforms the sugar's energy into kinetic and heat energy.

Energy transfers and transformations happen constantly. They allow life to exist.
Read the following selection from the section "Energy Can Change Form."

The ball's kinetic energy is changed into heat by the opposing force of friction. Friction is the force resisting objects sliding against each other. The ball stops at the bottom of the hill because friction transforms all its kinetic energy into heat. As with energy transfers, the amount of energy stays the same in transformations.

Based on this selection, choose the statement that is TRUE.

(A) Friction is a force that causes moving objects to stop.
(B) Energy is lost when friction stops it with heat.
(C) Friction is a force that keeps objects from rolling down hills.
(D) Energy is present in moving objects but not stopped ones.

Which selection from the article helps the reader to understand that heat is a form of energy?

(A) When something is heated, its temperature rises. That's because its molecules move faster.
(B) Temperature measures the "hotness" or "coldness" of an object.
(C) "Heat" refers to thermal energy moving from a hotter system to a cooler one.
(D) Thermal energy transfers in three ways: conduction, convection and radiation.

How does wind happen?

(A) Thermal energy from the sun travels to Earth because of radiation. Water heats more slowly than land, and the difference in temperature between land and water creates a convection current in the air.
(B) Heat from the sun travels to Earth because of energy transformation. Hot air moves to create wind because of energy transfers.
(C) Thermal energy from the sun travels to Earth because of convection. Water heats more slowly than land, and the difference in temperature between land and water creates a conduction current in the air.
(D) Heat from the sun travels to Earth because of energy transfer. Hot air moves to create wind because of kinetic energy.

Complete the sentence.

Placing a metal spoon in boiling water causes _____.

(A) thermal energy to transform because of radiation
(B) thermal energy to transfer because of conduction
(C) thermal energy to transfer because of convection
(D) thermal energy to transform because of conduction
Paradise Lost

Can the Amazon Rain Forest Be Saved From Destruction?

Bright-colored scarlet macaws rest on forest branches. Howler monkeys leap from tree to tree. Endangered jaguars slink through the thick brush. Those are just a few of the thousands of animals that call the Amazon rain forest home.

In a tropical rain forest, such as the Amazon, the region is warm and has heavy rainfall. The Amazon is the largest rain forest in the world. It covers most of northern Brazil, in South America.

Farmers, however, are rapidly destroying this lush landscape. They are cutting and burning trees to make room for their soybean fields and cattle ranches.

In 2004, deforestation in the Amazon was the second-worst ever, according to Brazil’s government. Deforestation occurs when loggers cut down trees for farms, homes, or roads. The government said loggers destroyed an area of land slightly larger than New Hampshire.

Cause for Concern

Why should we worry about a rain forest in South America? Deforestation reduces the rain forest's biodiversity, or the variety of plants and animals in a particular area. The Amazon is one of the richest areas of the world in animal and plant variety. It is home to the biggest flower in the world, a bird-eating spider, and a monkey the size of a toothbrush.

Scientists have identified only a small number of all species that live in the rain forest. As loggers and farmers destroy the forest, animals and plants may become extinct before they are discovered.

Deforestation affects people, too. Many of the foods, spices, and medicines people need come from the rain forest.

Without the Amazon rain forest, life on Earth would have a hard time existing. The Amazon's plants and trees clean the air by breathing in carbon dioxide and exhaling oxygen. Too much carbon dioxide in the air is harmful to humans. Carbon dioxide is also a greenhouse gas. Greenhouse gases trap the sun's heat close to Earth. Without the trees in the rain forest, Earth's climate would get much hotter.
Why Now?

Human activity is mainly to blame for the destruction of the rain forest. Loggers illegally chop down trees for timber. Construction workers burn vast portions of the jungle to build new roads and farms.

"The single most important factor contributing to forest loss is population growth in Brazil," scientist Jim Bowyer told Senior Edition. "Almost 2 million people make the forest their home. All these people need land for farming and wood for heat and cooking. They are looking for a way to survive."

Fixing the Problem

Stopping the destruction of the rain forest is not an easy task. Some people think that Brazil’s government is not doing enough to stop deforestation. Ranchers and farmers think it is unfair for others to tell them that they can’t use the rain forest for their own livelihood. Scientists predict that if deforestation continues at its current rate, the rain forest may survive only another 40 to 50 years.

"We need to address the real causes of deforestation, like poverty and population growth," says Bowyer. "Solutions need to involve the very people who destroy the forest."
1. When Bower says, "Solutions need to involve the very people who destroy the forest," he is referring to
   A. the government.
   B. ranchers and farmers.
   C. the reader.
   D. scientists.

2. In order to stop deforestation, the government of Brazil could
   A. gather up all the rain forest animals put them in the zoo.
   B. create laws that prohibit cutting down trees.
   C. encourage more people to live in the rain forest.
   D. build more ranches and farms.

3. The types of human activity that endanger rainforests include
   A. breathing and eating.
   B. trapping the sun's heat.
   C. farming, logging, road building.
   D. making medicines and foods.

4. People that live in the rain forest probably eat
   A. small amounts because they are poor.
   B. food brought in from other countries.
   C. at the many restaurants being built.
   D. the plants and animals of the rain forest.

5. Using the map, list the countries that include part of the Amazon rain forest.
Day 7
1) Write as a mixed number.
\[ \frac{10}{3} = \]

2) Use <, > or = to compare.
\[ 9.37 \quad 9.81 \]

3) Which number sentence is true?
A. 1.57 = 1.75  
B. 0.26 = 0.62  
C. 2.56 > 2.65  
D. 2.06 < 2.6

4) Fill in the blank to complete the pattern.
\[ \frac{1}{3} = \frac{2}{6} = \frac{4}{12} = \frac{5}{15} = \frac{6}{18} \]

5) Answer as a mixed number (if possible).
\[ \frac{2}{5} + \frac{1}{3} = \]

6) Which option shows the numbers ordered largest to smallest?
A. 2.79, 2.45, 2.4, 2.33  
B. 3.34, 4, 3.79, 3.8  
C. 4.67, 4.69, 4.17, 4.2  
D. 2.42, 2.58, 2.4, 2.71

7) \[ \frac{3}{5} \times 5 = \]

8) Which choice best shows the shaded amount?
A. 81  
B. 810  
C. 0.81  
D. 8.1

9) Brandon was training for a marathon. On his first day he ran 2.20 kilometers. On the second day he ran 2.3 kilometers. How far did he run altogether?

10) A chef bought \( 8 \frac{4}{5} \) pounds of carrots. If he later bought another \( 5 \frac{2}{5} \) pounds of carrots, what is the total weight of carrots he bought? Answer as a mixed number.
Ten interesting things about energy

By NASA.gov, adapted by Newsela staff on 02.17.17
Word Count 980
Level 640L

Water rushes through a dam in Georgia. Inside the dam is a hydropower plant. It uses the water's energy to produce electricity. Photo by: U.S. Army Corps of Engineers.

Energy is the ability to do work. Another word for energy is "power." It is what makes things move, work and grow.

Energy powers the lights in our schools and homes. It is also fuel for our cars and buses.

Most of our energy comes from materials in the earth, such as coal and oil. These are nonrenewable sources of energy. This means once we use all of them, they are gone forever.

Today, we are learning more about renewable energy. Wind, water and sunlight are examples of renewable energy sources. If we can use these sources to power our lives, we will always have energy.

Here are 10 fascinating facts about energy.

**Always Turn Off lights When You Leave The Room**

You should always turn off the light when you leave a room. It saves energy.
However, this is not true for special light bulbs called CFLs. Turning these bulbs on and off too many times shortens their lifespans. You should turn them off only if you’ll be gone for 15 minutes or more. If you’ll be right back, you can leave them on.

**Coal Is King, But Not Everywhere**

In the United States, coal makes almost half of our electricity.

First, coal is burned in a power plant. The heat makes steam. Then, this steam moves a turbine and generates electricity.

Burning coal is harmful to the planet. Coal plants make a gas called carbon dioxide. It is one of the main causes of global warming.

Global warming is the rise of Earth’s temperature. This changes our planet forever. One example is making sea levels rise. Global warming is harmful to animals, plants and people, too.

Not all U.S. states depend on coal. It differs from state to state. Almost all electricity in West Virginia is generated from coal. But almost none of the electricity in California is generated from coal.

**Daylight Saving Time Is Good For The Planet**

In many places, people move the time on their clocks forward one hour every spring. This is called daylight saving time. It moves an hour of daylight to the end of the day. When the day is longer, people use less artificial light. This saves energy.

Scientists did the math one year. Daylight saving time saved enough electricity to power 100,000 houses for a year.

**Every State Uses Hydropower For Electricity**

Rivers are powerful. Their flowing water can be used to make electricity.

Today, every state uses hydropower, which is electricity from the flow of water. More than half of the electricity in Washington state comes from hydropower.

**The United States Is A World Leader In Wind**

Using the wind for energy started thousands of years ago. People used windmills back then. Today, wind power is made from big wind turbines. Some of these turbines are hundreds of feet tall. They can have as many as 8,000 parts.

The United States uses wind to make lots of electricity. So do other countries, such as China, Germany and Spain.

**The First Solar-Powered Satellite Is Still In Orbit**

The sun provides a great amount of energy on Earth. Every day, it hits us with 10,000 times the total amount of energy used across the world. That means the sun is a powerful source of energy.
Solar power is another way to generate electricity.

The U.S. space program has used solar power since the 1960s. The first spacecraft that used the sun's energy is called Vanguard 1. Its flight was powered by the sun. This spacecraft is still in orbit today.

**We Can Get Energy From Trash**

Believe it or not, the waste we flush down the toilet and and throw into trashcans can be reused. When waste breaks down, it makes a gas. The gas is called methane. With the right technology, scientists can trap that gas and use it to make electricity.

Doing this also helps the planet. Methane is a greenhouse gas. Like carbon dioxide, it is adding to global warming. If we use methane instead of releasing it, we will keep it out of the air around Earth. This is better for the planet.

**Electric Vehicles Are Great, But Not Everywhere**

Some cars run on electricity instead of gas. These cars don't let off pollution. But are they better for the environment? It depends on how you charge them. When you charge an electric car at home, where does that electricity come from?

Electric cars are great for the planet if their electricity comes from renewable energy. A car charged with electricity from coal is not as good. The car does not pollute. But the power plant that burns the coal does.

**We Need Better Batteries**

In order to use renewable energy, people have to be able to store energy. For example, we need to be able to store power from the wind. This is so we can still have electricity on days with no wind.

Batteries are not very good at storing energy yet. Scientists are working to make them better. They are trying to build batteries that hold more energy. This will let them last longer.

**We Measure Energy In BTUs**

Just as we might use feet or meters to talk about length, we need a unit for energy. This helps everyone around the world understand how much energy is being discussed. Energy is measured in BTUs. This stands for British Thermal Units. A BTU is the amount of energy needed to raise the temperature of a pound of water by one degree Fahrenheit.
Quiz

1. What is the MAIN idea of the section "Coal Is King, But Not Everywhere"?
   (A) West Virginia only uses coal, but should switch to another energy source.
   (B) Carbon dioxide is a gas made from coal, but it has to be burned first.
   (C) Coal is an energy source that half the United States uses, but it hurts the planet.
   (D) California uses other energy sources, but should try using coal instead.

