



Sixth Grade

(6)

English Language Arts
Math
Social Studies
Science

Lesson 9

Varying Sentence Patterns



Introduction

Good writers use a variety of sentence types. They mix short and long sentences, and they find different ways to start sentences. Here are ways to improve your writing:

- Use different sentence types: statements, questions, imperatives, and exclamations.
- Use different sentence structures: simple, compound, complex, and compound-complex.
- Sometimes begin a sentence with a prepositional phrase or a dependent clause.

Draft

We went on an impressive field trip. We went to the science museum. The building was huge. It had many exhibits. I especially liked the laser exhibit. You should make sure to visit the museum.

Revision

Our field trip to the science museum really impressed me. The building itself was huge, and it was filled with exhibits. Do you dream of seeing actual lasers? At some point, then, be sure to visit the museum. You won't be sorry!



Guided Practice

Follow the directions to rewrite each sentence or pair of sentences.

Hint

When a sentence begins with a dependent clause, use a comma to separate it from the main clause. When a sentence begins with a prepositional phrase, usually use a comma after the phrase.

- 1 Change this sentence to a question: It is fun to learn about insect colonies.

- 2 Use the word *when* to combine these sentences: I looked at the museum map. I noticed a new insect exhibit.

- 3 Combine these sentences so that the new sentence begins with a prepositional phrase: It was near the entrance to the exhibit. The first thing I saw was a giant grasshopper.



Independent Practice

Read the paragraphs for numbers 1–4. Then answer the questions that follow in each column.

(1) Many of the insects were robots.
(2) I almost thought they were real.
(3) They moved like real insects. (4) They were much larger than real insects.

- 1** Which is the best way to revise sentence 1?
- A** For me, the insects were robots.
 - B** When looking, many of the insects were robots.
 - C** To my surprise, many of the insects were robots.
 - D** Surprised, many of the insects were robots.

- 2** Which best combines sentences 3 and 4?
- A** They moved like real insects, or they were much larger.
 - B** They moved like real insects, so they were much larger.
 - C** They moved like real insects, but they were much larger.
 - D** They moved like real insects, because they were much larger.

Answer Form

1 (A) (B) (C) (D)

2 (A) (B) (C) (D)

3 (A) (B) (C) (D)

4 (A) (B) (C) (D)

Number
Correct

4


(5) The tour guide told us that the robots show insect behavior. (6) A wolf spider seemed to rush toward me.
(7) I was scared. (8) I remembered it was a robot spider.

- 3** Which is the best way to revise sentence 6?
- A** After a long time, a wolf spider seemed to rush toward me.
 - B** At that moment, a wolf spider seemed to rush toward me.
 - C** After the trip, a wolf spider seemed to rush toward me.
 - D** Along with others, a wolf spider seemed to rush toward me.

- 4** Which is the best way to combine sentences 7 and 8?
- A** Remembering it was a robot spider, I was scared.
 - B** I looked scared, but the robot looked like a spider.
 - C** I was scared until I remembered it was a robot spider.
 - D** I was scared when I remembered it was a robot spider.

Lesson 11

Using Context Clues

 **Introduction** When you come across a word you do not know in your reading, look for clues. **Context clues** are words and phrases in the text that give hints to a word's meaning.

Context Clue	Signal Words	Example
Definition	<i>are, is, means, or</i>	Larger animals often treat smaller animals as <u>prey</u> , or something to be killed and eaten.
Example	<i>like, such as, for example</i>	<u>Predators</u> , such as hawks, wolves, and coyotes, hunt rabbits.
Cause and Effect	<i>as a result of, because, and thanks to</i>	Because many animals eat rabbits, the number of wild rabbits has <u>decreased</u> .
Comparison and Contrast	<i>like, too, similarly, but, unlike, although</i>	Although wolves eat both plants and animals, hawks are completely <u>carnivorous</u> .

A word's position and function in the sentence can also be a clue to its meaning. For example, read the sentence below:

Brown bears are solitary animals and are often found alone.

