A Man Called Snowflake

*Lexile 750L - B*

1 Wilson A. Bentley was born on a farm in Vermont on February 9, 1865. He loved the long winters in his home state, and he especially loved the snow. Bentley felt that “snowflakes were miracles of beauty.” He thought it was sad that some people never got to see this beauty.

2 Sometimes, Bentley would just watch the snow falling from the sky. Other times, he would watch the wind pushing it along the ground. On his 15th birthday, his mother gave him a microscope. This let him take a closer look at the snowflakes he loved so much. He wanted to see what different snowflakes looked like, so he caught them on black cloth. Then, he put them under his microscope and looked. Sometimes, he drew what he saw. In fact, he made over 300 drawings of these snow crystals, but the snowflakes often melted before he could draw them exactly as he saw them. Bentley thought there had to be a better way to make his drawings more precise.

3 Then one day, Bentley had an idea. He would take his camera and connect it to his microscope. That way he would be able to take pictures of the tiny snowflakes before they melted!

4 First, Bentley built a shed where he could work. Then, he went outside to catch snowflakes. He caught them on a black board so he could see them more easily. Next, he used a toothpick to place a single snow crystal onto a microscope slide. Finally, he photographed it. This did not work right away, but Bentley was **persistent**. He never gave up, and on January 15, 1885, he became the first person to successfully photograph a single snowflake.

5 Bentley was not just interested in precipitation in a solid form, like snowflakes. He also studied liquid precipitation, or rain.

6 Bentley studied the rain in a surprising way. He used a tray of flour! When it rained, he would carry the tray outside where the raindrops would leave impressions in the flour. Then, he would go back inside and measure the size of the drops. Bentley found that raindrops of all sizes fall to Earth during most storms. He also found that there are usually more small drops than large ones. There were some storms when the drops were almost all the same size, but Bentley never figured out why. Even today, no one knows why this happens.
Continued

7 In 1931, Bentley published a book called *Snow Crystals*. It has 2,400 pictures of snowflakes. Bentley received awards for his work. He published papers in science magazines. A famous jewelry company even used his photographs to help them design jewelry.

8 Sadly, Bentley died of pneumonia after walking home in a snowstorm, but to this day he is remembered. In fact, many people still call him “Snowflake Bentley” for his work with snowflakes.
1. Which sentence from the passage is the author’s opinion?
   A. Bentley studied the rain in a surprising way.
   B. Wilson A. Bentley was born on a farm in Vermont on February 9, 1865.
   C. In 1931, Bentley published a book called *Snow Crystals*.
   D. It has 2,400 pictures of snowflakes.

2. Which of the following would also be a good title for this passage?
   A. *Wilson Bentley: A Man Who Loved Microscopes and Cameras*
   B. *Wilson Bentley: A Man Who Studied The Weather*
   C. *Wilson Bentley: A Jewelry Designer*
   D. *Wilson Bentley: A Boy Scientist*

3. The word *persistent* (fourth paragraph) means:
   A. lazy
   B. scientific
   C. determined
   D. frozen

4. What do you think people thought about Bentley’s work?
   A. They thought he was crazy to try to photograph snowflakes.
   B. They were impressed by the new scientific discoveries he made.
   C. They thought the photographs were pretty but didn’t know what to do with them.
   D. They thought he could make a lot of money if he would leave his farm.
5. Complete this analogy:

Snowflake is to crystal as __________ is to liquid.

A. solid
B. snowstorm
C. raindrop
D. melted

(4.2C)
LOOK at this picture:

THINK about the screws in this picture. Can you determine anything about their length from the photograph? Can the same tool be used to install each one?

WRITE about ways to determine some of the properties of these screws. How can you begin predicting which ones would or would not stick to a magnet? How would these behave differently from pieces of wood having the same size and shape?
The fourth grade class at Eagle Lake Elementary was learning about the **states** of matter. They learned that matter was anything with mass and volume: a chair, a person and even air are all matter. Their teacher, Ms. Jones, also told them that matter could change states, or forms, depending upon temperature.

“That does not make any sense,” said Ivan. “A chair is always a chair, air is always air, and I’m always Ivan. I never see any of these change.”

“Hmm…” said Ms. Jones. “What if I can prove to you this is wrong?”

The kids were excited because this sounded like a challenge.

“I bet you, tomorrow I can prove to you that the air around us can change. If I cannot do this I will give you extra recess on Friday.”

The kids gleefully accepted the challenge. After lunch, they eagerly watched as Ms. Jones showed them an ice cube on a tray.

“Is this ice cube matter?” she asked them.

“Sure,” said Tamara. “It definitely has mass because we can put it on the balance and weigh it. It has volume, too, because it takes up space.”

“Great. So we all agree this is matter,” Ms. Jones said. “I just recently took it out of the cafeteria freezer, but let us see what happens as it warms up.”

The fourth graders got out their observation notebooks. They watched closely and took careful notes as the ice cube began to drip and create a small puddle in the middle of the tray. Tamara suggested that the ice cube might melt even faster if they raised the temperature.

“That’s an interesting idea, Tamara,” Ms. Jones said. “Can you think of how we might test your hypothesis?”
Continued

12 “I know!” said Tamara. “The overhead projector always heats up when we use it. We can put the tray on the projector and observe what happens then.”

13 Ms. Jones transported the tray to the overhead projector, where the extra heat did make the ice cube melt faster. In fact, in just a short amount of time the ice cube disappeared entirely and all that remained was a big puddle of water.

14 “OK,” said Ivan. “I see what you mean. Melting is one way that matter can change states.”

15 “Yes,” said Ms. Jones. “Even the chair could change states. It is made of metal and plastic. If I heated it to a high enough temperature, the metal and plastic would melt and become liquid just like the ice.”

16 “Yeah,” said Bobby. “One time my mom accidentally melted a plastic spoon on the stove top. It turned to liquid and it smelled terrible!”

17 “Right. Matter changes states.”

18 “You said even air can change,” said Ivan. “You still have not proved your point.”

19 “Just wait until tomorrow,” said Ms. Jones.

20 The kids packed up to go home, and Ms. Jones left the tray of water out on the table overnight. The next morning, the tray was dry!

21 “What happened?” asked Tamara.

22 “I bet I know!” said Ivan. “The water evaporated. Heat caused it to become a gas.”

23 “Right. So where is the water now?” asked Ms. Jones.

24 “The water …” Ivan realized he had been beaten. “The water is in the air. Now the air contains more water vapor than it did yesterday, and we lose the bet.”

25 “Yes,” said Ms. Jones, “but the most important thing is that you were thinking like scientists. I’m going to give you that extra recess anyway.”

26 All the kids cheered.
Here are some dictionary definitions of the word state:

1. (n) a nervous feeling
2. (n) a territory of the government
3. (n) the form of matter
4. (n) a part of the United States of America

Which definition is closest to the way the word states is used in the following sentence from the first paragraph?

Their teacher, Ms. Jones, told them that matter could change states, or forms, depending upon temperature.

A Definition 1  
B Definition 2  
C Definition 3  
D Definition 4

What should go in the arrow?

Ice -> Water

A evaporation  
B heat  
C gas  
D liquid

What was Tamara’s hypothesis?

A The ice cube would evaporate.  
B The ice cube would refreeze if they put it in the freezer.  
C The ice cube would melt faster if they put it outside.  
D The ice cube would melt faster if the temperature was raised.