2. Which statement would be MOST important to include in an objective summary of the article?
   (A) Using more renewable sources of energy can help to protect our planet.
   (B) Countries around the world are using more renewable sources of energy than the United States.
   (C) Turning off lights in your house is one of the most effective ways to conserve energy and power.
   (D) More companies are beginning to make electric cars that can be charged from renewable energy.

3. Read the following paragraph from the section "Daylight Saving Time Is Good For The Planet."

   In many places, people move the time on their clocks forward one hour every spring. This is called daylight saving time. It moves an hour of daylight to the end of the day. When the day is longer, people use less artificial light. This saves energy.

   Which of the following BEST describes the structure used in this paragraph?
   (A) cause and effect
   (B) chronology
   (C) compare and contrast
   (D) description

4. How is the section "We Need Better Batteries" important to the article?
   (A) It describes different sources of renewable energy.
   (B) It presents a problem with renewable energy.
   (C) It highlights how renewable energy is stored.
   (D) It shows how to make batteries for renewable energy.
Types of renewable energy

By National Geographic Society, adapted by Newsela staff on 02.12.20
Word Count 782
Level 750L

Wind turbines (left) and solar panels (right) create electricity. Photo by: Christoph Burgstedt/Science Source

Renewable energy is energy that does not get used up. The wind, the sun and Earth are sources of renewable energy.

Solar Energy

Solar energy comes from the sun. There are two types: active solar energy and passive solar energy.

Active solar energy uses special technology to capture the sun's rays. The two types are photovoltaic cells (PV cells or solar cells) and mirrors. They focus sunlight in a specific spot to generate electricity. PV cells last for a long time and are efficient.
Passive solar energy does not use equipment. Energy comes from natural sunlight. One example is building a house such that it faces the sun more often. More sun means more heat.

Solar power cannot be used as the only power source in a community. It can be expensive to install PV cells or build structures that use passive solar technology.

Also, it is difficult to say when we will get sunshine. The sunlight we get depends on where we live, the season and the time of the day.

**Wind Energy**

Throughout history, people have used the wind's energy. Ancient Egyptians made boats powered by the wind more than 5,000 years ago. In 200 B.C., people used windmills to grind grain in the Middle East and pump water in China.

Today, we use wind turbines. Turbines are towers with two or three blades at the top. The wind turns the blades. The blades turn a generator inside the tower. The generator creates electricity. Turbines do not release pollutants into the air.

Groups of wind turbines are known as wind farms. Wind farms can be found near farmland, in narrow mountain passes and even in the ocean.

If winds are steady, we get cheap electricity. But wind speed depends on the location, time of day and weather. So we cannot rely on it fully. Also, wind turbines are dangerous for bats and birds. They can crash into them.

**Geothermal Energy**

The center of the earth is extremely hot. It's more than 6,000 degrees Celsius (about 10,800 degrees Fahrenheit). Geothermal energy makes use of this heat.

We can access underground geothermal heat in different ways. One way is to use geothermal heat pumps. Hot water from underground is used to heat houses and other buildings. Geothermal heat pumps can be used to heat houses, sidewalks and even parking lots.

Another way to use geothermal energy is with steam. In some areas of the world, there is underground steam that naturally rises to the surface. The steam can be piped straight to a power plant.

In Iceland, there are large reservoirs of underground water. Almost 90 percent of people in Iceland use geothermal as an energy source. They heat their homes and businesses.

**Biomass Energy**

Biomass is material that comes from plants or animals. Plants create energy from the sun through a process called photosynthesis. This energy is stored in the plants even after they die.

Trees, branches, bark and recycled paper are sources of biomass energy. Manure, garbage and crops like corn, soy and sugar cane can also be used for biomass.

We get energy from biomass by burning it.
Biomass can also be made into biofuel. It can power cars and trucks when mixed with gasoline. Biofuels release less harmful pollutants than gasoline.

Biomass can be stored and used when it is needed. However, to grow crops for biofuels, we need large amounts of land and pesticides.

**Hydroelectric Energy**

Hydroelectric energy is made by flowing water. Most hydroelectric power plants are located on large dams. Dams control the flow of a river.

Dams block the river and create a man-made lake. A small amount of water is forced out through tunnels in the dam. This water turns huge turbines and generates electricity.

Hydroelectric energy is inexpensive and reliable. Water is constantly flowing and so the dam does not depend on the weather and time of day.

But when a river is dammed, it creates a large lake behind the dam. This lake can drown the original river habitat and sometimes entire towns.

**Other Renewable Energy Sources**

Scientists and engineers are working to make use of other renewable energy sources. Three promising examples use ocean tides, waves in water and algae.

Tidal energy uses ocean tides to generate electricity. Moving tides turn the blades of a turbine.

Wave energy uses waves from the ocean, lakes or rivers. They work in the same way as tidal energy.

Algal fuel is a type of biomass energy that uses the chemicals in seaweed to create a clean and renewable fuel. This kind of fuel does not need the acres of cropland that other biofuel sources do.
1
Select the sentence that BEST summarizes the article.
(A) Renewable energy can be a good way to make less pollution, so scientists are trying to create energy from ocean tides.
(B) Renewable energy can be created from biomass, which is material that comes from plants and animals to be burned.
(C) Renewable energy from the wind, sun and water is better than other types, but sometimes it is difficult to get sunshine.
(D) Renewable energy from the wind, sun and Earth can be used in many ways, and each has good and bad things about it.

2
Read the paragraph from the section "Geothermal Energy."

In Iceland, there are large reservoirs of underground water. Almost 90 percent of people in Iceland use geothermal as an energy source. They heat their homes and businesses.

How does this paragraph support the main idea of the article?
(A) It gives an example of a place that effectively uses renewable energy.
(B) It shows that Iceland is an interesting place to visit and see reservoirs.
(C) It explains why many homes and businesses need renewable energy.
(D) It describes the reaction of people in Iceland to geothermal energy.

3
Read the paragraph from the section "Solar Energy."

Active solar energy uses special technology to capture the sun's rays. The two types are photovoltaic cells (PV cells or solar cells) and mirrors. They focus sunlight in a specific spot to generate electricity. PV cells last for a long time and are efficient.

What is the structure of this paragraph?
(A) list
(B) comparison
(C) cause and effect
(D) problem and solution

4
Read the paragraph from the section "Wind Energy."

Throughout history, people have used the wind's energy. Ancient Egyptians made boats powered by the wind more than 5,000 years ago. In 200 BCE, people used windmills to grind grain in the Middle East and pump water in China.

What does this paragraph do in this section?
(A) It explains the causes of wind energy's use for windmills and water pumps.
(B) It explains the effects of wind energy on the people of ancient Egypt.
(C) It introduces the idea that wind energy has been used for a long time.
(D) It introduces the idea that energy is needed for power and electricity.
Let's get down to the bare bones: You need your skeleton. The **skeletal system**, or framework of bones, doesn't just hold you up. It gives your body its shape, protects your organs, and works with your muscles to help you move.

At birth, you had more than 300 bones, which fused together as you grew. By the time your body is finished growing, you'll have about 206 bones. Researchers at Wright State University School of Medicine in Ohio have discovered that kids who exercise have stronger bones as adults.

Your body has plate-like bones that cannot move, such as those that make up the cranium. The cranium protects your brain.

The **stirrup bone**, also called the **stapes**, is in the ear. It is the smallest bone in the human
body.

Your body is made up of many movable bones, such as the humerus, which is located in the upper arm.

Your ribs provide a protective casing for important organs, such as your heart and lungs.

The spine is made up of 33 bones called the vertebrae.

The thighbone is called the femur. It's the longest and strongest bone in your body.

How else can you bone up? Make sure your body gets enough calcium. That bone-building mineral is found in foods and drinks such as yogurt, leafy greens, and milk.

Did You Know?

More than half the bones in the human body are in the hands and feet. Each hand has 27 bones. Each foot has 26 bones.
1. The author begins the passage saying, "Let's get down to the bare bones." The figurative meaning of "bare bones" is: "the most basic parts of something, without any detail." Why would the author start an article about the skeletal system with this figurative use of "bare bones"?

   A. the skeleton is made up of bones.
   B. a person’s skeleton is basic to the structure of his/her body.
   C. the skeleton lacks details such as muscles, tendons, ligaments.
   D. all of the above.

2. To say "the ribs provide a protective casing," means the ribs

   A. cannot be penetrated.
   B. protect the heart, lungs, and other organs.
   C. can easily be broken.
   D. are not bones.

3. Which of the following functions does the skeleton not do?

   A. give the body its shape.
   B. protect the organs inside.
   C. combine with muscles to enable movement.
   D. tell the nerves when to feel pain.

4. A figurative use of "bone up" means to study something. The literal meaning of "bone up" as used in the article is to

   A. increase the number of bones you have.
   B. strengthen the bones in your body.
   C. become taller by lengthening your thighbone.
   D. make your backbone longer.

5. Why do you think hands and feet have so many bones, while legs and arms have fewer?
Day 8

1) Write as a mixed number.
   \[ \frac{27}{6} = \]

2) Use <, > or = to compare.
   \[ 4.11 \underline{\quad} 4.28 \]

3) Which number sentence is true?
   A. 1.79 > 1.97  
   B. 0.93 < 0.39  
   C. 3.58 = 3.85  
   D. 4.10 = 4.1

4) Fill in the blank to complete the pattern.
   \[ \frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \]

5) Answer as a mixed number (if possible).
   \[ \frac{1}{2} - \frac{1}{5} = \]

6) Which option shows the numbers ordered smallest to largest?
   A. 1, 1.5, 1.34, 1.31  
   B. 3, 3.08, 3.23, 3.48  
   C. 8.21, 8.78, 8.51, 8.5  
   D. 4, 4.5, 4.47, 4.29

7) \[ \frac{2}{3} \times 2 = \]

8) Which choice best shows the shaded amount?
   A. 8.6  
   B. 86  
   C. 0.86  
   D. 860

9) Eriana was trying to put some files on her flash drive. If she had one file that was 3.14 mb and another file that was 4.8 mb what is their combined file size?

10) Joshua bought a box of fruit that weighed \[ 8 \frac{4}{8} \] kilograms. If he bought a second box that weighed \[ 7 \frac{3}{7} \] kilograms, what is the combined weight of both boxes? Answer as a mixed number.
The conservation of matter during physical and chemical changes

By National Geographic Society, adapted by Newsela staff on 04.23.19

Word Count 923
Level 760L

Image 1. The Colorado River at Horseshoe Bend in Arizona. A river flowing through a canyon involves many physical and chemical changes, all happening at the same time. Photo by: Kojhirano/Getty Images

The same atoms that were in a dinosaur millions of years ago may be inside you today. This is even true for atoms from a star billions of years before that.

Atoms are the building blocks of all matter. They are the tiny particles, or pieces, that make up everything in the universe. Atoms can join together with other atoms. Then they form molecules.

From port-a-potties to supernovas, matter makes up everything visible in the known universe. Because matter is never created or destroyed, it cycles through our world.