You can tell that *solitary* is an adjective in this sentence. The adjective describes the bears. Then the word *solitary* is defined in the sentence. Since the bears *are often found alone*, this gives a good clue to what the word *solitary* means.

 **Guided Practice** Read the paragraph below. Circle context clues to help you figure out the meaning of the underlined words. Then tell a partner the meaning of the underlined words.

Hint

Think about the different types of context clues. Look for words that signal examples, cause and effect, and contrasts. Then use the clues to help you figure out the meanings of the underlined words.

Marsupials are mammals that carry their young in pouches.

The American opossum is a marsupial. Thanks to its defense mechanisms, the opossum keeps itself safe from predators. When threatened, it hisses, growls, and bites. If this doesn't work, the opossum reacts in an unusual way. Although many animals move quickly to escape danger, the opossum collapses and pretends to be dead. This is an unconscious response to stress that is similar to jerking your hand away from a hot object before thinking.



Independent Practice

Read the paragraph. Then answer the questions that follow for numbers 1–4.

Answer Form

1 (A) (B) (C) (D)

2 (A) (B) (C) (D)

3 (A) (B) (C) (D)

4 (A) (B) (C) (D)

Number
Correct

4

Pangolins have a physical resemblance, or likeness, to an armadillo, with claws and armored bodies. When attacked, pangolins thwart combat by rolling into a hard ball and hiding. Like bats and other animals that sleep all day, pangolins are nocturnal. Because they lack teeth, eating tiny stones with their food is critical for digestion.

1 Which phrase from the paragraph best helps you understand the meaning of the word resemblance?

- A** have a physical
- B** or likeness
- C** with claws
- D** armored bodies

2 What does the phrase thwart combat mean in the paragraph?

- A** get attacked
- B** attack others
- C** avoid a fight
- D** start a fight

3 What does the word nocturnal suggest about the pangolins?

- A** They roll into hard balls.
- B** They are awake at night.
- C** They are like all other animals.
- D** They lack teeth.

4 What does the word critical mean in the paragraph?

- A** safe
- B** possible
- C** necessary
- D** imaginable

Lesson 12

Greek and Latin Word Parts



Introduction

Many English words have Greek and Latin roots and affixes. By becoming familiar with them, you will be able to unlock the meaning of many words.

- **Roots** are word parts that have meanings but usually cannot stand alone. Sometimes roots combine with other roots to form words, such as *audiovisual*.

Root	Meaning	Root	Meaning
<i>aud</i>	"hear"	<i>mot, mov</i>	"move"
<i>cycle</i>	"circle, wheel"	<i>vis, vid</i>	"see"
<i>therm</i>	"heat"	<i>meter</i>	"measure"

- **Affixes**, such as prefixes and suffixes, can also be added to roots to form words, such as *interject*.

Prefix	Meaning	Suffix	Meaning
<i>uni-</i>	"one"	<i>-ance, -ence</i>	"state of"
<i>bi-</i>	"two"	<i>-ion, -al</i>	"action, process"
<i>tri-</i>	"three"	<i>-or</i>	"state" or "quality of"



Guided Practice

Circle the roots in the underlined words. Write the meaning of each root. Then tell a partner the meaning of the underlined words.

Hint

A suffix adds meaning to a root or word. Suffixes often give clues that indicate part of speech (noun, adjective, etc.). The suffix *-ence* usually signals a noun; the suffix *-al* usually signals an adjective.

- 1 Inez sat in the audience at a cooking show.

- 2 The motor of the cake mixer broke. The chef needed help.

- 3 He made a hand motion for Inez to come up on stage.

- 4 As he worked, she kept an eye on the oven thermometer.

- 5 Because she had great vision, this was an easy task.



Independent Practice

For items 1–4, read each sentence. Then answer the question.

Answer Form

1 (A) (B) (C) (D)

2 (A) (B) (C) (D)

3 (A) (B) (C) (D)

4 (A) (B) (C) (D)

Number
Correct

4

- 1** "Watch how I extend the dough with my hands," said the chef.