Why did Ms. Jones give the students recess even though they lost the bet?

A She was proud of their thinking.  
B She wanted to take a break on Friday.  
C She always let them have extra recess on Fridays.  
D They had behaved well.
5 In this story what did Ivan learn?

A Always bet against Ms. Jones.
B Ms. Jones never keeps her promises.
C Matter can change states even though you may not be able to see it happen.
D Matter never changes.

(Fig. 19D)
LOOK at this picture:

THINK about the effects of this hot lava. What problems could it create for the people who live in this town?

WRITE about what you think is happening to the ground and the pavement under the lava. What do you think will occur when the lava cools? What will the lava and the ground be like then?

Notes
WRITING SCIENCE

Changes from Heat
Matter and Energy

Topic: ________________________________
Scott's Science Project

Lexile 650L - B

1 It was a warm spring day. Scott was walking home from school. His science teacher had just given his class a big homework assignment. They had to enter a project into the school science fair. Scott had no idea what he was going to do. They could choose anything they had studied that year. There were so many choices. Scott couldn’t decide.

2 When Scott arrived home, he was hot and sweaty. He decided to make a glass of his favorite drink, sweet iced tea. After pouring the tea into his glass, he grabbed a spoon. Then he began to stir in sugar to make it nice and sweet. As he stirred, he watched the sugar spin around inside the cold glass before it began to disappear. Scott had never really thought about why this happened. Suddenly it hit him. There was a science experiment right inside his glass of iced tea! He remembered they had studied mixtures and solutions in science class, and he knew his sweet tea was one of them. This would be his topic. He would find a mixture and a solution in his own kitchen.

3 First he needed to know if his iced tea was a mixture or a solution. He couldn’t quite remember. He hurried to his backpack and pulled out his science book. He found the definition of a mixture. It said:

4 Mixture — The combination of two or more substances that are not similar and do not combine chemically. This means the substances still hold their original properties.

5 Scott looked into the glass. He could no longer see the sugar. His iced tea must not be a mixture.

6 Then, he looked through his science book again and found the chapter on solutions. It said:

7 Solution — A type of mixture that is a combination of two or more substances. In a solution, the solute is spread homogenously throughout the solvent. Homogenously means “evenly throughout,” and a solute is the substance that is spread throughout the solvent.
8 Scott realized that in his glass, the sugar was the solute and the iced tea was the solvent. This is because the sugar dissolved into the tea. This meant his iced tea was a solution!

9 Now Scott needed to figure out an example of a mixture. He wanted to use a liquid like tea or water as one of the substances in the mixture. He thought it might make it easier to compare the differences between mixtures and solutions. So, he poured a glass of water and tried to find something else to make a mixture.

10 First he tried salt. After stirring in the salt, he realized that, like sugar, it also dissolved in water and was therefore a solution. “Think, Scott, think,” he said to himself. He tried to think about a substance that was very different from water and wouldn’t mix with it chemically. “Aha!” he said out loud. “Pepper!” He poured black pepper into the glass. He stirred and stirred but nothing happened. Scott knew he had a mixture because the pepper did not dissolve.

11 Scott had his project all figured out. He ran to his room and began making a big poster about what he had just discovered. He knew his project was simple, but he also knew it was educational. Who knew? Maybe he could even win the science fair!
1. Which sentence is the best summary of the second paragraph?
   A. Scott got started on his science project.
   B. Seeing the sugar dissolve into the iced tea gave Scott an idea for an experiment.
   C. Scott was hot and sweaty so he made sweet iced tea.
   D. Scott was stumped on what his project might be.

2. What does the word *homogeneously* (seventh paragraph) mean?
   A. evenly throughout
   B. solution
   C. dissolve
   D. slowly

3. What do you think Scott might write at the top of his poster?
   A. Sweet Tea For Sale
   B. Mixtures and Solutions in the Kitchen
   C. Sugar and Water
   D. Solutions Are Everywhere

4. Which of the following is NOT a mixture?
   A. a bucket of sand and pebbles
   B. chocolate chips in cookie dough
   C. cereal and milk
   D. salt and water
The author arranged the facts in this story by:

A. telling a story that used mathematical facts
B. comparing and contrasting solutions and mixtures
C. sequencing the steps needed to make a mixture of iced tea
D. explaining what makes a solution sweet

(4.11C)
LOOK at this picture:

THINK about your favorite pizza toppings. The pizza in the picture is ready to bake. Why are the toppings considered a mixture?

WRITE about what happens to some toppings while the pizza is being baked. Are the toppings still considered a mixture? Do they change at all? Can they still be separated? Would any of them become a solution when heated in an oven?

Notes
WRITING SCIENCE

Matter and Energy

Topic: ____________________________
Powering Up Your Day

Lexile 650L - B

1 What was the first thing you did when you woke up today? Maybe you looked at the clock. Maybe you turned on a light. Or, maybe you got up and turned on the radio. If you did any of these things then you used electricity. Electricity plays a huge role in our lives. Our overhead lights and household appliances use it. Our TVs, computers, cell phones, and iPods use it. We have large power stations that bring electricity to our homes. And, we have batteries that give it to us on the go. Electricity is truly everywhere.

2 What was the first way you used electricity this morning? Maybe it was when you flipped the switch to turn on the lights. This is easy to do today. But, if you had lived 150 years ago you could not have done this. You would have had to use a candle or a lamp for light. We can thank Thomas Edison for the electric light. In 1880, he perfected the light bulb. He also invented a way to bring electricity into peoples’ homes. To make the light bulb, Edison put a filament inside a glass bulb. A filament is a thin strand that resists, or fights against, the flow of energy. This resistance creates friction. When there is enough friction, the filament heats up and produces light.

3 What about breakfast? Did you have toast? In the old days, if you wanted toast you had to hold it over an open flame. Not anymore. Now we have electric toasters. We have Albert Marsh, who invented a special wire, to thank for this. The wire is wrapped around a reflective surface. So, when electricity flows through the wire, it glows and creates heat. Even a short amount of this wire can make a great deal of heat. The heat that is created cooks, or toasts, the bread.

4 Did you use an electric fan to keep yourself cool? That device uses a motor to turn the fan blades. The blades make the breeze that keeps us cool. We can thank Michael Faraday for inventing the electric motor in 1821. He showed how electricity and magnetism are related. An electric current flowing through a circuit creates a magnetic field. A motor uses electricity and magnets to create motion. The magnetic fields from the current and magnets push and pull on each other. This turns the motor, much like when you push the pedals on your bicycle.
Did you listen to music on the way to school? Did the sound come from a radio? Or, from an MP3 player or an iPod? All these use electricity. And they all make music in much the same way. First, a microphone captures a musical sound. Next, a recorder stores the signal as an electric code. Then, a player reads the code and changes the electrical signal back into sound. And last, an amplifier boosts the signal to a speaker. Who do we thank for the sound of music in our lives? Once again, it is Thomas Edison! He invented the phonograph in 1877. It was a machine for recording and replaying sound. Other inventors then improved on his invention. In 1909, Lee de Forest found a way to make this sound louder. And in 2001, a company called Apple invented the iPod. It is a device that can store thousands of songs, as well as videos and images.