Matter Can't Be Created Or Destroyed

Matter is anything that has mass and takes up space. It includes molecules, atoms, fundamental particles and any substance that has these particles. Matter can change form through physical and
chemical changes. Still, through any of these changes, matter is conserved. That is, the same amount of matter exists before and after the change. None is created or destroyed. This concept is called the Law of Conservation of Mass.

In a physical change, a substance's physical properties may change. However, its chemical makeup does not. Consider water, for example. Water is made up of two hydrogen atoms and one oxygen atom. Water is the only substance on Earth that exists naturally in three states. These are solid, liquid and gas. To change between these states, water must undergo physical changes. When water freezes, it becomes hard and less dense. Still, it is chemically the same. There are the same number of water molecules present before and after the change. Water's chemical properties remain constant.

**Hydrogen And Oxygen Undergo Changes To Make Water**

To form water, however, hydrogen and oxygen atoms must undergo chemical changes. For a chemical change to occur, bonds between atoms must break or form. This changes the chemical properties of the substances involved. Both hydrogen and oxygen exist naturally as bonded pairs. These are $\text{H}_2$ and $\text{O}_2$, respectively. In the right conditions and with enough energy, these bonds will break. The atoms will join to form $\text{H}_2\text{O}$ (water). Chemists write out this chemical reaction as:

$$2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$$

This equation says that it takes two molecules of hydrogen and one molecule of oxygen to form two molecules of water. Notice there are the same number of hydrogen atoms and oxygen atoms on either side of the equation. In chemical changes, just as in physical changes, matter is conserved. There's a difference in this case, though. The substances before and after the change have different physical and chemical properties.

At standard temperature and pressure, hydrogen and oxygen are gases. Meanwhile, water is a colorless, odorless liquid.

**In Nature, Water Goes Through A Lot Of Physical Changes**

Ecosystems have many chemical and physical changes happening all at once. Matter is conserved in each and every one — no exceptions. Consider a stream flowing through a canyon. How many chemical and physical changes are happening at any given moment?

First, let's consider the water. For many canyon streams, the water comes from higher elevations. It begins as snow. Of course, that's not where the water began. It's been cycled all over the world since the Earth first had water.

The snow must undergo a physical change — melting — to join the stream. As the liquid water flows through the canyon, it may evaporate into water vapor. This is another physical change. Water gives a very clear example of how matter cycles through our world. It frequently changes form but never disappearing.
A Chemical Change Takes Place In Photosynthesis

Next, consider the plants and algae living in and along the stream. These organisms convert light energy from the sun into chemical energy. This is stored in sugars. The process is called photosynthesis. However, the light energy doesn't produce the atoms in those sugars. That would break the Law of Conservation of Mass. It simply provides energy for a chemical change to occur. The atoms come from carbon dioxide in the air and water in the soil. Light energy allows these bonds to break and reform to produce sugar and oxygen. This is shown in the chemical equation for photosynthesis:

$$6\text{CO}_2 + 6\text{H}_2\text{O} + \text{light} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 \text{ (sugar)} + 6\text{O}_2$$

This equation says that six carbon dioxide molecules combine with six water molecules. Together, they form one sugar molecule and six molecules of oxygen. If you added up all the carbon, hydrogen and oxygen atoms on either side of the equation, the sums would be equal. Matter is conserved in this chemical change.

Animals around the stream eat these plants. Their bodies use the stored chemical energy to power their cells and move. They use the nutrients in their food to grow and repair their bodies. The atoms for new cells must come from somewhere! Any food that enters an animal's body must either leave its body or become part of it.

Our Atoms Are Very Old

The bottom line is this. Matter cycles through the universe in many different forms. In any physical or chemical change, matter doesn't appear or disappear. Atoms created in the stars a very long time ago make up every living and nonliving thing on Earth, even you! It's impossible to know how far and through what forms your atoms traveled to make you. And it's impossible to know where they will end up next.
Quiz

1. Which of the following is a physical change?
   (A) photosynthesis
   (B) ice cube melting
   (C) food digesting
   (D) baking soda and vinegar bubbling

2. Read the selection from the section "In Nature, Water Goes Through A Lot Of Physical Changes."

   The snow must undergo a physical change — melting — to join the stream. As the liquid water flows through the canyon, it may evaporate into water vapor. This is another physical change.

   What does "evaporate" refer to?
   (A) the reactions that happen when snow melts into water
   (B) the idea that water disappears during physical changes
   (C) the process of water changing from a liquid into a gas
   (D) the problems that occur when water flows through a canyon

3. What's the difference between physical and chemical changes?
   (A) Physical changes conserve matter, chemical changes do not.
   (B) Chemical changes conserve matter, physical changes do not.
   (C) Physical changes produce the same chemicals; chemical changes make new chemicals.
   (D) Physical changes make new chemicals; chemical changes have the same chemicals.

4. Read the selection from the section "Our Atoms Are Very Old."

   The bottom line is this. Matter cycles through the universe in many different forms. In any physical or chemical change, matter doesn't appear or disappear.

   What does the author mean by "bottom line"?
   (A) the most important idea
   (B) the very small detail
   (C) the last thing on the list
   (D) the newest discovery

5. An ice cube melts into a glass. The water from that glass evaporates into water vapor. What is true about this ice cube?
   (A) It has the same physical properties in all three states.
   (B) It has the same number of water molecules in all three states.
   (C) It goes through a chemical change in each state.
   (D) It has a different amount of hydrogen in each state.
What do Image 3 and the text in the section "A Chemical Change Takes Place In Photosynthesis" explain?

(A) how plants use carbon dioxide and water to produce sugar and oxygen
(B) how plants use the light from the sun to grow and repair their bodies
(C) how to add up atoms in an equation so that both sides are equal
(D) how to make water molecules during the process of photosynthesis

Can water be involved in chemical changes?

(A) Yes, when it melts and evaporates it is undergoing chemical changes.
(B) Yes, photosynthesis is an example of water going through a chemical change.
(C) No, it only goes through physical changes going from solid, to liquid, to gas.
(D) No, water has only existed in its current form since it has existed on Earth.

Examine Image 2.

How does this image help the reader understand water molecules better?

(A) It shows that two hydrogen and two oxygen molecules make two water molecules.
(B) It shows that a water molecule is made up of one oxygen atom and two hydrogen atoms.
(C) It shows all of the steps to the equation for the chemical reaction that makes water molecules.
(D) It shows how hydrogen and oxygen molecules break up and bond to each other.
To the Moon and Back

Note: This article was published in 2007. The program described in the article, NASA's Constellation program, is no longer active. This news article has been preserved for historical context.

Astronauts Aim for the Moon-And Beyond

NASA announced plans that are out of this world-literally! The space agency hopes to send humans to the moon again by 2020.

NASA hopes to make a giant leap-back to the moon. Back in 2005, the U.S. space agency announced its plan to send four astronauts to the moon within the next 15 years.

nasa.gov

The new spacecraft is like Apollo, "But bigger."

NASA officials say the moon is just the first step. They hope future missions will take astronauts to Mars and beyond. "We will return to the moon no later than 2020 and extend the human presence across the solar system and beyond," says Michael Griffin, the head of NASA.

So far, the moon is the only place beyond Earth that humans have visited. At 226,000 miles away, the moon is Earth's closest space neighbor.

On July 20, 1969, Neil Armstrong and Edwin "Buzz" Aldrin became the first astronauts to land
on the moon. They traveled there aboard Apollo 11. When Armstrong first set foot on the moon, he spoke these famous words: "That's one small step for a man, one giant leap for mankind."

During NASA's Apollo program, 12 American astronauts explored the lunar terrain. The last U.S. trip to the moon ended in December 1972.

**New Spaceship**

The new NASA mission may have the same destination, but the astronauts will have a new way of getting there.

Astronauts who trek to the moon will do their traveling in a crew exploration vehicle—a souped-up version of the three-person Apollo capsule that transported explorers to the moon. "It's very Apollo-like," says Griffin, "but bigger."

While on the moon, astronauts hope to demonstrate that they can "live off the land." They will use resources on the moon to produce drinkable water and fuel.

The moon journey would be a trial run for a Mars mission. Astronauts would spend more time on Mars—at least 500 days—because it is 49 million miles from Earth. Because they will be on the planet so long, astronauts will need to be able to sustain themselves using local resources; they will not be able to bring enough supplies for the whole mission.

**Split Decisions**

Not everyone is over the moon about NASA's plans. The project is estimated to cost $104 billion. Critics say the price tag is too high, especially because the United States is dealing with a federal budget deficit and the war on terror. A deficit occurs when a sum of money is short of its expected total.

However, supporters insist that space exploration offers enormous long-term benefits to all of humankind and that the United States should not be deterred from this mission. "The space program is a long-term investment in our future," Griffin says.
1. The phrase, "out of this world," means not only "off planet Earth" but also, figuratively,
   A. on another planet's moon.
   B. going outside the atmosphere.
   C. visiting Mars and beyond.
   D. above and beyond the usual.

2. By using the phrase, "out of this world," the author hints that he/she is:
   A. frightened about giving up the security of Earth life.
   B. enthusiastic about NASA's plans.
   C. suspicious that there won't be enough money to complete the program.
   D. used to the idea of space travel.

3. The author ended the article with a quote from the head of NASA, stating: "The space
   program is a long-term investment in our future," This seems to indicate that
   A. The quote has nothing to do with the rest of the passage.
   B. The statement is in line with the critics of the program.
   C. The author wants to stress NASA's optimism about the program.
   D. the program is unrealistic because the destinations are so far away.

4. In the sentence, "While on the moon, astronauts hope to demonstrate that they can
   "live off the land," the phrase, "live off the land," means to
   A. eat only food grown in dirt like Earth's soil.
   B. support their needs with what is available on-site.
   C. make their own fuel without digging it up.
   D. get purified water by collecting it underground.

5. Explain the meaning of: "Not everyone is over the moon about NASA's plans."
Day 9

1) Write as a mixed number.  
\[
\frac{42}{4} =
\]

2) Use <, > or = to compare.  
7.7 ___ 7.70

3) Which number sentence is true?  
A. 0.59 = 0.95  
B. 9.20 = 9.2  
C. 4.79 > 4.97  
D. 5.68 = 5.86

4) Fill in the blank to complete the pattern.  
\[
\frac{6}{7} = \frac{12}{14} = \frac{18}{21} = \frac{30}{35} = \frac{36}{42}
\]

5) Answer as a mixed number (if possible).  
\[
\frac{1}{2} - \frac{1}{5} =
\]

6) Which option shows the numbers ordered largest to smallest?  
A. 3.85, 3.75, 3.7, 4  
B. 6, 5.94, 5.6, 5.58  
C. 9.53, 9.4, 9.35, 9.93  
D. 3, 3.24, 3.5, 3.59

7) \[
\frac{1}{5} \times 4 =
\]

8) Which choice best shows the shaded amount?  
A. 0.01  
B. 1  
C. 0.1  
D. 10

9) Shawn was making some brownies and cupcakes for his school fundraiser. If the brownies needed 3.55 cups of sugar and the cupcakes needed 1.6 cups, how much sugar would he need altogether?