The prefix *ex-* means "out," and the root *tend* means "stretch." What does the word extend mean in the sentence?

- A** pull it in different directions
- B** form it into small balls
- C** loosen it with water
- D** cut it into small pieces

- 2** "Next, I add the equivalent of a teaspoon of spice," explained the chef.

The prefix *equi-* means "equal," and the root *vale* means "worth." What does the word equivalent mean in the sentence?

- A** half portion
- B** cost
- C** same measure
- D** double the amount

- 3** "Are my directions audible?" asked the chef.

The root *aud* means "hear," and the suffix *-ible* means "able." What does the word audible mean in the sentence?

- A** necessary
- B** too complicated
- C** realistic
- D** loud enough

- 4** Inez told the chef she was grateful for the cooking lesson.

The root *grat* means "pleasing," and the suffix *-ful* means "having or giving." What does the word grateful mean in the sentence?

- A** eager
- B** thankful
- C** greatly impatient
- D** responsible

Citing Evidence to Make Inferences

Theme: *Mysterious Creatures*

Writers don't always tell you exactly what's on their minds. Sometimes you need to make a reasonable guess about what the writer thinks. A reasonable guess, which is based on both evidence and your prior knowledge of a topic, is called an **inference**.

The passage below is about a creature known as the giant squid. You will read it twice.

For many years, both sailors and scientists suspected that a creature they called the giant squid lived in the ocean depths. Over the years, the evidence mounted, and in 2012 came solid proof: They filmed giant squids swimming in the ocean. Before the 2012 video, nobody had answers to several significant questions about giant squids. How did they act in the wild? Were they hunters? Or did they just float in the water, eating what came their way? What purpose did their huge eyes serve? Thanks to the video, we have some answers. We know that the squid is a hunter that uses its large eyes to spot prey and avoid being eaten. But many fascinating mysteries about the creature still need solving. Will this important research continue?

Read the passage again. This time, underline any evidence suggesting whether the writer feels scientists should keep researching the giant squid.

So, does the writer think that scientists should keep researching the giant squid? You can use evidence from the text to make and support an inference about what she thinks.

Study the chart. It shows how you can support an inference using textual evidence.

What You Know	+	What the Text Says	=	Inference
<p>A person with positive feelings about a type of work usually wants that work to continue.</p>		<ul style="list-style-type: none"> • "Before the 2012 video, nobody had answers to several significant questions about giant squids." • "But many fascinating mysteries about the creature still need solving." • "Will this important research continue?" 		<p>The author thinks that scientists should keep researching the giant squid.</p>

By using text evidence and what you already know, you can make and support inferences. In a way, you make the same kinds of educated guesses that scientists do when they study mysterious creatures of the deep!



Read the first part of a scientific account about Bigfoot.

Genre: Scientific Account

A Scientist’s Search for Bigfoot *by Tetsuo Fujii*

Dr. Jeffrey Meldrum is an Associate Professor of Anatomy and Anthropology at Idaho State University. He specializes in primate foot structure—a category that includes apes, monkeys, and humans. His interests also include evaluating footprints that some claim are left by a mythical North American ape known as Bigfoot.

Meldrum’s laboratory houses more than 200 casts and artifacts relating to Bigfoot. Although he believes that some samples are hoaxes, others interest him, such as unidentified hair and unique casts of muscle and foot-bone anatomy.

(continued)

Explore how to answer this question: *“Dr. Meldrum thinks that some samples are hoaxes, but others interest him. Why is he most likely interested in those other samples?”*

Reread the second paragraph. It suggests what Dr. Meldrum thinks, but does not state it directly.

Look for details suggesting why Meldrum is interested in the other samples. One detail is listed in the second column; write another detail there. Then complete the inference statement.