All of these devices use electricity. Indeed, electricity is essential to our modern lives. How else do you use electricity during the day?
1. This passage is mostly about —
   A. Thomas Edison.
   B. the electrical inventions we use every day.
   C. the power plants that generate electricity.
   D. the things you do to get ready for school.

(4.11A)

2. The author organized this passage by:
   A. explaining how electricity causes a variety of effects
   B. sequencing the creation of the electrical inventions that have impacted our lives
   C. describing how the inventions we use each day use electricity and magnets
   D. comparing and contrasting the time before electricity to the time after

(4.11C)

3. The word **resists** (second paragraph) is closest in meaning to:
   A. makes easier
   B. heats
   C. struggles against
   D. lights

(4.2B)

4. What can you tell about Thomas Edison from this passage?
   A. He was a kind man.
   B. He made lots of money from his inventions.
   C. He was lucky.
   D. He invented several devices that used electricity.

(Fig. 19D)
5. The motor that turns a fan is most like:
   A. pouring sand out of a bucket
   B. pedaling a bicycle
   C. reading a book
   D. a ball rolling down a hill

(4.11A)
LOOK at this picture:

THINK about what kind of sound might come from an instrument like those in the picture. How many types of energy do you think are needed to make music with them?

WRITE about playing an instrument like these. What must people do to play them? Do you think more than one part of the instrument can produce sound? How do you think you can make the sound that comes from the instrument louder or quieter?

Notes
WRITING SCIENCE

Topic: ____________________________________________

Forms of Energy
Force, Motion, and Energy

Sample
Conductors and Insulators

1 Electricity is useful in many aspects of our lives. It powers many of the things we use every day. Because of electricity we can turn on a lamp or a fan. We use electricity to watch TV and it allows us to listen to the radio. In fact, electricity plays an important role in most of the things we do every day. But how does electricity work?

2 Let’s take the example of a lamp. Pretend that you are in the living room. It is getting dark so your mom asks you to turn on a light. You reach over and turn the on/off switch... but nothing happens. You try again, but still nothing. What’s wrong?

3 You look down and see that the lamp is not plugged into the wall socket. That’s it! You get off of the couch, plug in the cord, and try turning the light switch again. This time it works!

4 Why was this cord so important? Well, electricity cannot move all by itself. It cannot just jump from the socket on the wall to the lamp on the table. Electricity needs a conductor. A conductor is a material what carries electricity from one place to another. Conductors are made of things like copper, iron, and steel. All of these metals will carry electricity. One of these metals was probably in the cord that you plugged into the socket.
Continued

5 Because our bodies can conduct electricity, it would be a problem if the wires carrying electricity were bare. We might even get shocked if we touched them! Luckily, scientists have found that there are other materials that don’t conduct electricity. These materials are called insulators. Wood, plastic, rubber, and glass are all insulators. So, as a precaution wires are usually placed inside of an insulator. That way we will be safe.

6 Still, it is important to be careful around electricity. Sometimes the insulator on an electrical cord can become damaged. The cord may be cut or a part of the insulation might be worn away so that you can see the wires. This is dangerous. Whenever you see a cord that looks like this you should tell an adult so they can dispose of it.

7 Also, you must always be very careful when an electrical device is near water. This is because water and salt are conductors, too. Our bodies contain both of these materials. That is why our bodies are conductors.

8 So, while electricity is both important and amazing, you must always remember that it can also be dangerous. Knowing about conductors and insulators is one way to stay safe when you are around electricity.
1. Here are some dictionary definitions of the word conductor:
   (1) one who manages or controls
   (2) one who leads a band
   (3) one who takes tickets on a train or bus
   (4) object that carries or transmits

Which definition is closest to the way that the word conductor is used in the fourth paragraph?
A Definition 1
B Definition 2
C Definition 3
D Definition 4

2. What is the main idea of the fourth paragraph?
A Electrical appliances work because they have wires that carry electricity.
B Electricity can flow through some materials, called conductors.
C Insulators will not conduct electricity.
D Your body is a conductor.

3. The diagram below the fourth paragraph shows:
A how a light bulb works
B the design of an appliance
C the inside of an electrical cord
D an unsafe cord

4. Which would be the safest place to be standing during a lightning storm?
A under an aluminum roof
B in a pond
C in a plastic shed
D touching a copper statue
5 If you were on the playground and saw an electrical cord that had fallen in the wind, the responsible choice would be to:

A pour water on it
B use a stick to move it out of the way
C find an insulator
D tell an adult about it

(Fig. 19D)
LOOK at this picture:

THINK about the last time you drank something warm. The hot chocolate in this picture is so warm that the whipped cream on top is melting.

WRITE about the differences between a conductor and insulator. Is the spoon in the picture a conductor or an insulator? What about a cooler on the beach? If you wanted to soundproof a room, what kinds of things could serve as good insulators?
WRITING SCIENCE

Topic: ____________________________

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1 Have you ever looked at the Moon on a clear night? What did you see? At times the Moon can look like a smooth, glowing ball. But, nothing could be further from the truth.

2 The Moon is covered with craters. Craters are bowl-shaped pits. They are created when objects from space hit the Moon. If these same objects headed towards Earth, they would probably burn up before reaching our planet or lose speed because of Earth’s atmosphere. The Moon does not have an atmosphere surrounding it so there is nothing to stop objects from hitting its surface.

3 When a meteoroid, or piece of rock, hits the surface of the Moon, it is a lot like when a rock falls into a puddle of water. On impact the meteoroid throws up dust and dirt just like a rock would splash water up into the air. The meteoroid breaks up into pieces and it leaves a ring on the surface. The dust and dirt that splash out create bright lines that look like rays.

4 You can tell a lot by looking at these craters. When a large rock strikes the Moon’s surface, it makes a big ring. Smaller rocks make smaller rings. A deep crater means the rock that hit the Moon’s surface was moving very fast, while a shallow crater means that it was moving slower.

5 Scientists name the Moon’s craters. One crater that has fascinated them is named Tycho. Tycho is one of the few craters where the bright lines coming out of it can be seen clearly. The reason these rays are so visible is that Tycho is fairly young for such a large crater. It is only 108 million years old! That might seem old to you, but some of the craters on the Moon are more than 1 billion years old!

6 The patterns found on the surface of the Moon provide scientists with a lot of information. The information tells them about dust particles and other objects that were floating in space millions of years ago. Scientists can even learn about what happened on the Moon before people were on Earth. All of this is possible because of the unique patterns that are created from the force and motion of rocks hitting the Moon’s surface.

7 The next time you look at the Moon, think about all the craters. Some of them are so big that you can even see them with your own eyes!
1. The author probably wrote this passage to:
   A. persuade you to study the Moon
   B. entertain you with stories about the Moon
   C. inform you about what scientists can learn from craters on the Moon
   D. explain how to use information about craters to calculate how fast meteoroids were traveling when they hit the Moon

2. Scientists measured the depth of four craters. Their data are in the table below. Which crater was caused by a meteoroid moving at the fastest speed?
   - Crater A: 5 m
   - Crater B: 25 m
   - Crater C: 4 m
   - Crater D: 27 m
   A. Crater A
   B. Crater B
   C. Crater C
   D. Crater D

3. Another good title for this passage would be:
   A. Learning from the Moon’s Craters
   B. Scientists on the Moon
   C. Tycho the Crater
   D. Objects in Space

4. Scientists found two crater rings, one on top of the other. They could tell:
   A. how fast the meteoroids that formed the craters were traveling
   B. the crater on the bottom was older
   C. the shape of the meteoroid
   D. what the crater should be named

(Fig. 19D)
5 Why aren’t there as many craters on Earth as there are on the Moon?