10) A regular size chocolate bar was \(4\frac{7}{10}\) inches long. If the king size bar was \(6\frac{1}{6}\) inches longer, what is the length of the king size bar? Answer as a mixed number.
The magnificent sea otter: Small in size, but big for coastal ecosystems

By The Guardian, adapted by Newsela staff on 11.14.19
Word Count 1,302
Level 1040L

In his famous book, "On the Origin of Species," Charles Darwin considered whether predators could affect their surrounding environment. He wondered how neighborhood cats might affect the number of flowers in the fields near his house at Downe in Kent, England.

A robust cat population, he argued, would cause local mouse numbers to decrease. This means there would be more bees – because mice destroy bee combs and nests. And as bees pollinate clover, this cascade of oscillating species numbers would result in more clover in fields in areas where there are lots of feline pets. Cats mean clover, in short.

Understanding Trophic Cascades

What Darwin described was a trophic cascade. This is when a top predator is added or removed from an ecosystem, changing the population of its prey and other organisms in a food web.

Trophic cascades are a powerful and important force in shaping the natural history of our planet. Yet as human activity continues to impact wildlife populations, we are creating trophic cascades
with profound and unexpected consequences.

One example of a trophic cascade involves the work of James Estes, an American marine biologist. He has studied wildlife in the north Pacific Ocean for the past 45 years. During that time, he has revealed the astonishing manner in which predators can change their environments.

**Sea Otters Were Once Targeted For Their Fur**

Estes has spent most of his working life in the isolated Aleutian Islands. They stretch across the North Pacific Ocean from Alaska to the coast of Kamchatka in eastern Russia.

This isolation has not put the islands beyond the harmful influence of humans. Beginning about 200 years ago, hunters moved into the Aleutians looking for sea otters pelts. The animals once thrived there with a population in the hundreds of thousands. As members of the weasel family, the sea otter (Enhydra lutris) stays warm in the water because it has the densest fur in the animal kingdom. There are about 850,000 to a million hairs per square inch. This keeps otters insulated from the cold.

However, the sea otter’s thick, rich pelt also made it a major target for fur hunters. By the 1900s, hunters had brought the animal close to extinction. "Only a dozen or so small colonies survived," Estes tells us. Then, an international ban on sea otter hunting was imposed, saving the animal from complete eradication.

Since then, the sea otter has become an important poster species for the ecology movement. Some call them they are the teddy bears of the ocean. They open sea urchins, crabs and other shellfish with flat stones before eating them, an endearing sight.

This constant activity masks a serious issue for the sea otter as an adult animal needs to consume vast amounts of food to survive. It needs to eat about a quarter of its own body weight – up to 24 pounds – every day.

**Taking A Closer Look At Sea Otters**

Estes began studying the Aleutians in the 1970s. He wanted to know: given its large appetite for urchins and shellfish, what happened to the rest of the ecosystem after sea otter populations declined? To find out, he began studying the sea floors around islands where sea otters had survived and where they had disappeared.

What Estes found was striking. Islands without sea otters had an abundance of sea urchins, the main prey of sea otters. The forests of kelp that once grew there had disappeared. Instead, huge urchins littered the barren seafloor, having consumed every kelp plant in sight.

By contrast, kelp flourished on nearby islands where sea otters survived or had been reintroduced. The discovery was important. That’s because kelp forests provide nourishment for fish and other sea animals.

Everywhere Estes looked he found the same picture. Islands with sea otters had healthy kelp forests. Islands without otters had barren sea floors littered with sea urchins and no kelp.

**Sea Otters Ensure Health Of Kelp Forests**
Sea otters are now recognized as a keystone species. This means their position in a food web is crucial to the ecological health of an area. Sea otters ensure the health of kelp forests. They also affect many other local species. For example, fish and mussels also thrive in kelp forests.

Kelp forests play a key role in maintaining global environmental health. Human activity is leading to more carbon dioxide in the atmosphere. This carbon dioxide is absorbed by the ocean, making it more acidic. This harms many species. Estes has calculated that healthy kelp forests have the capacity to absorb billions of kilograms of carbon.

"Our results were eye-opening," he states. "The difference in annual absorption of atmospheric carbon from kelp photosynthesis between a world with and a world without sea otters is somewhere between 13 and 43 billion kg (13 and 43 teragrams) of carbon."

**Another Threat To Sea Otters**

In removing sea otters from the north Pacific, humans had endangered the species and disrupted a large chunk of the Pacific marine environment.

Fortunately the species was saved from extinction, or at least it seemed that way in the 1980s and 1990s. Then Estes made a second disturbing discovery when he returned to the Aleutian islands of Adak and Amchitka, where sea otter numbers had been steadily rising. There, he found their populations were now dwindling.

Estes looked elsewhere in the chain of islands. He found that some sites – such as Clam Lagoon on Adak – still had healthy populations. Though most others showed population declines. He calculated that about 40,000 sea otters had disappeared in a few years. And when sea otter numbers dropped, urchins reappeared on the seafloor. Kelp forests began to disappear again.

One of Estes' colleagues, Tim Tinker, noticed that two otters he recently tagged for future study had gone missing after a group of killer whales passed Adak island. Further observations confirmed the idea. Killer whales were now eating sea otters.

Prior to 1991, there had been no confirmed attacks by killer whales on sea otters. So Estes looked at the history of other related species in the region. He uncovered a startling picture. When killer whale populations targeted an animal species, the population dropped. This happened with sea otters in the 1990s, and with seals and sea lions in the 1970s and 1980s. Why?

Estes determined that commercial whaling after the Second World War was the cause. Before commercial whaling, killer whales fed on great whales of the North Pacific and southern Bering Sea, says Estes. By the time commercial whaling stopped, there were virtually no great whales left for killer whales to eat. So, they expanded their diet first to seals, sea lions and sea otters.

The involvement of killer whales means that a new apex predator seems to have appeared at the top of the food web. It reveals how this view of the food chain, from the top to the bottom, provides us with an illuminating new way of looking at nature and its tightly interwoven components.

**Other Keystone Species**

There are many other examples of keystone species in an ecosystem like the jaguar, a dominant keystone predator. It feeds on large herbivores like deer, capybara and tapirs. If left unchecked,
these prey species could devour most of the plants in a habitat. This would cause disastrous population crashes in birds, insects and mammals.

Snowshoe hares are keystone prey. They get their name because of their large hind feet, which help them remain on top of deep snow. Being one of the few small mammals that live above ground in arctic environments, they have many predators and must therefore breed at a rapid rate to survive. These hares are a main food source for several species, supporting endangered populations of lynxes, bobcats, coyotes and mountain lions, among others.
1. Read the following selection from the section "Another Threat To Sea Otters."

*It reveals how this view of the food chain, from the top to the bottom, provides us with an illuminating new way of looking at nature and its tightly interwoven components.*

Which two words would BEST replace "Illuminating" and "components" in the selection above?

(A) inspiring; traits  
(B) captivating; aspects  
(C) convincing; segments  
(D) enlightening; elements

2. Read the following selection from the section "Sea Otters Ensure Health Of Kelp Forests."

*Sea otters are now recognized as a keystone species. This means their position in a food web is crucial to the ecological health of an area. Sea otters ensure the health of kelp forests. They also affect many other local species. For example, fish and mussels also thrive in kelp forests.*

Which word or phrase from the selection shows a consequential and urgent tone?

(A) recognized  
(B) crucial  
(C) affect  
(D) thrive

3. What is the MAIN reason the author includes the section "Sea Otters Were Once Targeted For Their Fur"?

(A) to provide details about sea otters and background information about sea otter populations  
(B) to illustrate how sea otters affect the environment and how humans affect sea otter populations  
(C) to explain what James Estes has learned through his research on sea otters in the Aleutian Islands  
(D) to outline how the behavior of sea otters in the Aleutian Islands has evolved over time

4. The author includes information about Charles Darwin's exploration of predators' impact on their environment first. What is a reason WHY the author provides information about trophic cascades next?

(A) to further outline Darwin's exploration and show how it applies to modern scientific theories  
(B) to compare and contrast Darwin's findings about predators' environmental impact to those of Estes  
(C) to reveal how Darwin's findings significantly shifted scientific understanding about the impact predators have on their environment  
(D) to give Darwin's exploration broader context by explaining the concept it illustrated
Seals with high-tech hats are collecting climate data in the Antarctic

By Katherine J. Wu, Smithsonian, adapted by Newsela staff on 12.18.19
Word Count 622
Level MAX

Image 1. An elephant seal outfitted with specialized sensors that helped researchers track how heat moves through ocean currents. Photo by: Etienne Pauhenet/Sorbonne University

Elephant seals in funny-looking hats are helping NASA study climate science.

The seals have been outfitted with specialized sensors. The sensors resemble lumpy metal yarmulkes with antennae. The seals are collecting data that's helping researchers track how heat moves through ocean currents. A paper was published the week of December 2 in Nature Geosciences. In the paper, a team of climate scientists led by oceanographer Lia Siegelman used this clever technique to track changes in temperature as the seals swam the icy waters of the Antarctic.

Researchers enlisted the help of one particularly fearless female seal. She helped researchers discover that heat stored at the ocean's depths can sometimes get swirled back up to the surface by some deeply penetrating currents. Researchers have known that these currents can ferry heat downward into the ocean's interior. However, the new findings suggest the reverse is true as well. This causes a process that can warm the sea's topmost layers as well.
This might sound inconsequential. However, Siegelman thinks it's important to incorporate this new information into existing climate models. Oceans serve as a sink for the atmosphere's heat. This means the cooler their surfaces are, the more energy they can absorb. With heat rising up from below, though, the world's waters might be less equipped to offset rising temperatures than scientists once thought, Siegelman explained.

What this means in the long term is unclear. As Sarah Zielinski reported for Smithsonian.com in 2014, climate change is reshuffling how ocean waters in the Antarctic move and mix. What happens in the Antarctic doesn't stay in the Antarctic. Shifts in the water cycle at our planet's South Pole have reverberating effects on climate and weather throughout the rest of the globe.

Before the seals' help, scientists had a pretty limited view of what went on beneath the surface of the Southern Ocean. Here, temperatures can plunge below 30 degrees Fahrenheit. Thick sheets of sea ice block instruments from collecting data. It is a difficult environment for underwater science field work.

None of that troubles southern elephant seals. They spend nine to 10 months of each year at sea. They swim thousands of miles and dive up to half a mile beneath the ocean's surface, usually about 80 times a day. "Even when they sleep, they dive," Siegelman said earlier this year. "They float down like a leaf."

To capitalize on the seals' wanderlust, Siegelman and her colleagues tagged a female elephant seal on the Kerguelen Islands. They glued a sensor to her head. Don't be alarmed: The researchers remove the tags on the seals' next visit ashore. If not for that, they're sloughed off with dead skin during molting season.

With the high-tech hat atop her head, the seal embarked on her post-breeding swim in October 2014. For the next three months, the researchers followed her 3,000-mile journey. During this journey, she dived 6,333 times, Meghan Bartels reported for Space.com.

Combined with satellite images, the wealth of data the seal recovered gave Siegelman and her team a clearer picture than they'd ever been afforded before. It's probably safe to say that the significance of this was lost on the seal.