What You Know	+	What the Text Says	=	Inference
<ul style="list-style-type: none"> • If a scientist is interested in something, he or she might think it has scientific value. • A scientist might keep samples that could lead to a discovery. 		<ul style="list-style-type: none"> • “Meldrum’s laboratory houses more than 200 casts and artifacts relating to Bigfoot.” • 		Dr. Meldrum is most likely interested in those other samples because . . .

On the lines below, explain how the details you presented in the chart support your inference.



Close Reading

What do most other scientists think about Meldrum’s work? **Underline** the sentence that tells how they feel about it.

Continue reading the account about Meldrum’s research. Use the Close Reading and the Hint to help you answer the question.

(continued from page 20)

Many anthropologists criticize Meldrum’s work. They feel he is trying to find an imaginary creature that exists only in folklore. Meldrum tells critics he is not saying that Bigfoot exists. He just believes there is enough evidence to justify scientific investigation.

Unsurprisingly, most anthropologists reject Meldrum’s evidence. Dr. David J. Daegling, a University of Florida anthropologist who thinks Meldrum’s methods of analyzing data are unscientific, sums up this feeling: “Meldrum’s evidence doesn’t look better on deeper analysis; it looks worse.”

Hint

Which choice gives evidence of what most scientists think of Bigfoot research?

Circle the correct answer.

Which sentence from the account best supports the idea that most scientists do not find value in investigating Bigfoot artifacts?

- A** “Many anthropologists criticize Meldrum’s work.”
- B** “They feel he is trying to find an imaginary creature that exists only in folklore.”
- C** “Meldrum tells critics he is not saying that Bigfoot exists.”
- D** “He just believes there is enough evidence to justify scientific investigation.”



Show Your Thinking

Look at the answer you chose above. Explain how the evidence in your answer helped show that most scientists do not find value in investigating Bigfoot artifacts.



Read the scientific account. Use the Study Buddy and Close Reading to guide your reading.



As I read, I'm going to underline clues that help me infer the author's viewpoint about chupacabras.

Close Reading

According to the author, why do people hope that chupacabras are real? **Underline** a sentence that shows the author's explanation.

What examples of new discoveries does the author give? **Underline** the evidence that new creatures have been discovered.

Genre: Scientific Account

Tales of Chupacabras *by Cynthia Burnham*

- 1 Legend tells of the chupacabra, a monster that sucks the blood of livestock. *Chupacabra* means “goat sucker” in Spanish. For many in the southwestern United States and Mexico, these tales are more than just stories; they have been accepted as fact. In Puerto Rico in 1995, hundreds of livestock fatalities were blamed on the chupacabra.
- 2 Some describe chupacabras as two-legged, lizard-like creatures with claws, spikes, and piercing red eyes. Others insist they are hairless, four-legged creatures that are part kangaroo, part dog, and part rat. Many similar beasts have been brought to labs for DNA testing, but most have been coyotes with mange, a disease that strips animals of fur.
- 3 Why do we want these mythical beasts to be real? Surely not because we want livestock to fall prey to vampires! Perhaps it is because of our natural desire to shed light on the unknown. Scientists constantly identify new life-forms. According to the World Wildlife Federation, more than 1,200 species of plants and vertebrates were discovered in the Amazon rain forest between 1999 and 2009. Given this fact, the idea that undiscovered species could exist empowers our imaginations and gives us hope.
- 4 Although we have explored much of this planet, there are still creatures that lurk in the underbrush, evading recognition. That is a thrilling concept. So even as evidence mounts against the existence of chupacabras, a part of us hopes that one will creep from the shadows and boggle our minds.



Hints

Think about the word choice in each sentence. Which choice helps you infer what the author actually thinks about chupacabras?

Which sentence offers support for why people hope chupacabras are real?

What kinds of life-forms were discovered between 1999 and 2009? What is the author’s purpose for including this evidence?

Use the Hints on this page to help you answer the questions.