A People are able to keep the meteoroids from hitting Earth.

B Meteoroids never come near Earth.

C The Earth’s atmosphere causes most meteoroids to burn up.

D People fill in the craters that are formed.

(4.11A)
LOOK at this picture:

THINK about your backpack or book bag. Is it heavy or light? There are many forces acting on this boy from his full, heavy backpack.

WRITE about all the various forces you can identify that help this boy’s backpack stay on. Where do you think the greatest force is applied? From which direction does it come? What if he were to lean backwards?

Notes
WRITING SCIENCE

Experimenting with Forces
Force, Motion, and Energy

Topic: ____________________________________________________________

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Sample
Sample
Imagine that you woke up this morning, and you had turned into a corn plant. After you got over the shock, you’d have to find a good place to live. You’ll also need to find some nutrients. A bedroom is no place for a corn plant to grow. Your usual breakfast of frozen waffles isn’t going to help you out!

Where can you find a new home? In the soil! Soil seems so simple. But soil is more than just dirt. Different soils have different properties. If you turned into a corn plant, you would have to find just the right spot to grow. Not every type of soil is good for all kinds of plants.

Take the soil’s color, for instance. You might think that the color wouldn’t matter to a plant. But the color can tell you a lot about what is in the soil. Some soil is made up of dark colors like black and brown. Other soils are almost white. Maybe you’ve seen reddish soil on a baseball field. Or maybe you’ve seen black soil on the edge of a pond. These different colors tell us that the soils are made up of different materials. Red soils have more minerals from the rock they came from. Usually the darker soils have more nutrients for growing plants. So if you had to choose one to live in, which would you choose?

The texture of soil depends on the size and number of particles that make up the soil. The particles can feel rough and thick, or fine and small. Soils have different amounts of sand, silt, and clay particles. More sand in the soil makes it feel gritty and sharp. Greater amounts of silt give a texture that is smooth and powdery. Clay makes soil feel smooth when dry and sticky when wet. Soil with more clay is sticky enough to mold into a shape. You may have played with clay when you were a kid, but now you’re a corn plant! You’ll have to find soil where your roots can hold on and where you will be warm enough. Sandy soil warms up faster than other kinds. So if the weather is bad, you’ll want to find soil that has some sand — but not too much.
5 You can’t have too much sand, because you also need to think about water. **Water retention** is the amount of water the soil can hold. Too much or too little water are both just as bad for plant health. The amount of water the soil will retain depends on the amount of sand, silt, and clay in the soil. Soil that is very sandy holds little water. That is why some plants in a desert have long roots. This helps the plant get at water supplies deep under the ground.

6 Clay soils hold large amounts of water. Rice plants grow very well in wet environments. Clay soil, like that found in some parts of Texas, can be flooded with water for growing rice. This makes it look like the plants are growing in ponds for a certain period of time.

7 But you didn’t wake up as a rice plant — you are a corn plant. A corn plant cannot grow in the sandy desert soils or in a flooded rice paddy. One would mean not enough water, and the other would mean too much.

8 So what kind of soil would you want to live in? You’ll have to perk up your “ears” and find the right place!
## READING SCIENCE

### Properties of Soil

#### Earth and Space

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The author probably wrote this passage to:</td>
<td></td>
</tr>
</tbody>
</table>
A. give advice on what you should do if you turn into a corn plant  
B. tell about the properties of soil in a funny way  
C. persuade you to take care of the soil  
D. tell you how to plant corn  |
| 2. Which sentence from the passage expresses the author's opinion? |  
A. A bedroom is no place for a corn plant.  
B. Maybe you've seen reddish soil on a baseball field.  
C. Soils have different amounts of sand, silt, and clay particles.  
D. Soil with clay is sticky enough to mold into a shape.  |
| 3. If you were a corn plant, which type of soil would you choose to live in? |  
A. reddish clay soil flooded with water  
B. sandy desert soil that is a light yellow color  
C. dark soil with some sand particles  
D. dry, rocky soil  |
| 4. Which of the following materials would be the best for water retention (fifth paragraph)? |  
A. sand  
B. a net  
C. rock  
D. a sponge  |
5 What would be a good heading for the fourth paragraph?

A Properties of Soil
B Soil Texture
C Water Retention
D Growing Corn

(4.11A)
LOOK at this picture:

THINK about the different kinds of soil that can be found on the Earth. Each kind has properties making it better for certain uses than others.

WRITE about what soil looks like, how it feels, and how it holds water. Describe some uses for different types of soil. What types of soil hold more water? What kind of soil is better for plants that don’t need lots of water, like the cactus in this picture?

Notes
Humans have always been fascinated by caves. As long as 17,000 years ago, people created paintings on the walls of caves. Caves can provide shelter for people and for animals. You may have even visited a cave. Have you ever wondered how caves are formed?

The process of cave formation takes a long time. It begins when rain falls and seeps into small cracks in limestone. This dissolves some of the rock and then ground water carries the rock away. When this happens the cracks become bigger than they were before.

Over a very long period of time, the cracks in the rock become large enough for water to flow through them like a river. The faster the water flows, the greater effect it has on the rock. Pieces of rock break away and become sediment. This sediment is carried away by the water. It may take thousands of years, but in time, a cave is formed.

If you were to explore a cave, you might find underground streams made up of the water that formed the cave. Some of the streams contain fish that are able to live in the dark environment of the cave. There are some places where people even swim in these underground streams. If you shine a light, you might even be able to see some of the unusual fish.

When a cave is formed, rock is carried away. This creates a hole. But, there are also other forces that deposit, or leave, rock inside the cave. This creates beautiful and amazing structures. Water that is carrying minerals seeps through the ground and down into the cave. As this water slowly drips through the ceiling of the cave, it evaporates and leaves the mineral sediments behind. Some of the minerals in the water stick to the ceiling of the cave and some fall to the cave's floor.
The structures that hang from the ceiling of a cave are called stalactites. They often look like icicles. The structures that rise up from the floor of the cave are called stalagmites. Stalagmites break easily and explorers may find pieces from them on the cave floor.

Caves are truly fascinating places. They are very beautiful and they also tell us a lot about how the Earth changes.
1. The formation of a cave would most likely take about:
   A. 1 year
   B. 100 years
   C. 10,000 years
   D. 100,000 years

2. Look at the pictures below. Which one shows a stalactite?

3. Which statement belongs in the empty box?
   A. The cave is formed by constructive forces that deposit sediments.
   B. Water begins to carry away the broken rock.
   C. Rain seeps into cracks and dissolves some of the rock.
   D. An underground stream is formed

4. What does the word deposit (fifth paragraph) mean?
   A. carry away
   B. leave behind
   C. dissolve
   D. erupt

Sample
5. The main idea of this passage is:

A. Caves are interesting places to explore and swim.
B. Caves take a long time to form.
C. Caves form through processes that carry away and deposit rock.
D. People painted on the walls of caves 17,000 years ago.

(4.11A)
LOOK at this picture:

THINK about the effects of weathering on the Earth’s surface.