From the human perspective, it is clear seals are filling in some massive gaps in knowledge, Guy Williams said in 2016. Williams is a polar oceanographer at the University of Tasmania. He's conducting his own temperature studies with seals and walruses.

"The [seals] have gone to areas where we've never had an observation before," Williams said.
1. Which sentence from the article BEST introduces the purpose of the NASA climate study?

(A) Elephant seals in funny-looking hats are helping NASA study climate science.
(B) The seals have been outfitted with specialized sensors.
(C) The sensors resemble lumpy metal yarmulkes with antennae.
(D) The seals are collecting data that's helping researchers track how heat moves through ocean currents.

2. Which answer choice accurately characterizes Guy Williams's reaction to using seals to gather information underwater?

(A) He thinks walruses and seals should dive together to collect the most comprehensive temperature information.
(B) He thinks researchers should take care to avoid putting any animals in harm's way during their information-gathering journeys.
(C) He thinks the seals are providing very useful information about the ocean that people otherwise would not have access to.
(D) He thinks it is an interesting approach, but satellite images are more likely to provide useful information.

3. When did scientists track the movements of a female elephant seal? How do you know?

(A) In 2019; "The seals are collecting data that's helping researchers track how heat moves through ocean currents. A paper was published the week of December 2 in Nature Geosciences."
(B) In 2014; "As Sarah Zielinski reported for Smithsonian.com in 2014, climate change is reshuffling how ocean waters in the Antarctic move and mix."
(C) In 2014; "With the high-tech hat atop her head, the seal embarked on her post-breeding swim in October 2014. For the next three months, the researchers followed her 3,000-mile journey."
(D) In 2016; "From the human perspective, it is clear seals are filling in some massive gaps in knowledge, Guy Williams said in 2016."

4. Select the paragraph from the article that shows the results of NASA's climate study.

(A) The seals have been outfitted with specialized sensors. The sensors resemble lumpy metal yarmulkes with antennae. The seals are collecting data that's helping researchers track how heat moves through ocean currents. A paper was published the week of December 2 in Nature Geosciences. In the paper, a team of climate scientists led by oceanographer Lia Siegelman used this clever technique to track changes in temperature as the seals swim the icy waters of the Antarctic.
(B) Researchers enlisted the help of one particularly fearless female seal. She helped researchers discover that heat stored at the ocean's depths can sometimes get swirled back up to the surface by some deep currents. Researchers have known that these currents can ferry heat down into the ocean's interior. However, the new findings suggest the reverse is true as well. This causes a process that can warm the sea's topmost layers as well.
(C) To capitalize on the seals' wanderlust, Siegelman and her colleagues tagged a female elephant seal on the Kerguelen Islands. They glued a sensor to her head. Don't be alarmed: The researchers remove the tags on the seals' next visit ashore. If not for that, they're sloughed off with dead skin during molting season.
(D) With the high-tech hat atop her head, the seal embarked on her post-breeding swim in October 2014. For the next three months, the researchers followed her 3,000-mile journey. During this journey, she dived 6,333 times, Meghan Bartels reported for Space.com.
Endangered Animals at a Glance

Back to the Wild

Not all the news is bad about endangered animals. In the United States, dozens of endangered animals have been making a comeback. Here are few of them:

**Gray Wolf:** By the 1970s, the gray wolf had all but vanished from Yellowstone National Park. In 1995 and 1996, federal biologists brought 66 wolves from Canada and set them free in the wilderness areas of the park and central Idaho. Today, about 285 gray wolves live in central Idaho, and 271 more roam Yellowstone.

**Bald Eagle:** Before Europeans came to North America, the sky was teeming with bald eagles. As settlers moved west, they destroyed the eagles' natural habitat. Egg collectors and pesticides almost wiped out the bald eagle population.

However, about 30 years ago the federal government passed laws to protect the eagles. Today, more than 7,678 pairs of bald eagles live in the lower United States.

**Grizzly Bear:** In the 1800s, an estimated 50,000 grizzly bears roamed the West. Today, the bears are making a comeback in several Western areas, including Yellowstone Park.
Can Zoos Help Save Endangered Animals?

Emi is a crowd-pleasing Sumatran rhinoceros at the Cincinnati Zoo. Why is she so popular? In 2004, Emi gave birth to Suci, a healthy, wide-eyed female calf.

Although most visitors to the zoo enjoy gazing at Emi and Suci, scientists are happy for another reason. Suci's arrival brings scientists a step closer to pulling the Sumatran rhinoceros back from the edge of extinction.

As the populations of wild animals dwindle, conservationists are hoping that they can breed animals in zoos and later release them into the wild.

Scientists have reintroduced at least 19 species to the wild from captivity. For example, by 1985 only nine wild California condors were living in that state. Biologists captured all nine and began a captive breeding program. As of July 2005, the number of condors increased to 280, with more than 120 living in the wild.
1. The passage explains why some endangered animals, including gray wolves and bald eagles may
   A. be getting killed at increasing rates
   B. be making a comeback
   C. be hard to find
   D. be living in zoos

2. The big problem described in the passage is that many animals at one time were in danger of extinction. The passage also describes the efforts that contributed to solving this problem which include
   A. arresting hunters and importing animals from other countries
   B. federal laws and breeding animals in captivity
   C. breeding animals in captivity and allowing animals to roam freely
   D. importing animals from other countries and feeding them special food

3. Which of the following conclusions are supported by the passage?
   A. Scientists do not want to breed animals in zoos.
   B. Endangered animals may no longer survive.
   C. Zoos should not help endangered animals.
   D. People have been able to find ways to save endangered animals.

4. Read the following sentence:

   "As the populations of wild animals dwindle, conservationists are hoping that they can breed animals in zoos and later release them into the wild."

   In this sentence the word **dwindle** means
   A. sickly
   B. missing
   C. decline
   D. raise
5. Which statement best describes the main idea of this passage?

A. People are harming endangered animals.
B. Endangered animals need our help.
C. Scientists are trying to find a way to help animals to find safe places to live.
D. Some endangered animals are increasing in number.

6. When the gray wolf had nearly vanished, what did people do to help prevent it from becoming extinct?

7. Why might conservationists want to breed animals in captivity?

8. The question below includes an incomplete sentence. Choose the word that best completes the sentence.

At one time only nine wild California condors were living in that state. __________ May 2012, that number has increased to 405 with about 226 living in the wild.

A. Next  
B. Now  
C. Since  
D. When
Day 10

1) Write as a mixed number.
\[
\frac{21}{5} =
\]

2) Use <, > or = to compare.
\[
5.15 \underline{\quad} 5.1
\]

3) Which number sentence is true?
A. \[6.79 = 6.97\]  
B. \[7.69 < 7.96\]  
C. \[3.48 > 3.84\]  
D. \[2.46 > 2.64\]

4) Fill in the blank to complete the pattern.
\[
\frac{1}{5} = \frac{2}{10} = \frac{3}{15} = \frac{4}{20} = \frac{5}{25} =
\]

5) Answer as a mixed number (if possible).
\[
\frac{2}{3} - \frac{1}{2} =
\]

6) Which option shows the numbers ordered smallest to largest?
A. \[4.29, 4.06, 4.52, 4.9\]  
B. \[6.05, 6.6, 6.64, 6.75\]  
C. \[6.56, 6.59, 6.44, 6.6\]  
D. \[3.9, 3.86, 3.73, 3.74\]

7) \[\frac{7}{10} \times 3 =
\]

8) Which choice best shows the shaded amount?
\[
\begin{array}{c}
\includegraphics[width=\textwidth]{shaded.png}
\end{array}
\]
A. 760  
B. 0.076  
C. 0.76  
D. 76

9) Darwin was checking how much power his lights used. His first light by itself used 71.19 amps. When he turned on the second light, together they used 161.59 amps. How many amps did just the second light use?

10) Deondre spent \(2\frac{3}{4}\) hours working on his math homework. If he spent another \(3\frac{2}{3}\) hours on his reading homework, what is the total time he spent on homework? Answer as a mixed number.
Help butterflies, bees and birds with a pollinator garden in your yard

By Chistina Barron, Washington Post, adapted by Newsela staff on 10.22.19
Word Count 429
Level MAX

Monarch butterflies are on the move. They're traveling from the Northeast to their winter home in Mexico, and as they travel, they might stop in your neighborhood for sips of nectar from flowers. But what if none of the yards offer a tasty snack for monarchs or other pollinators? You can change that, and October is a good time to start.

We talked to two experts at Smithsonian Gardens for pointers on creating a home garden to attract pollinators. James Gagliardi and Sylvia Schmeichel are the horticulturalists responsible for the large pollinator garden outside the National Museum of Natural History in Washington, D.C. It features 230 plant species to attract pollinators and host their eggs.

They encourage kids (and their parents) to think about a variety of animals when planning a garden.

"Move beyond monarchs," Gagliardi said. "Different pollinators connect with different plants in different ways. Beetles are pollinators. Hummingbirds, flies, bees, moths."
Gagliardi suggests finding out which plants are native to your area and seeing what those plants attract. Mountain mint, asters and goldenrod are a few of his suggestions.

"Plant a variety that blooms all year long," Schmeichel said. "If there is a particular pollinator you want, read about what they like."

And you don’t have to have a large planting space.

"You can even do it in a container on your balcony," she said.

Using seeds or plants depends on the time and money you can spend.

"I like to use plant material because I’m impatient," Gagliardi said.

Some flowers come from bulbs, which require a bit of patience. You plant bulbs such as daffodils, crocuses and snowdrops in the fall, and they flower in the spring. Thinking ahead is important for creating a welcome spot for pollinators in every season.

"You know that on a warm day at the end of winter you start to see insect activity, and there are places for them to eat," Gagliardi said.

Providing year-round food for pollinators has benefits well beyond your yard. Pollinated plants provide berries and seeds that other wild animals eat, and about 35 percent of the world’s food crops rely on pollinators. So at your next meal, you might consider something Schmeichel mentioned: "Every third bite of food is thanks to a pollinator."
Quiz

1. Read the following sentence from the article.

*Providing year-round food for pollinators has benefits well beyond your yard. Pollinated plants provide berries and seeds that other wild animals eat, and about 35 percent of the world's food crops rely on pollinators.*

Which of the following words, if it replaced the word "rely" in the sentence above, would CHANGE the meaning of the sentence?

(A) count
(B) depend
(C) hinge
(D) doubt

2. What is the definition of "pointers" as used in this selection?

*We talked to two experts at Smithsonian Gardens for pointers on creating a home garden to attract pollinators.*

(A) advice
(B) problems
(C) rewards
(D) questions

3. James Gagliardi thinks that kids should plant gardens to attract a variety of animals.

Which detail from the article supports this opinion?

(A) "Move beyond monarchs," Gagliardi said. "Different pollinators connect with different plants in different ways."
(B) Gagliardi suggests finding out which plants are native to your area and seeing what those plants attract. Mountain mint, asters and goldenrod are a few of his suggestions.
(C) "I like to use plant material because I'm impatient," Gagliardi said.
(D) "You know that on a warm day at the end of winter you start to see insect activity, and there are places for them to eat," Gagliardi said.