- 1 A student makes the following claim about the author of “Tales of Chupacabras.”
The author believes that chupacabras are imaginary even though she would like to think they exist.
Which sentence from the text best supports this claim?
 - A “Chupacabra means ‘goat sucker’ in Spanish.”
 - B “Some describe chupacabras as two-legged, lizard-like creatures with claws, spikes, and piercing red eyes.”
 - C “Why do we want these mythical beasts to be real?”
 - D “Scientists constantly identify new life-forms.”

- 2 Which sentence from the text explains why the author thinks people want to believe in chupacabras?
 - A “For many in the southwestern United States and Mexico, these tales are more than just stories: they have been accepted as fact.”
 - B “Legend tells of the chupacabra, a monster that sucks the blood of livestock.”
 - C “Others insist they are hairless four-legged creatures that are part kangaroo, part dog, and part rat.”
 - D “Perhaps it is because of our natural desire to shed light on the unknown.”

- 3 Explain how the examples of recent scientific discoveries support the idea that chupacabras may one day be found. Use details from the text in your explanation.



Read the scientific account. Then answer the questions that follow.

Looking for the Loch Ness Monster

by Stuart Clyburn

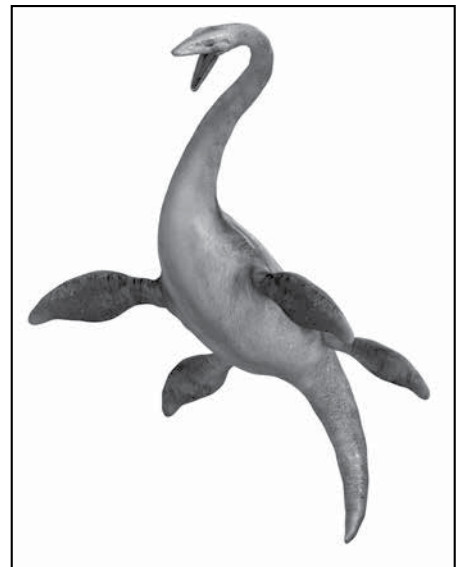
1 The word *loch* is a Scottish Gaelic word for *lake*. And there are a whole lot of lochs in Scotland—more than 500 of them! But one loch, Loch Ness in the Scottish Highlands, is known around the world. The reason for its fame is not its great size or beauty. People know the name *Loch Ness* because it is said to be the home of a mysterious, giant creature known as “the Loch Ness monster.” Whether the creature really exists or not has been a matter of great debate for decades.

2 What does “Nessie,” the popular nickname for the monster, supposedly look like? By most accounts, she has a small head on a very long neck. Her body is broad and rounded, with four flippers and a long tail. If you know your prehistoric creatures, you might be thinking: Nessie sounds like a *plesiosaur*, a giant sea reptile that lived hundreds of millions of years ago. One common theory about Nessie is that she actually *is* a plesiosaur. Other explanations for Nessie are far less dramatic. Some people think that the “mysterious” creature people have mistaken for a monster may have been nothing more than a walrus, seal, or eel.

3 How could a creature as big as a plesiosaur hide in a lake? Well, Loch Ness is a huge body of water. It’s the second largest loch in Scotland, based on the surface area of its water. Loch Ness covers more than 21 square miles, and only Loch Lomond is bigger. But if you look at the volume of water, Loch Ness is the biggest. And that’s because it’s deep—about 755 feet at its deepest point. This single loch contains more water than all the freshwater lakes in England. In other words, it’s one big place to hide.

4 Some people who believe in Nessie say that she’s made her home in the region for more than a thousand years. A book written in the seventh century tells about an Irish monk who saw a giant “water beast” in the River Ness in 565 C.E. No one thought much about that story until 1933. A couple was driving home along the loch late one night. They said they were forced to stop when a giant, dragon-like creature crossed the road and slid into the water. Their story appeared in newspapers. Soon, many more people claimed to have seen the monster. The following year, in 1934, a doctor from England took a photo that became famous worldwide. The poorly lit, grainy photo shows what looks like the head and long neck of a plesiosaur-like creature rising from the water. The photo served as “proof” of the monster until 60 years later—when it was revealed to be a fake.