WRITE a description of what the fast-moving water in this picture is doing to the rocks. What do you think the rocks might look like if you came back many years later? Other than water, what else causes the Earth’s surface to change slowly?

Notes
WRITING SCIENCE

Topic: ________________________________

Sample
The Poster Contest

**Lexile 800L - B**

1. Just after lunch one day, Miss Simpson had an announcement for her class.
2. “Kids,” she said, “we are going to enter a poster contest. We are going to make posters to convince kids to use resources wisely.”
3. John asked, “What does that mean?”
4. “Earth provides us with the resources we need to live,” said Miss Simpson. “Earth provides us with air, plants, water, and animals. Humans cannot make these resources themselves.”
5. “But why do you say we have to use them wisely?” asked Amir.
6. “Well,” Miss Simpson continued, “even though some resources are renewable, which means they can be replaced in time, it takes a long time to replace them.” She held up a piece of notebook paper. “This paper is made from trees. When trees are cut down to make things like paper, they can be regrown. But, it takes a long time to regrow trees, or replace dirty water with clean water, or clean air after it has been polluted. That is why we need to take care of our renewable resources.”
7. “What about things that cannot be renewed?” asked Addison. “My dad says there is only so much oil in the world, so we have to **conserve** it, or not use so much of it.”
8. “That is right, Addy,” said Miss Simpson. “Besides oil, there are other nonrenewable resources like coal, and natural gas, the fossil fuels. Once we use them up, there are no more of them. It took the planet a long time to create these resources, but we are using them so fast. Supplies will disappear if we do not do something about this soon. You kids are so smart. I know you will want to help spread the word about how important it is to conserve.”
9. “I think this poster contest sounds like a great idea!” said Amir. “I don’t want us to run out of resources!”
Miss Simpson passed out crayons, paper, and markers to the kids. They started drawing pictures and writing messages on their posters.

They wrote things like: *Please Recycle and Walk To Save Gas.* Miss Simpson gave them other ideas, such as: *Turn Off The Water When You Brush Your Teeth!* and *Reuse Plastic Bottles.*

Miss Simpson asked the kids to make additional posters to put up around the school so that all of the other students would know how important it is to use resources wisely.

The kids hung their posters and then stood back and looked at them with pride. They felt like they had done something good for their school and for the planet. Miss Simpson was proud of them, too, and gave all of the kids cupcakes that she had baked.
READING SCIENCE

1. What is the story mainly about?
   A. Students learning about resources and the importance of using them wisely.
   B. Students enter a poster contest.
   C. Miss Simpson is a kind and knowledgeable teacher.
   D. Students decorate their school with posters.

2. Which of these is most likely to happen the next day at school?
   A. Miss Simpson will give a math lesson.
   B. Amir, John, and Addison will throw away paper and plastic bottles.
   C. Other students at school will see the posters and recycle.
   D. The principal will get upset because the kids put up posters without permission.

3. What does the author mean by the word **conserve** (seventh paragraph)?
   A. save
   B. convince
   C. use
   D. waste

4. Complete this analogy:
   Trees are to renewable as ______ is to nonrenewable.
   A. water
   B. oil
   C. corn
   D. money
5 Which of these statements from the passage is Miss Simpson’s opinion?

A “We are going to enter a poster contest.”

B “When trees are cut down to make things like paper, they can be regrown.”

C “There are also nonrenewable resources like oil, coal, and natural gas, the fossil fuels.”

D “You kids are so smart. I know you will want to help spread the word about how important it is to conserve.”

(4.11B)
LOOK at this picture:

THINK about what this wood looked like before it became a part of the frame of a building.

WRITE about this natural resource. How was it formed? In what other ways can we use wood? What makes it a renewable resource?

Notes
WRITING SCIENCE

Topic: ________________________________

Sample
Dan, the Meteorologist

Lexile 820L - B

1 Hi! My name is Dan. I am a meteorologist for Channel 12 News. When I say that, some people think that I study meteors, but what I really study is the weather. It is an interesting job because the weather is always changing. One thing I love about it is that I get to use the latest tools to collect data about the weather.

2 One tool I use is a rain gauge. A rain gauge measures how much rain has fallen in a given time period. You might even have one of these in your school science lab. If you do, you could place it outside to measure the amount of rain that falls at your school. That would give you one piece of data. But that is not enough information to report on rainfall across the entire city. Sometimes when it is raining in one part of the city, it is dry in another part. That is why I have rain gauges in many different locations. Then I can tell people exactly what is going on in their neighborhood.

3 There are even newer instruments that go up into the sky. For instance, there are some satellites that circle the Earth. They take pictures from above and then send them back to us. These pictures are helpful because they show storms out in the ocean. They can even help us predict when and where these storms will make landfall.

4 We also have computers that take the data from satellites and do calculations, or math problems, with them. These calculations would take a human being a long time to do. But, a computer can do them in just a few seconds. They help us predict how storms, cold air, and wind will travel. In all, these new tools allow us to be much more accurate about predicting the weather than we could be before satellites and computers.

5 Accuracy, or getting the right answers, is important to a meteorologist. That is because many weather events are dangerous for humans and animals. If I make good predictions, then I can warn people to get ready. For example, during Hurricane Ike I was able to predict when and where the storm would reach land. Also, I was able to tell people living close to the sea to move inland. I told people further from the shore to stay in their homes. Although they would not have to deal with the waves, they might still have to deal with high winds and a lot of rain. Many people were safe because they listened to my advice and prepared their homes and families for the storm.
Continued

6 I feel great about my job when I get to help people. The new tools and computers are really fun. But, what I enjoy the most is that I am able to make accurate weather predictions that help people in their daily lives.
1. **Meteorology** is the study of weather. The root *zoo-* means animals. What do you think the study of animals is called?
   A. zooistry  
   B. zoophobe  
   C. zoology  
   D. zoolog  

(4.2A)

2. Where do you think would be a good place to put a rain gauge?
   A. under a tree  
   B. in your classroom  
   C. in a car  
   D. out on the playground  

(Fig. 19D)

3. Why do you think Dan wrote this passage?
   A. He wanted to tell people about why he needs more satellites and computers.  
   B. He wanted to inform others about what a meteorologist does.  
   C. He wanted to persuade more people to watch Channel 12 News.  
   D. He is looking for another job.  

(4.10)

4. Dan says **accuracy** is important in his job (sixth paragraph). When is another time that accuracy is important?
   A. when you are doing a math problem  
   B. when you are watching TV  
   C. when you are waiting for school to start  
   D. when you are listening to music  

(4.2B)
5. What is something that Dan would probably say about his job?

A. “Weather is boring.”

B. “The favorite part of my job is the cool computers and tools.”

C. “It’s okay if I’m wrong sometimes.”

D. “The best part of my job is helping people.”

(Fig. 19D)
LOOK at this picture:

THINK about the last time it rained. What clues did the clouds give you that it might rain?

WRITE about what happens before a rainstorm. What changes can you feel with your five senses? What do scientists use to predict the weather? What tools do they use to gather weather data?

Notes
1 Have you heard the story of *Goldilocks and the Three Bears*? In the story Goldilocks tries three chairs. One is too big. Another is too small. But then, Goldilocks finds a chair that is just right for her.

2 Well, our planet Earth is “just right” for us. It is not too far from the Sun. It is not too close to the Sun. Because our planet is just the right distance from the Sun, we are able to survive.