4. Read the following paragraph from the article.

*Some flowers come from bulbs, which require a bit of patience. You plant bulbs such as daffodils, crocuses and snowdrops in the fall, and they flower in the spring. Thinking ahead is important for creating a welcome spot for pollinators in every season.*

WHY did the author include this paragraph?

(A) to describe the types of plants that are only specific to attracting monarch butterflies
(B) to highlight the reasons why people benefit from planting a pollinator garden
(C) to explain that there is some work and planning involved with planting a pollinator garden
(D) to show that pollinator gardens need to be planted in wide, open spaces to flourish
Monarch butterflies disappearing from Midwest gardens

By St. Louis Post-Dispatch, adapted by Newsela staff on 09.14.14

A monarch butterfly rests on a plant inside Norfolk Botanical Garden's butterfly house in Norfolk, Virginia, Adrin Snider/Newport News Daily Press/MCT

WASHINGTON - The colorful monarch butterfly is in danger. Environmentalists believe an enemy other than the changing climate is hurting the insect.

Over the last year, the population of monarch butterflies across the United States fell to 90 percent below its 20-year average.

To halt the population loss, a number of groups made a request that the Fish and Wildlife Service grant the butterfly endangered species protection. Environmentalists believe that this formal classification will help bring more attention to the shrinking number of monarchs throughout the country.

The petition requests that the Fish and Wildlife Service aggressively protect the species and its different habitats across the county.
The environmental groups believe the culprit responsible for the butterfly's decline is Monsanto Company.

**Monarchs Need Milkweed To Survive**

Monsanto is an agricultural biotechnology company. They produce genetically engineered plants and chemicals. Monsanto's specialized products can have a huge impact on the lifestyle of other plants and animals.

Monsanto produces a chemical spray for plants called Roundup. The spray is a "potent killer of milkweed, the monarch caterpillar's only food," according to a statement from the Center for Biological Diversity, the Center for Food Safety and the Xerces Society.

According to the statement, most monarchs are born in the Midwest. The use of chemicals like Roundup on genetically modified plants is also common in that region. The surge of Roundup and Roundup Ready crops - or crops that are not affected by chemical sprays - comes at the expense of the milkweed plants. Ultimately, it harms the monarch caterpillars, who starve without healthy milkweed to eat.

**A Stable Climate Is Important**

Monsanto does not believe that its chemicals are behind the declining population. Charla Lord, a Monsanto spokeswoman, said there are other reasons to explain the population loss.

"Scientists think a number of inter-related factors are contributing to the decline and year-to-year variation of monarch butterfly populations," she said.

Those factors include weather events, like snow and frost, logging in Mexico, and simply the way that humans use land. She said Monsanto would help restore monarch habitats, but did not offer specific ideas.

The groups who filed the petition acknowledge that Monsanto is not the only factor behind the monarch's decline. The fragile butterfly is also affected by weather and construction.

Heatwaves and droughts can harm the fragile butterfly, who needs water and stable climates. Also, as more people move from cities to rural areas, new construction can damage butterfly habitats. This process is called urban sprawl.

**Help Is Needed Now!**

The butterfly population in 2013, they say, was about 35 million. In the mid-1990s, there were about 1 billion monarchs. Scientists like Tierra Curry from the Center for Biological Diversity, are hoping that good weather this year may boost numbers again.

"We're at risk of losing a symbolic backyard beauty that has been part of the childhood of every generation," she said.

The petitioners feel that something must be done — fast.

By filing a petition with Fish and Wildlife, they took the first step in earning federal protection for the butterfly. The agency has 90 days to respond to the request, although they may take up to nine months to fully come to decision.
Quiz

1. Read the following sentence from the article: The environmental groups believe the culprit responsible for the butterfly's decline is Monsanto Company.

Why do environmental groups hold Monsanto responsible for the decline in the monarch butterfly population? Select the sentence from the article that BEST supports your answer.

(A) Environmentalists believe an enemy other than the changing climate is hurting the insect.
(B) The use of chemicals like Roundup on genetically modified plants is also common in that region.
(C) The surge of Roundup and Roundup Ready crops - or crops that are not affected by chemical sprays - comes at the expense of the milkweed plants.
(D) Monsanto does not believe that its chemicals are behind the declining population.

2. Select the sentence from the article that shows the impact of industrialization on the population of monarch butterflies.

(A) "Scientists think a number of inter-related factors are contributing to the decline and year-to-year variation of monarch butterfly populations," she said.
(B) Over the last year, the population of monarch butterflies across the United States fell to 90 percent below its 20-year average.
(C) Also, as more people move from cities to rural areas, new construction can damage butterfly habitats.
(D) Heatwaves and droughts can harm the fragile butterfly, who needs water and stable climates.

3. Which of the following is NOT a reason for the decreasing number of monarch butterflies?

(A) genetically engineered plants
(B) cutting down of trees
(C) changing climatic conditions
(D) decline in their food source

4. Select the paragraph from the section "Help Is Needed Now!" that depicts environmentalists' major concern over the monarch butterfly's population.
Rare butterflies' habitats designated "no spray" zones in South Florida

By Miami Herald, adapted by Newsela staff on 08.25.15
Word Count 977
Level 1150L

The Florida atala butterfly, pictured here laying eggs on a Florida coontie, was 1 of 5 types of butterflies that FIU scientist Gary Rand used in research that found routine spraying for mosquitoes is more damaging to butterflies than previously thought. Brian K. Mealey/TNS

Every summer, South Florida residents battle swarms of mosquitoes. They do this by spraying pesticides. However, new research has found that routine spraying is causing much greater harm to innocent bystanders: butterflies.

The U.S. Fish and Wildlife Service commissioned a study to address the growing number of butterflies going extinct. Florida International University researcher Gary Rand found two common chemicals used in spraying - at amounts typically used to control mosquitoes - were toxic to butterflies. While researchers have long suspected that pesticides killed butterflies, Rand’s research confirmed this and documented the deadly amounts. He also found that spraying may have lasting effects.

Rand and his research team spent five years studying the impact of the pesticides on butterflies. The findings resulted in federal wildlife managers deciding to increase the boundaries around
endangered butterflies' habitats. This forced two counties in Florida — Miami-Dade and Monroe — to change where they spray for mosquitoes.

“It’s up to us to protect them. They don’t protect themselves,” said Rand, who published his findings in three journals this spring.

More Toxicity Tests Needed

Rand is a toxicologist. He believes his research shows the need to broaden insect safety testing for pesticides, which currently is done only on honeybees. Pesticides have come under more and more scrutiny after the widespread collapse of the honeybee populations. However, other pollinators have suffered historic declines too, such as monarch butterflies, wasps and beetles. Since 1990, the number of monarch butterflies has dropped by 970 million, federal officials announced earlier this year.

“You can’t make a blanket statement about insect testing when you only test for honeybees,” Rand said.

Butterflies Get More Breathing Room

Miami-Dade County officials agreed to increase the boundaries for spraying around three areas. Totaling nearly 2,000 acres, the areas are known to be inhabited by endangered Florida leafwing and Bartram’s hairstreak butterflies. Craig Grossenbacher, chief of the county’s Water Resources Coordination Division, said that Miami-Dade County also decided to stop spraying on a patchwork of environmentally endangered land inhabited by native butterflies.

Monroe County is making changes, too. The county is expanding the boundaries around endangered butterflies' habitats to 400 meters for aerial spraying and 250 meters for truck fogging, said Anthony Sowers, a toxicologist with the U.S. Fish and Wildlife Service.

Protecting The Public

While the drought made this mosquito season one of the mildest in years, mosquito managers say the new rules mean they will have to work a little harder at educating the public about the risks from stagnant water. Mosquitoes use water that is stagnant, or standing still, as a place to breed.

“It’s not going to be easy,” said Chalmers Vasquez, operations manager for Miami-Dade County Mosquito Control. “The population needs to be protected before the butterflies.”

Mosquito season typically starts about two weeks after the rainy season, when salt marsh mosquitoes get blown inland from the Everglades National Park or Biscayne Bay’s tangled mangroves. So far this year, Vasquez said the district has sprayed just once, at a half dozen parks, before the July 4 holiday.

Standing water in pots and plants has so far posed a bigger concern.

Vasquez has found that the bromeliad flower is causing particular problems.

More Butterflies Land On The Endangered List

Risks linked to spraying date back to at least the 1990s, when researchers began connecting the decline in butterflies to pesticides. Worry only increased in recent years as the butterfly population
continued to drop. In 2013, federal officials declared two Florida species extinct. A report found three more have probably disappeared, largely the result of their habitats being razed for development and pesticide spraying.

Just last year, the leafwing and hairstreak butterflies were added to the endangered species list, bringing the total number of endangered butterfly species in the state to four. Another three are considered threatened.

One solution is to do a better job of managing butterflies' habitats, particularly on Big Pine Key where Keys residents have come to rely on spraying for mosquitoes to make the summer months tolerable. Ocean winds easily carry pesticides to nearby butterflies' habitats, though, and federal officials decided it was time to take a closer look at toxicity, Sowers said.

“Everyone went into it with the understanding they are insecticides. They are insects. There is going to be some toxicity,” he said. “The goal was to see what type of exposure was needed for impacts to occur.”

**Without A Wing Or A Prayer**

For his study, Rand selected five Florida species he purchased from a breeder in Naples. He chose the common buckeye, painted lady, zebra longwing, atala hairstreak and white peacock butterflies. Then he focused on naled, permethrin and dichlorvos, the most common pesticides used in spraying for mosquitoes across South Florida.

He coated leaves with the chemicals and used a hole puncher to create tiny servings for the caterpillars. Rand also tested exposure for butterflies by spraying them, conducting separate tests to look at what happened when the pesticides landed on their thorax or on their wings.

Rand found that naled and permethrin, but not dichlorvos, harmed both butterflies and caterpillars. Permethrin also tended to pose a lasting risk since it stayed on leaves longer.

“If they’re spraying according to the label rate and doing a proper job, you wind up with concentrations that produce acute toxicity to a number of species,” he said.

Despite the findings, Rand said he is not opposed to pesticide use.

“I’d love for the whole world to be organic farming, but I don’t think it’s possible,” he said. Instead, he said his findings should be used as a warning about how pesticides are applied. “Everybody complains about farmers, but you’ve got massive amounts of spraying outside by people. What other organisms are out there being depleted that we don’t know about? And we won’t know until it’s too late.”
Quiz

1. Which statement is MOST clearly supported by the information in this article?
   (A) Unfortunately, the use of any pesticide will always have severe, though unintended, consequences.
   (B) Reducing mosquito populations while simultaneously protecting other wildlife can be complicated.
   (C) Humans will almost always choose their own comfort over the health of wildlife.
   (D) In Florida, protecting butterfly populations now takes priority over all other wildlife management concerns.

2. Review the section "Without A Wing Or A Prayer." What is MOST significant about Rand's findings?
   (A) He found that most people are not using these pesticides properly and they are spraying in areas that are protected.
   (B) He found that some pesticides stay on leaves longer than others, harming caterpillars in addition to butterflies.
   (C) He found that it is not only farmers who are spraying large amounts of pesticides.
   (D) He found that even when people correctly follow instructions for the pesticides, they are harmful to many species.