5 Since the 1930s, dozens of serious, scientific searches have been undertaken to find the Loch Ness monster. One early effort involved placing scouts with cameras and binoculars around the loch for five weeks. Later searches relied on the use of sonar. This method involves bouncing sound waves through the deep



an artist's depiction of a plesiosaur



waters of the loch to detect moving objects. In 2003, the famous British Broadcasting Corporation (BBC) sponsored one of the most thorough searches ever. Scientists used 600 sonar beams and satellite tracking. What did they find? Nothing of note, really. They concluded that Nessie was a myth.

6 After so many attempts, you have to wonder why people keep looking for the Loch Ness monster. It may just be that there's something exciting about the idea of mysterious creatures living so close to us, always just out of view. There's a word for such creatures: *cryptids*. It comes from a Greek word meaning "to hide." The Loch Ness monster is one of many cryptids that have captured the public imagination. Others include Bigfoot in North America, the Yeti in the Himalaya Mountains, and the chupacabra in the southwestern United States and Mexico.

7 Many animals whose existence we take for granted today might once have been considered cryptids. Komodo dragons and giant squids were once thought to be tall tales. Until 1902, people regarded stories of "giant ape-men" living in Africa as just a myth. Today, we know them as mountain gorillas. The odds of "Nessie" turning out to be real may not be quite as good. But if it were true, we'd all love it, wouldn't we? It's exciting to think that a real live monster lives deep in a loch in Scotland.

1 According to the account, what is one reason many people believe the Loch Ness monster does not exist?

- A** The earliest sighting of the Loch Ness monster occurred in 565 c.e.
- B** The photo taken in 1934 has been proven to be a fake.
- C** Plesiosaurs, like the dinosaurs, lived hundreds of millions of years ago.
- D** Sonar beams and satellite tracking found no evidence in the loch.

2 Which detail provides evidence that a creature as huge as a plesiosaur could really hide in Loch Ness?

- A** Loch Ness has a surface area of 21 square miles and is 755 feet deep.
- B** The Loch Ness monster might actually be an ordinary walrus, seal, or eel.
- C** Dozens of scientific searches of Loch Ness have been conducted.
- D** The Loch Ness monster is known as a cryptid, a word whose root word means "to hide."

Answer Form

1 (A) (B) (C) (D)

2 (A) (B) (C) (D)

3 (A) (B) (C) (D)

4 (A) (B) (C) (D)

**Number
Correct**

/ 4



- 3** Which statement is **best** supported by the account?
- A** It is illogical to think that a plesiosaur could still be living in Loch Ness today.
 - B** Someday, scientists will prove that no giant creatures live in Loch Ness.
 - C** Some people want to believe in the Loch Ness monster and ignore scientific evidence showing it does not exist.
 - D** People have always been fascinated by the idea of strange creatures such as Bigfoot and the Loch Ness monster.

- 4** Despite the great interest in the Loch Ness monster, it is highly unlikely that such an animal actually exists. Which sentence from the passage **best** supports this conclusion?
- A** "Whether the creature really exists or not has been a matter of great debate for decades."
 - B** "Some people who believe in Nessie say that she's made her home in the region for more than a thousand years."
 - C** "Since the 1930s, dozens of serious, scientific searches have been undertaken to find the Loch Ness monster."
 - D** "Many animals whose existence we take for granted today might once have been considered cryptids."

- 5** Some people firmly believe that the Loch Ness monster is actually a plesiosaur. Use at least **three** details from the account to explain why some people believe this.

 **Self Check** *Go back and see what you can check off on the Self Check on page 1.*

Reading

Read the passage. Then answer the questions that follow.

Worth More Than Gold

by Amy Charles

1 Every summer, millions of acres of America are green with growing crops. American farmers grow wheat, soybeans, corn, and other foodstuffs, and it's an impressive sight. There's also something eerie about it, though. Each field grows an army of identical plants. Every cornstalk in the cornfield is exactly like its neighbors, with the same DNA. That means it has the same instructions for building itself. This kind of field is called a monoculture, *mono* meaning "one."