3 Solar energy begins its journey through space 93 million miles away from Earth. It is this energy that creates the water cycle that is so important for life to exist on Earth.

4 Other planets in the solar system do not have a water cycle in the same way we do. This diagram shows the Sun and the other planets near us:

![Diagram of the solar system showing the Sun, Earth, Venus, and Mars.](image)
5 If Earth were closer to the Sun, all the water would heat up and evaporate. It would enter its gas state and rise into the air. This is what happened on Venus. Venus is so close to the Sun that its temperature is hotter than a pizza oven. The atmosphere on Venus is thick and filled with water vapor and other substances.

6 If Earth were farther from the Sun, all the water would remain in a frozen state. Mars is farther from the Sun than Earth. It is so far from the Sun that its surface temperature never gets above the freezing point of water. All of the water on Mars remains frozen solid.

7 But we are “just right” out in space between Venus and Mars. Earth’s atmosphere traps solar energy and heats our planet. This warm blanket of air keeps Earth at about the same temperature both day and night. If Earth had no atmosphere, it would drop to below freezing every night. All of the water would freeze. In the daytime, the temperature would get so hot that all of the ice would melt and then evaporate. We would never have flowing rivers.

8 Luckily, this does not happen. The Sun’s energy allows most water to stay in its liquid state. We have water to drink and beautiful oceans to look at and enjoy. However, some water does evaporate and rise into the atmosphere. As it cools, it forms clouds which lead to precipitation. This precipitation, known as rain, allows plants to grow. We must have the water cycle to live. We have the water cycle because our planet’s distance from the Sun is “just right.”
# READING SCIENCE

## The Sun and the Water Cycle

### Earth and Space

1. Why did the author begin the passage by writing about Goldilocks?
   - **A** The author would like to write a fairy tale instead of a science article.
   - **B** The author thought a comparison to something familiar would help the reader understand why distance from the Sun is important.
   - **C** The author wanted to confuse the reader by making the passage more interesting.
   - **D** The author was trying to be funny.

2. Look at the diagram in the passage. What is the temperature probably like on Mercury?
   - **A** much colder than Earth
   - **B** much hotter than Earth
   - **C** about the same as Earth
   - **D** we have no way of knowing

3. What would you have to do to get a drink of water on Mars?
   - **A** cool the water so it would turn from gas to liquid
   - **B** heat the water so it would turn from solid to gas
   - **C** cool the water so it would turn from liquid to gas
   - **D** heat the water so it would turn from solid to liquid

4. Which sentence from the passage is the best summary of the article?
   - **A** Because our planet is just the right distance from the Sun, we are able to survive.
   - **B** Other planets in the solar system do not have a water cycle the way we do.
   - **C** Earth’s atmosphere traps solar energy and heats Earth.
   - **D** Some water, however, evaporates and rises into the atmosphere.
5. Complete this analogy:
   Water vapor is to Venus, as
   __________ is to Mars.
   A. water vapor
   B. water
   C. ice
   D. gas

   (4.2C)
LOOK at this picture:

THINK about the major source of the Earth’s energy. How does the Sun affect water and life on Earth?

WRITE about the Sun’s role in the water cycle. How does the Sun affect weather? What would life be like for plants without the Sun?

Notes
Positions Cause Patterns

Lexile 710L - B

1. It may seem like the Earth is always changing — and it is! But many of these changes form patterns, which means the changes repeat over and over again. In fact, there are patterns all around us.

2. Take the tides, for example. If you build a sand castle and leave it on the beach, most likely it will be gone by the morning. Why? This happens because tides can be high or low. High tide means that the water comes up higher on the land. Low tide means that the water flows back out. High tide and low tide each happen twice in a 24-hour day. So, when the tide is high, water will cover up the parts of the beach where you may have built a sand castle during the low tide.

3. High and low tides are caused by the position of the Moon. Sure, the Moon is over 200,000 miles away, but it is so large that its gravity affects the water on Earth. The pull of the Moon's gravity is strongest when the Moon is more directly facing our part of Earth. That is when high tide occurs. When the Moon is not facing our part of Earth, its pull is not as strong. That is when low tides occur.

4. You can observe another pattern by looking at the Moon itself. The way the Moon looks changes from night to night. Sometimes you see a full Moon and sometimes you see a half moon. And, sometimes the moon is not visible at all. It all depends on the position of the Sun, Earth, and Moon. But, the phases of the Moon (shapes of the Moon that we see from Earth) are always predictable. They happen in the same order over and over again.

5. We see these phases because only one half of the Moon's surface is facing the Sun at any given time. At different times of the month, we can see different parts of the Moon's lighted surface because of where we are positioned.
Continued

6 The seasons are another pattern caused by the positions of Earth and the Sun. Earth revolves, or travels in an orbit, around the Sun. The Earth is tilted. As it orbits, the northern half is tilted toward the Sun, receiving stronger, more concentrated rays from the Sun. This causes the warmer temperatures of summer. Likewise, winter temperatures are colder because the position of the Sun causes the northern half of Earth to receive less direct heat. At the same time, the southern part of the world is having summer.

7 Yes, Earth may always be changing. But we can predict many of these changes because they happen in the same way over and over again.
READING SCIENCE

1. What is the best summary of this passage?
   A. Moon phases are caused by the position of the Sun, Earth, and Moon.
   B. Tides are caused by the position of the Moon.
   C. Seasons are caused by the positions of the Sun and Earth.
   D. Many patterns on Earth are caused by the positions of objects in the solar system.

2. If you build a sand castle and it disappears it is probably because:
   A. Kids knocked it over in the night.
   B. Low tide made the water level go down.
   C. High tide raised the water level.
   D. The position of the Earth, Sun, and Moon caused a change in moon phases.

3. What is the best synonym for the word position (sixth paragraph)?
   A. placement
   B. orbit
   C. phase
   D. shadow

4. What is something that might happen at low tide?
   A. Things on the beach will be washed away.
   B. People who are not careful might be trapped by rising water.
   C. The Moon’s gravity will cause the water to rise.
   D. You can walk on the beach in places that were underwater earlier in the day.
5. What is an example of another pattern in nature that is caused by the position of objects in the solar system?

A. the petals on a flower
B. zebra stripes
C. day and night
D. a bee's honeycomb

(Fig. 19D)
LOOK at these pictures of the Moon and an umbrella shadow.

THINK about the full moon causing the highest and lowest tides when big fish happen to be the most active. Can predicting when a full moon phase will occur be helpful? Look at the shadow of the beach umbrella. Can predicting how that shadow will shift be useful? Imagine a family’s trip to the shore where they will fish at night and relax under a shady umbrella during the day.

WRITE a story about this family’s predictions about full moon tides and shifting shadows. How did that affect fishing and their shade?
Two weeks ago a fire destroyed much of the forest on the west bank of Silver Lake. It was started by a campfire that was not put out properly. Firefighters were able to smother the blaze but it still burned across a wide area. Now scientists are investigating how much damage was done.

Silver Lake was a popular spot for families to picnic, camp, and hike. In the shallows near the shore, long-legged birds like herons and egrets could be seen. The waters were known as great fishing grounds. And, hikers often saw deer, rabbits, and armadillos.