3. Read the sentence below.

   The U.S. Fish and Wildlife Service commissioned a study to address the growing number of butterflies going extinct.

   Which word MOST accurately replaces "commissioned" in the sentence above?
   (A) wrote
   (B) requested
   (C) criticized
   (D) reviewed

4. Read the paragraph below.

   Every summer, South Florida residents battle swarms of mosquitoes. They do this by spraying pesticides. However, new research has found that routine spraying is causing much greater harm to innocent bystanders: butterflies.

   What does the phrase "innocent bystander" MOST clearly evoke in this sentence?
   (A) a sense of danger
   (B) a sense of injustice
   (C) a sense of shame
   (D) a sense of hopelessness
Why some flowers greet us each spring

By Rachel Feltman, Washington Post, adapted by Newsela staff on 05.15.18
Word Count 608
Level MAX

You know what they say about April showers, right? Well, when all those May flowers start to poke their heads out to say hello, you may see some familiar faces in your backyard. Many plants live and die within one growing season, so gardeners must replant them each spring. But others have evolved to linger year after year, so they can blossom anew without any help from a human horticulturist. (That's someone who studies the science of plants.)

Many flowers are what we call annuals. Their entire life cycle — from seed to death — takes just one year. They might leave behind sleeping seeds that could sprout again in the future, but the flowers, roots, stems and leaves all fade away as soon as the season is done. Sunflowers and petunias are examples of annuals.

Some plants technically last a little longer, but not in a way humans can truly appreciate. Biennials (bi-EN-ee-als) take two years to start flowering instead of shooting up in a single spring. But they still wither and die once the flowers are gone. One to look for is a foxglove, a tall plant with clusters of bell-shaped blooms, often in pink or purple.
Then there are perennials (per-EN-ee-als), which can survive for years. Scientists believe these types of plants came first.

James Boyer is the vice president for children's education at the New York Botanical Garden. According to Boyer, annuals may have evolved to survive in areas where water was scarce.

"Annuals are putting all of their chips into the reproduction basket," Boyer explains. "All of the energy to make roots and shoots is just enough to create an overwhelming display of flowers. They are evolutionarily gambling that they will create enough seeds to continue the species."

That energy gathered to make roots and shoots is from the sun. All plants harness sunlight, water and air to fuel their growth.

The perennial strategy is to be a jack-of-all-trades, tucking tissues inside protective buds or bulbs to keep cells fresh until it's time to bloom again. Perennials devote a lot more of their fuel to keeping themselves alive than annuals do.

"Roots, stems and leaves are repaired and grown each year," Boyer says. Many eventually produce flowers, but it can sometimes take years. And in most cases, they'll save enough energy to flower again the following season. The colorful tulips you see in many yards are perennials.

There are exceptions to this: "Monocarpic" plants spend decades growing before throwing all their resources into a single, brilliant season of flowers. They make thousands or even millions of seeds in one go, and then they die.

Whether a plant is a perennial or an annual can depend on where you plant it. Plants sold in cold regions that are labeled annuals could be tropical perennials; in warm weather they'd live for years, but a single harsh winter will kill them.

Boyer says that researchers are trying to trick annuals into sticking around. To survive for many years, a plant must have instructions in its DNA, or genetic code, telling its cells to save resources instead of spending them all on flowers. Scientists think they might be able to tweak the DNA of annual plants to send that message.

"If we could change corn into a perennial, we wouldn't need to replant every year, which disrupts the soil and their fragile ecosystem," Boyer says. "It could change our agricultural system."
1. What is a difference between perrenials and annuals?
   (A) Annuals can survive longer than perrenials because they do not use all their energy on producing flowers.
   (B) Perrenials grow more flowers compared to the annuals because they need to make more seeds to reproduce.
   (C) Perrenials use more energy than perrenials because they need to continue to live year after year.
   (D) Perrenials make more seeds than annuals because they need them to reproduce and grow into more flowers.

2. Select the detail from the article that BEST explains WHY annuals die every year.
   (A) But others have evolved to linger year after year, so they can blossom anew without any help from a human horticulturalist.
   (B) Many flowers are what we call annuals. Their entire life cycle — from seed to death — takes just one year.
   (C) They might leave behind sleeping seeds that could sprout again in the future, but the flowers, roots, stems and leaves all fade away as soon as the season is done.
   (D) According to Boyer, annuals may have evolved to survive in areas where water was scarce.

3. Both annuals and perrenials make beautiful flowers. How does producing flowers effect a plant's lifespan?
   (A) Flowers of annuals bloom every season, causing them to stay alive.
   (B) Flowers of perrenials bloom once a year causing it to die after one season.
   (C) Annuals use most of their energy to make flowers, so they will die after one season.
   (D) Perrenials use most of their energy to make flowers, causing them to stay alive.

4. Which sentence from the article supports the conclusion that perrenials have more energy than annuals?
   (A) "Annuals are putting all of their chips into the reproduction basket," Boyer explains.
   (B) All of the energy to make roots and shoots is just enough to create an overwhelming display of flowers.
   (C) Perrenials devote a lot more of their fuel to keeping themselves alive than annuals do.
   (D) And in most cases, they’ll save enough energy to flower again the following season.

5. How can scientists change an annual plant into a perrenial plant?
   (A) by repairing its roots and shoots
   (B) by changings its genetic code
   (C) by growing it in cold weather
   (D) by tucking its tissues into bulbs

6. Which statement is a CENTRAL idea of the article?
   (A) Researchers would like to find a way to keep plants alive and blooming for a longer period of time.
   (B) DNA is where plants store information about how low long they will live.
   (C) Annuals hope to create enough seeds to continue the species but they are not always successful.
   (D) Perrenials are special plants because they do not require help from horticulturalists.
What would be the advantage of changing corn into a perennial?

1. It would not need to be replanted.
2. It can repair its roots, shoots and stems.
3. It would produce a lot of seeds.

(A) 1 only
(B) 1 and 2
(C) 2 and 3
(D) 3 only

Which sentence from the article would be MOST important to include in a summary of the article?

(A) Many plants live and die within one growing season, so gardeners must replant them each spring.
(B) One to look for is a foxglove, a tall plant with clusters of bell-shaped blooms, often in pink or purple.
(C) James Boyer is the vice president for children's education at the New York Botanical Garden.
(D) "If we could change corn into a perennial, we wouldn't need to replant every year, which disrupts the soil and their fragile ecosystem," Boyer says.
Nobody moved and neither did the bear. The crows cawed in the trees. The trees rustled in the wind. The wind carried our scent to the bear. The bear took a step toward us.

We had been sitting on the deck when the bear came. It climbed over the rock wall that separates our backyard from the woods. It growled. Slobber dripped from its mouth. On the deck were me, my mom, my dad, and my little sister. When the bear growled, we gasped, and we became very still.

The bear took a step toward us, but we didn't move. It was only one step, we thought to ourselves. No need to panic. We didn't want to spook the bear. We didn't want the bear to charge.

The bear took another step. Okay, we thought, perhaps we should move. But we didn't move.

The bear took a third step. We grabbed each other. I grabbed my dad, my dad grabbed my mom, my mom grabbed my sister.

The bear roared. My mom said, "Nobody move," which I thought was unnecessary. Slowly, very slowly, she backed away from the bear, away from us. She backed across the deck all the way to the door. Without turning around, she pulled the handle. Locked.

"I forget which one you're supposed to do," my little sister whispered. "Are you supposed to play dead, or are you supposed to try and scare the bear?"


The bear raised itself on its hind legs and roared even louder. It was eight feet tall. It had teeth
the length of my fingers. It had eyes without fear or pity.

"Let's cover all our bases," I said. "Mom, you scare the bear. Dad, you play dead. Sis, you play bear. I'll scare the dead."

It was settled. The bear took one step closer, and we sprang into action. Dad collapsed in a heap. Mom raised her arms and jumped up and down. My sister got down on all fours and started growling. I ran over to my dad and at the top of my lungs I screamed, "BOO!"

It worked like a charm. The bear stopped growling. Mom says I'm making this up, but I swear I saw it raise one eyebrow in surprise. It almost seemed to shrug, and then it turned and lumbered off. I think bears are like people: they don't like surprises.
1. What are the narrator and the narrator's family doing when a bear comes?
   A. climbing a tree
   B. walking through the woods
   C. sitting on the deck
   D. climbing a rock wall

2. To solve the problem of the bear coming over, what does the narrator's mother do?
   A. She raises her arms and jumps up and down.
   B. She gets down on all fours and starts growling.
   C. She collapses in a heap.
   D. She runs up to the bear and screams, "BOO!"

3. The narrator and the narrator's family are scared of the bear. What evidence from the text supports this statement?
   A. "The wind carried our scent to the bear."
   B. "The bear raised itself on its hind legs and roared even louder."
   C. "When the bear growled, we gasped, and we became very still."
   D. "The bear took a step toward us."

4. Read these sentences from the text.
The bear roared. My mom said, 'Nobody move,' which I thought was unnecessary.

Based on the information in the story, why might the narrator think the mother's words are unnecessary?
   A. The narrator thinks that doing something would be more helpful than saying something.
   B. The wind is too loud for anybody to hear the mother's words.
   C. Nobody is moving when the mother says, "Nobody move."
   D. The narrator thinks the mother's words will anger the bear.
5. What is a theme of this story?

A. People should spend more time in nature and less time indoors. 
B. Neither bears nor humans like surprises. 
C. Grown-ups always know what to do in an emergency. 
D. People should treat animals with respect and kindness.

6. Read these sentences from the text.

The bear took one step closer, and we sprang into action. Dad collapsed in a heap. 
Mom raised her arms and jumped up and down. My sister got down on all fours and 
started growling. I ran over to my dad and at the top of my lungs I screamed, 'BOO!'

It worked like a charm. The bear stopped growling. Mom says I'm making this up, but I 
swear I saw it raise one eyebrow in surprise. It almost seemed to shrug, and then it 
turned and lumbered off.

Based on these sentences, what is the meaning of the phrase "it worked like a charm"?

A. It worked very hard. 
B. It worked really well. 
C. It did not work at all. 
D. It did not work well.

7. Read these sentences from the text.

The bear took a third step. We grabbed each other. I grabbed my dad, my dad grabbed 
my mom, my mom grabbed my sister.

In the last sentence, what conjunction could be added after the second comma without 
changing the meaning of the sentence?

A. and 
B. because 
C. or 
D. nor
8. Near the end of the story, the family springs "into action." Describe what each member of the family does at this time.

9. Explain whether the family's behavior near the end of the story surprises the bear. Support your answer with evidence from the text.