2 This is of some benefit to the farmer because each plant grows about as well as the next. The farmer is in trouble, however, if a pest or disease strikes. If one cornstalk in the field can be killed easily by an attacker, so can all the rest. This was a serious problem in Ireland long ago. The Irish potato famine in 1845 was caused by a fungus that is extremely harmful to potatoes. Because all the potatoes in Ireland at the time were so similar, most of the potato crop died. And because potatoes were the main food in Ireland at the time, people began to starve. The situation became even worse because the fungus stayed in the ground. When new potatoes were planted, the fungus killed them, too. Within 25 years, nearly half of Ireland's people had starved or moved away.

3 Why was the famine so destructive in Ireland? One problem was that we didn't have the science to know what had gone wrong; people didn't know about DNA. DNA tells the cell how to take atoms, the smallest pieces of matter, and make from them the smallest pieces of the body. These pieces, called molecules, are too small for us to see, but once they're made, the molecules work together to grow the body and keep it alive.

4 Some molecules are great at fighting disease. Unfortunately for those desperate farmers in Ireland, none of the potatoes they planted, year after year, could make the right molecules. Because of this, the potatoes weren't protected from the fungus.

5 Scientists now know how to solve that problem, and the answer lies in how DNA works. DNA is a molecule, too—a long molecule at the center of the cell. The cell can read DNA like a cookbook, finding recipes that tell how to make other molecules that it needs. We call the recipe for each molecule a gene. If you want molecules that will fight potato fungus, you need the genes for making those molecules. If a potato doesn't have those genes, that potato can't fight the fungus. One way to solve the problem is to give the potato the right genes. To find those genes, we look in other strains, or kinds, of potatoes. We look for a potato that can fight off the fungus. That potato has the genes for making the right molecules. Then all we have to do is put that plant's genes into the unprotected potato plants. And, roughly speaking, we know how to do that.

Go On

6 Here's the big question, though: Where do you find that super-strong potato when a fungus is attacking? The answer comes from scientists and farmers around the world who have built gene banks to keep our food supply safe. All over the world, scientists and farmers collect seeds from different crop plants—corn, potatoes, alfalfa, wheat, oats, rice, and every other grain, fruit, and vegetable; they collect them all. They record what diseases and pests each plant can fight off, and they record which plants can live well in certain conditions, such as limited water, high heat, floods, or poor soil. Then they store seeds from each plant in a safe place, a gene bank.

7 Now, when a pest attacks a wheat crop in Oklahoma, scientists don't wait. They look in gene banks for a strain of wheat that fights that pest well. They can use that wheat's genes to create a new wheat plant that will grow well in Oklahoma and will also fight off the pest.

8 There are more than 1,600 plant gene banks around the world, and one of the most famous gene banks is in Norway. It's an abandoned coal mine north of the Arctic Circle, in a group of islands called Svalbard. This bank stores backup copies of seeds that are in other banks around the world. The Svalbard bank now has copies of over half a million seeds. If crops are in trouble, what's in those vaults is worth more than gold.

9 That's the extent to which scientists and farmers around the world go to protect those crops growing all across the Midwest—and Brazil, and Russia, and China. Thanks to their work, the food supply for seven billion people is safer than it ever was before.

1 Which sentence from the passage **best** supports the idea that growing monocultures can be risky?

- A** "American farmers grow wheat, soybeans, corn, and other foodstuffs, and it's an impressive sight."
- B** "Every cornstalk in the cornfield is exactly like its neighbors, with the same DNA."
- C** "If one cornstalk in the field can be killed easily by an attacker, so can all the rest."
- D** "One problem was that we didn't have the science to know what had gone wrong; people didn't know about DNA."
- E** "The cell can read DNA like a cookbook, finding recipes that tell how to make other molecules that it needs."
- F** "They look in gene banks for a strain of wheat that fights that pest well."