But, when Dr. Liz Jordan visited the lake yesterday, she saw a different scene. The area around the lake is now a black, charred landscape. The fire wiped out all of the small bushes, ferns, and other undergrowth. Some of the tree trunks are still blackened by the flames and have been stripped of their leaves and needles.

When asked where all of the animals and birds might be, Dr. Jordan was thoughtful.

“Well,” she said, “animals are clever. They are often able to escape a fire. But, the problem is that they won’t be able to return here for quite some time.”

Dr. Jordan explained that all of the green plants play a special part in the ecosystem. “We call these plants producers. They use sunlight, water, and carbon dioxide to make their own food. Some organisms, however, cannot make their own food. They have to consume, or use, the food from the plants. These organisms are called consumers.”

Dr. Jordan’s assistant, Ben Scott, added, “All the animals in the forest depend on the producers, even the ones who do not eat plants. Rabbits, for example, are herbivores. That means they eat plants. But, a hawk is a carnivore. It only eats other animals. When it eats the rabbit, it uses the energy that came from the plants that the rabbit ate.”

“And that energy,” said Dr. Jordan, “came from the Sun. It is a food web, with energy passing from the Sun, to plants, to animals that eat plants, to animals that eat other animals.”
Continued

9 A major fire, like the one at Silver Lake, can destroy food webs because it removes the producers from the web. The consumers who survive the fire now have to find food somewhere else.

10 However, as Dr. Jordan and Mr. Scott started to leave the forest, Dr. Jordan stopped. She reached down, brushed away some of the ash, and exposed a small green stem.

11 “Well,” said Dr. Jordan, “it looks as though the producers are already on their way back.”
1. The **shallows** of the lake (second paragraph) are probably:
   - A. shorelines
   - B. water near shore that is not deep
   - C. deep water close to shore
   - D. water far from shore that is not deep

2. Where does the energy in a food web begin?
   - A. fire
   - B. producers
   - C. consumers
   - D. sunlight

3. Complete this analogy:
   Fern is to producer as _________ is to consumer.
   - A. tree
   - B. sunlight
   - C. rabbit
   - D. water

4. What will probably happen next at Silver Lake?
   - A. Consumers will return, even though the producers have all disappeared.
   - B. Over time, producers will grow back, and when there are enough of them, consumers will return.
   - C. Producers will grow back, but consumers will have moved on and will never return to Silver Lake.
   - D. Another fire will destroy the east side of Silver Lake.
Another good title for this story would be:

A  Where Have All the Producers Gone?
B  All About Dr. Jordan
C  Silver Lake Picnic Area
D  How To Put Out Campfires Properly

(4.11A)
LOOK at this picture of a pumpkin that fell off a farmer’s delivery truck.

THINK about the flow of energy in an ecosystem. How is this pumpkin still involved in the transfer of energy, even though it is smashed?

WRITE about the pumpkin’s place in the food chain. Where did the pumpkin plant get its energy to grow? How might this pumpkin be used for energy now?

Notes
Have you ever noticed that the leaves of plants are different sizes, shapes, and colors? Have you ever noticed that some trees lose their leaves in the fall, while others do not? Why do you think that different kinds of plants are so different?

Plants have adaptations that help them grow in their natural environments. In fact, you can learn a lot about a plant’s environment just by looking at its leaves and stems.

For example, if you have visited a lake or swamp, you may have seen plants floating on top of the water. The part of the plant that floats on top of the water is the leaf. The leaf floats on top to help the plant get enough sunlight. The rest of the plant is down below the water’s surface. Another part of the plant has also adapted to its environment. Many water plants have soft, bendable stems so that they are able to move with the water currents. If they had stiff, straight stems, they would break off in strong currents.

But what about desert plants? Those plants look different than water plants, don’t they? That is because desert plants have adaptations that help them conserve water. A lot of desert plants have small leaves and some have no leaves at all. If a desert plant does have leaves, they are usually thick and waxy. These thick, waxy leaves keep the water inside the plant from evaporating into the dry desert air. Some desert plants — like some types of cactus — have spikes or needles. These keep animals from chewing on the plant and taking the water that is inside of it.

In places where the winters are cold, you might see deciduous (di-sij-you-us) trees. These are trees that grow new leaves in the spring and lose them in the fall. These leaves spread wide to capture lots of sunlight. The tree trunks are very hard and strong. These adaptations help a tree to stand up high and gather enough sunlight during the warmer months so that it can produce enough food for the winter. Deciduous trees have thick bark to protect them from the very cold winters. Losing their leaves also helps them in the winter. Having leaves in the winter would mean that snow and ice would collect on the leaves. Then, the tree branches would become heavy and break, damaging the tree.
Continued

6 Tropical rain forests have exciting types of plants, too. For example, some viney plants grow up tree trunks to reach the tops of the trees. Why do you think they do this? This adaptation helps them reach above the treetops to get sunlight. Other plants in a tropical rainforest are bowl-shaped. Having this shape allows them to collect water. They soak up the water that has collected in their bowl-shape leaves.

7 So look around. How do the plants you see adapt to their environment?
1. Which sentence from the passage is the best summary?
   
   A. Plants have adaptations that help them grow in their natural environments.
   B. That is because desert plants have adaptations that help them protect their water.
   C. In places where the winters are cold, you might see deciduous trees.
   D. Tropical rain forests have interesting types of plants, too.

2. The author arranged this passage by:
   
   A. Telling how different plants adapt to their environments.
   B. Describing the common adaptations found in several different environments.
   C. Comparing and contrasting plants in wetlands to those in deserts.
   D. Sequencing the different ways plants have adapted throughout time.

3. Which of the following plants is probably found in a place where there is a cold winter season?
   
   A. saguaro cactus
   B. maple tree
   C. water lily
   D. palm tree

(Fig. 19D)
4. What would happen to deciduous trees if their leaves did not fall off in winter (fifth paragraph)?

A. They would not get enough sunlight.
B. The leaves would blow away in the wind.
C. The tree would not have enough food.
D. The leaves would become heavy with snow and branches would break off.

5. If someone gave you a cactus, where should you put it?

A. in a pond in the backyard
B. in a place with lots of shade
C. on a windowsill in the sun
D. in damp soil

(Fig. 19D)
LOOK at this picture of a seahorse.

THINK about why this unique fish is able to survive in an aquatic habitat.

WRITE about the adaptations of this seahorse. Which ones help it survive and move in the water? Which ones help protect it from predators? What do you think would happen if the seahorse was a different color?

Notes
One hot summer day, Lenny was eating breakfast when his father entered the kitchen.

His dad said, “I’ve got a surprise for you! We are going to the aquarium!”

Lenny was surprised. “You mean, like the aquarium we have in my classroom?”

Lenny’s dad chuckled. “No, that one is just a small tank. The aquarium I am talking about is a place where we can go to observe marine life. An aquarium is like a zoo but specifically for fish and other marine animals.”

Lenny loved animals, so as soon as breakfast was over he was ready to go. He and his dad walked to the city train and then took the train to the aquarium. There, they saw many different types of animals, such as clownfish and seahorses. There was even a tank where Lenny could touch different animals and plants.

Lenny’s eyes were attracted to the lionfish. It had beautiful stripes and pointy spines.

One of the marine biologists stopped when he saw Lenny staring into the lionfish tank.

“You really like that one, huh?” said the scientist. “It is my favorite too. I am Dan.”