10. Explain whether the family's behavior near the end of the story is surprising to the reader. Support your answer with details from the text.
Name: __________________________ Date: ______________

1. What is a meaning of the word **action**?
   A. a machine for performing calculations
   B. something done
   C. a place where items may be routinely kept

2. What is another meaning of the word **action**?
   A. a customary way of operation or behavior
   B. a mass of land rising to a great height
   C. the series of events that form a plot

**Please use each answer choice only once. Choose the one word that best completes the sentence.**

3. The next _____ was the human cannon ball.
   A. action
   B. reaction
   C. active
   D. activity
   E. actions
   F. activities
   G. act

4. A word that shows _____ is a verb.
   A. action
   B. reaction
   C. active
   D. activity
   E. actions
   F. activities
   G. act
5. Different _____ take different amounts of time.
   A. action
   B. reaction
   C. active
   D. activity
   E. actions
   F. activities
   G. act

6. Physical _____ can help you get healthy.
   A. action
   B. reaction
   C. active
   D. activity
   E. actions
   F. activities
   G. act

7. Any fire is a chemical ______.
   A. action
   B. reaction
   C. active
   D. activity
   E. actions
   F. activities
   G. act
8. _____ volcanoes are volcanoes that might erupt again.
   A. action  
   B. reaction  
   C. active  
   D. activity  
   E. actions  
   F. activities  
   G. act  

9. Anyway, _____ speak louder than words.
   A. action  
   B. reaction  
   C. active  
   D. activity  
   E. actions  
   F. activities  
   G. act  

10. Please write your own sentence using the word action.

11. What would you like to remember about the meaning of the word action so that you can use it when you write or speak?
This Sauce Is Hot!

Article

SI RACHA, Thailand (Achieve3000, December 1, 2016). Sriracha is a popular hot sauce. Many Americans like it. In fact, more than $80 million of Sriracha is sold each year.

David Tran created Sriracha. He’s from South Vietnam. He moved to California in 1979. A year later, he began selling Sriracha. The sauce is named after Si Racha, Thailand. The town is known for a traditional sauce.

How are Tran’s Sriracha and the traditional sauce alike? Both contain sugar. They’re made with chilies.

Still, the sauces are different. The Thai sauce is made with roasted chilies. It has a well-rounded taste. It’s often eaten with noodle dishes.

Tran’s Sriracha is hotter. It’s made with red jalapeño peppers. It has a salty taste, and it’s often eaten with meat dishes.

Sriracha has a well-known look. It’s in a clear bottle with a white rooster logo on it. Some Americans call it “the rooster sauce.”

Information for this story came from VOA.

Dictionary

chili (noun) a kind of pepper; many are hot

logo (noun) a picture that a company puts on the things it makes

traditional (adjective) having been around a long time
PART 1

Question 1

**How Are These Sauces Alike and Different?**

- **Sriracha Sauce**
  - Often eaten with meat dishes
  - Contains sugar

- **Traditional Thai Sauce**
  - Has a well-rounded taste
  - Often eaten with noodle dishes

Think about the Article. Which fits best on the blank line above?

A. Is sold only in Thailand
B. Is not well known
C. Is sold in California
D. Is not made with chilies

Question 2

Let's say you are retelling this Article. Which is **most** important to say?

A. People eat Sriracha with meat.
B. David Tran is from South Vietnam.
C. Sriracha sauce is popular in the U.S.
D. Si Racha is a town in Thailand.

Question 3
Which two words have almost the same meaning, as they're used in the Article?

A) Sold and named  
B) Created and made  
C) Logo and dish  
D) Alike and different

Question 4
Which of these is an opinion?
An opinion tells what a person thinks or feels. Others may not think this is right.

A) More than $80 million of Sriracha sauce is sold each year.  
B) The traditional Thai sauce is made with roasted chilies.  
C) Sriracha sauce tastes best with meat dishes.  
D) Sriracha is sold in a clear bottle with a logo on it.

Question 5
Think about the Article. The reader can tell that ________.

A) Americans eat a lot of traditional food from Thailand.  
B) David Tran plans to stop selling Sriracha sauce.  
C) Americans must not eat many meat dishes.  
D) David Tran must like spicy foods.

Question 6
The Article says:
How are Tran's Sriracha and the traditional sauce alike? Both contain sugar. They're made with chilies.

Which must mean almost the same as contain, as it is used above?

A) Have  
B) Waste  
C) Need  
D) Make

Question 7
Bryce wants to know more about Thailand. He should look in a _______.

A. Math book
B. Music book
C. Science book
D. Social studies book

Question 8
Look at these sentences from the Article. Which sentence shows that Sriracha is popular?

A. It's made with red jalapeno peppers.
B. David Tran created Sriracha.
C. In fact, more than $80 million of Sriracha is sold each year.
D. The sauce is named after Si Racha, Thailand.
Thought Question

How is David Tran's Sriracha sauce the same as traditional Thai sauce? How is it different? Why do you think Sriracha is so popular? Use facts and details from the Article to back up your answer.

Write your answer below.
Math

PART 1

Suppose a store sold 23 bottles of Sriracha sauce on Wednesday and 17 bottles on Thursday. How many more bottles of Sriracha sauce did the store sell on Wednesday than on Thursday?

A) 7 bottles
B) 40 bottles
C) 20 bottles
D) 6 bottles
Sony Wants To Make Your Games

**Article**

**TOKYO, Japan.** Sony is making a new PlayStation Portable (PSP). When can people buy it? In late 2011.

What's new on this PSP? The device comes with a five-inch color touch screen. It can be tapped or tilted to move images. The back has touch pads, too. The images will look great. And like today's PSPs, this one has Wi-Fi.

Today, many people play games on other devices. Like what? A Nintendo DS or a smart phone. Smart phones also let people watch videos, send e-mails, and talk with friends.

Sony's not worried. Why not? It says the new PSP will be the best gaming device yet!

*Information for this story came from AP.*

**Dictionary**

device *(noun)*  a tool, often one that does a special job

image *(noun)*  a picture

portable *(adjective)*  able to be carried

tilt *(verb)*  to lean to one side

Wi-Fi *(noun)*  a way to join computers and cell phones to the Internet without using wires
PART 1

Question 1

Main Idea

Facts

People can buy the device in late 2011.

The device can be tapped or tilted to move images.

Think about the news story. Which fits best in the empty box above?

(A) Some people play games on a smartphone.
(B) Many people play games on a Nintendo DS.
(C) Sony is making a new PlayStation Portable.
(D) Smart phones let people watch videos and talk.

Question 2

Think about the news story. How is a smartphone different from a PSP?

(A) A smartphone has a screen that shows images.
(B) A smartphone can be used to play games.
(C) A smartphone is owned by many kids.
(D) A smartphone can be used to talk to friends.

Question 3

Think about the news story. You can tell that ________.

(A) Sony hopes that many people will buy the new PSP.
(B) The screen size on the new PSP is much too small.
(C) This will be the last new PSP that Sony will make.
(D) Sony will soon start selling PSP smart phones.
Question 4
Which means almost the **same** as *image*?

A. Button  
B. Game  
C. Picture  
D. Player

Question 5
Think about the news story. Which is most likely to happen?

A. Sony will ask people to give away any old gaming devices.  
B. Sony will ask Nintendo to make smart phones.  
C. Sony will not make any games for its new PSP.  
D. Sony will keep making new gaming devices.

Question 6
Which of these is an opinion?
**An opinion tells what a person thinks or feels. Others may not think this is right.**

A. The new PSP will move images when tilted.  
B. The new PSP will have touch pads on the back.  
C. The new PSP will come out in late 2011.  
D. The new PSP will be this year’s best gaming device.

Question 7
The news story says:
*Sony's not worried. Why not? It says the new PSP will be the **best** gaming device yet!*

Which must mean almost the **same** as *best*?

A. Loudest  
B. Greatest  
C. Prettiest  
D. Silliest

Question 8
The news story does not say that ______.

A. The new PSP will have Wi-Fi.
B. The new PSP will have a lower price.
C. The new PSP will have a five-inch screen
D. The new PSP will have a color touch screen.
This is a Venn diagram. Venn diagrams show facts. They show how things are alike and different. The Venn diagram below shows some facts about two video game devices:

Click to Enlarge (javascript:void(0);)

Look at the Venn diagram. Name something that the new PlayStation Portable has that the old PlayStation Portable doesn't have. How are the two devices alike?

Write your answer below.
PART 1

Sam played two games of video golf. She took 68 swings in the first game and 99 swings in the second game. How many more swings did Sam take in the second game than the first?

A 21 swings
B 37 swings
C 27 swings
D 31 swings
Yuck, Germs!

Article

ATLANTA, Georgia. Do people cover their mouths when they cough or sneeze? That's what some students in New Zealand wanted to know. They went to a train station, a shopping mall, and a hospital. They watched as people coughed or sneezed.

What did the students find? Many people tried to cover their mouths. But most used their hands. That's bad news. This puts germs on people's hands. The people can spread the germs to others. Then, those people can become ill, too.

What should people do? They should sneeze or cough into an elbow, where the arm bends. People could also use a handkerchief.

Information for this story came from AP.

Dictionary

cough (verb) to quickly push air out of the mouth

ergm (noun) a tiny living thing that can make people sick

handkerchief (noun) a small piece of cloth, often used for wiping one's nose, eyes, or face

hospital (noun) a place people go when they are very sick

sneeze (verb) to push air out of the nose quickly and loudly
PART 1

Question 1

Since . . .

Coughing into hands can spread germs to other people.

Then . . .

Think about the news story. Which fits best in the empty box above?

A) People should go to the hospital if they have a cough.
B) People should always carry a handkerchief.
C) People should use an elbow or a handkerchief.
D) People should quickly cover their mouths with their hands.

Question 2

This news story talks mainly about ________.

A) A shopping mall for students in New Zealand
B) The elbow, where the arm bends
C) The best way to cover a sneeze or a cough
D) A train station and a hospital in New Zealand

Question 3

A hospital is a place where people go ________.

A) When they want to catch a train
B) When they are sick
C) To shop for things
D) To read different books

Question 4
Think about the news story. How are a cough and a sneeze alike?

A They both are only done by people who live in New Zealand.
B They both are only seen at malls, hospitals, and train stations.
C They both make people who are sick look very silly.
D They both spread germs that can make people sick.

Question 5

The news story says:
What did the students find? Many people tried to cover their mouths. But most used their hands. That’s bad news. This puts germs on people’s hands. The people can spread the germs to others. Then, those people can become ill, too.

Look at the sentences above. Spread must mean _______.

A Whisper
B Save
C Pass
D Trouble

Question 6

Think about the news story. The reader can tell that _______.

A Many people do not want to buy handkerchiefs.
B Most people wash their hands after every sneeze.
C Many people spread germs when they cough or sneeze.
D Most people learn to cover their mouths with their elbows.

Question 7

Think about the news story. It does not say that _______.

A The students went to a shopping mall.
B The students went to a school.
C The students went to a hospital.
D The students went to a train station.

Question 8
The news story says:
What should people do? They should sneeze or cough into an elbow, where the arm bends. People could also use a handkerchief.

Why are these sentences in the news story? They help the reader to know _______.

A  What people should do when they cough or sneeze
B  Why most people buy handkerchiefs
C  How many people hurt their elbows
D  How long the students watched people in New Zealand
Thought Question

Think about covering coughs and sneezes. What would you teach others about this? How would you share these ideas?

Look at the news story for help. Use your own ideas, too.

Write your answer below.
PART 1

Twelve people sneezed at a shopping mall. Three of the people did not cover their mouths. The rest of the people covered their mouths with either a hand or an elbow. If three people covered their sneeze with an elbow, how many people covered their sneeze with a hand?

Draw a picture.

A 3 people
B 1 person
C 6 people
D 9 people