“Hi, Dan. I am Lenny. What does the lionfish eat?” asked Lenny.

“It eats other fish. It has inherited its own weapons system from its parents. The spines on the fish are full of venom to protect itself and also to intimidate other sea creatures. And, the lionfish is a very efficient predator. It herds other fish into a corner, attacks, and swallows them whole. In fact, it can eat 20 small fish in under 30 minutes.”

“Whoa!” said Lenny.

“I just got back from the Caribbean,” said Dan. “I saw a lot of lionfish there. They are causing damage to the reef fish.”
Lenny was confused. “But the information card says that lionfish are from the Pacific and Indian oceans. They are both far away from the Caribbean.”

“Good thinking,” said Dan. “Do you have any idea how the lionfish could have ended up so far from home? What’s your hypothesis?”

“Maybe someone had a lionfish as a pet and didn’t want it anymore so they probably let it go in the water.”

“You’re close. We think the lionfish showed up in 1992 due to Hurricane Andrew. We think that the force of the hurricane broke a private aquarium and released six lionfish into the sea.”

“How could only six lionfish cause such a problem for the other fish?”

“Well,” said Dan. “As I said, the lionfish has inherited traits that make it a very effective predator. But, the other fish are not used to lionfish and they haven’t learned behaviors that will allow them to escape from the lionfish. So those six lionfish have multiplied into a big population causing a big problem!”

Lenny looked back at the lionfish drifting in the water. It was still beautiful, but now Lenny understood how dangerous a predator it could be.
READING SCIENCE

1. Why did Lenny’s dad chuckle when Lenny said, “Like the aquarium we have in my classroom?” (third paragraph)
   A. Lenny told a joke.
   B. He realized that Lenny didn’t like aquariums.
   C. He realized that Lenny thought they were going to visit a small tank, which would be a silly thing to do.
   D. He realized that Lenny thought he was going to have to go to school.

2. What do you think Dan probably does at his job?
   A. He sells tickets to the aquarium.
   B. He cleans the tanks at the aquarium.
   C. He studies marine life.
   D. We can’t tell from the information in the story.

3. Why is the lionfish such a successful predator in the Caribbean?
   A. It has spines that hold venom.
   B. It knows how to herd other fish into corners.
   C. Other fish haven’t learned to escape it.
   D. All of the above

4. True or false: There are only six lionfish in the Caribbean today.
   A. True. Only six escaped from the aquarium during the hurricane.
   B. False. The six lionfish probably had offspring, who also had offspring, and so on.
   C. False. All of the lionfish are dead.
   D. This question cannot be answered with the information from the passage.
5 How do Lenny’s feelings about the lionfish change over the course of the passage?

A The lionfish is Lenny’s favorite, but as he learns more about it, he understands it can also be dangerous.

B Lenny doesn’t like the lionfish until he learns what a dangerous predator it can be.

C Lenny thinks the lionfish is neat, but he loves it even more when he realizes it is dangerous.

D Lenny prefers the clownfish at first, but learns to like the lionfish.
READ this paragraph:

Cameron and her mother look very similar. They both have brown hair and brown eyes. Cameron hopes that when she grows up she will be as tall as her mother. That way she will have a better chance of playing professional basketball. Cameron knows that in addition to being tall, she will need to practice her basketball skills. Everyday she spends many hours dribbling and shooting baskets in her driveway.

THINK about the traits Cameron was born with and the behaviors that she learned. What trait did Cameron inherit that could make her better at basketball? What learned behavior could make her better?

WRITE about some of the traits you have inherited from your parents. What behaviors have you learned from them?
The Stages of a Butterfly's Life

1. Think about a baby. It looks a lot like a little adult. It has two eyes, a nose, a mouth, and all of the other parts that an adult human has. However, some young animals look very different from their parents. Butterflies are one example.

2. Many insects, such as butterflies, go through four stages of growth. At each stage, these insects look and behave differently.

**Stage One: Egg**

3. The egg is the first stage of growth. The egg is usually very small. It is round or oval and may have a pattern on it. The butterfly will often lay eggs on the underside of leaves or stems. They lay the eggs on the type of plant that their offspring will eat. Different species, or kinds, of butterflies can lay different numbers of eggs. Some butterflies lay only one egg at a time. Others can lay up to 1,000 at once.

**Stage Two: Larva**

4. The larva is the second stage of growth. We call the butterfly larva a caterpillar. The caterpillar looks a lot like a worm. It may have stripes, patterns, or spiny hairs. Just like an adult insect, caterpillars have six legs. Are you surprised by that fact? You probably thought caterpillars have many more legs than that. Well, caterpillars have only six “true legs”, but they can have several pairs of “false legs,” which are called prolegs. The prolegs help the caterpillar move.

5. A caterpillar’s main job is to eat. The caterpillar of a Monarch butterfly can eat a milkweed leaf in under four minutes! That is fast for such a tiny creature. All that eating means the caterpillar grows quickly. It may shed its skin up to four times as it grows.
Stage Three: Pupa

During the third stage, the larva stops eating. It makes a hard covering to protect itself and it attaches it to a safe place. The insect is now a pupa, or chrysalis. The pupa is usually brown or green so that it is camouflaged by the leaves and branches of plants. While inside the chrysalis, the caterpillar’s body breaks down into a jelly-like substance and the adult body, including wings, is formed. The prolegs disappear. The chrysalis changes from its dark color to clear. Then, it is time for the adult butterfly to break free.

Stage Four: Adult

When the changes are complete, the adult insect emerges. This is the fourth stage of growth. Its wings are not strong at first until blood is pumped into them. Within a few hours, the butterfly is flying.

This four-stage life cycle is called complete metamorphosis. The word metamorphosis means “to change form.” The butterfly’s form truly does go through a spectacular change.
1. Which sentence from the passage is the best summary of the article?

A. Many insects, such as butterflies, go through four stages of growth.
B. We call the butterfly larva a caterpillar.
C. Then it’s time for the adult butterfly to break free.
D. The butterfly’s form truly does go through a spectacular change.

(4.11A)

2. Read this sentence from the third paragraph:

Different species, or kinds, of butterflies can lay different numbers of eggs.

Which answer below is the name of a species of butterfly?

A. caterpillar
B. pupa
C. Monarch butterfly
D. grasshopper

(4.2B)

3. The author arranged this passage by:

A. describing what causes a butterfly to go through life stages and the effects of those stages
B. sequencing the stages of a butterfly’s life
C. comparing and contrasting butterflies’ life cycles with other insects
D. telling a story about butterflies

(4.11C)

4. Why does the adult lay eggs on the underside of a leaf?

A. So the larva will have food to eat.
B. It is the easiest place for eggs to stick.
C. The eggs will be hidden from predators.
D. There is no reason.

(Fig. 19D)
5 Which sentence from the passage is the author's opinion?

A The egg is the first stage of growth.

B It may shed its skin up to four times as it grows.

C The pupa is usually brown or green so that it is camouflaged in the leaves and branches of plants.

D The butterfly’s form truly does go through a spectacular change.

(4.11B)
LOOK at this picture.

THINK about the similarities between the life cycles of animals and plants. They both go through distinct phases of a life cycle.

WRITE about what happens with plants and how they look as they develop. Describe the different stages and compare them to the stages a frog goes through to develop.
WRITING SCIENCE

Organisms and Environments

Topic: __________________________________________

Sample