2

The following question has two parts. First, answer part A. Then, answer part B.

Part A

What is one main idea of “Worth More Than Gold”?

- A Gene banks protect the world’s food supply.
- B People have studied DNA for hundreds of years.
- C Monocultures are often destroyed by pests.
- D The Irish potato famine began in 1845.

Part B

Which sentence from the article **best** supports the answer to part A?

- A “That means it has the same instructions for building itself.”
- B “Because all the potatoes in Ireland at the time were so similar, most of the potato crop died.”
- C “If you want molecules that will fight potato fungus, you need the genes for making those molecules.”
- D “If crops are in trouble, what’s in those vaults is worth more than gold.”

3

Which of the following would **not** belong in a summary of the passage?

- A The Irish potato famine in the 1800s was made worse because people at the time did not know about DNA.
- B To get molecules that will fight a potato fungus, you need to have the right materials.
- C One solution to possible problems caused by monocultures lies in the field of genetics, in plant DNA.
- D To protect the world’s crops, a gene bank in Svalbard, Norway, has backup copies of more than half a million seeds.

Go On

4 What is the **main** purpose of paragraph 5?

- A** It introduces the topic of worldwide famine.
- B** It provides a definition of the key term "fungus."
- C** It shows how genes can solve the problem of crop disease.
- D** It poses and answers logical questions about DNA and genes.

5 Read the statement below.

The author of this passage has great respect for the scientists and farmers who have made gene banks possible.

How can you tell this statement is true? Use **two** details from the text to support your answer.

Read the passage. Then answer the questions that follow.

The Scent of Memory

by Christopher Ford

1 Scientists say that, more than sight, sound, touch, or taste, the sense of smell can trigger memory. For me, the smell of wood smoke always makes me think of autumn. One whiff, and I am twelve, at home on my family's farm, snuggled in bed as the smell of wood smoke snakes through my slightly-open bedroom window.

2 It is early autumn, and all around us, our neighbors are harvesting apples. We have been eating apple pie, applesauce, apple cakes, even apple stew. My family does not own an orchard, but we rejoice in the benefits of the harvest and our special neighbors.

3 It's Saturday morning. My father wakes me gently, saying, "Let's go, Chris, it's time." I stand up stiffly, shivering, the chill draft hurrying me over to pull on jeans and a shirt, my favorite old sweatshirt, and my warmest socks.

4 My mom is already up and at the stove, coffee cup in one hand, stirring a huge pot of oatmeal with the other. It's not my favorite breakfast in the world, but on a morning like this, with hard work ahead of me, I know I'll appreciate it later.

5 "Good stuff, Lynn," my dad says as he gives my mom a kiss on one cheek. He spoons out a huge bowl for himself and then one for me. Even with raisins and brown sugar, it's hard to swallow.

6 "Eat up, Chris," my dad teases. "It'll stick to your ribs!"

7 He and my mom talk as they drink their coffee and eat their breakfast. It's all bills and money talk, so I tune out, watching the leaves swirl outside. My little sister pads in after a while, all pink fluff and fuzzy curls. Even I have to admit she's kind of adorable. She crawls silently into my dad's lap and he nestles her right into the crook of his arm, as if the shape of his arm was made to fit the curve of her back. He manages this maneuver while continuing to sip his coffee and talk to my mom. After we finish breakfast, we say goodbye to the two of them and head out.

8 It is just past dawn, and in the east, a smattering of lacy clouds drifts slowly across the streaks of pink, orange, and red that forecast a cold day. The air smells lightly of wood smoke from the farmers who are burning brush in the nearby orchards. Crunch, crunch, crunch, my feet push easily through the carpet of fallen leaves on the way to the barn. The colors are outrageous: orange, red, yellow, and even greens that are bright and playful. I can't resist kicking a few piles into the air to watch them swirl.

9 In the barn, it's warmer, with animal breath and body heat creating a hazy fog. I scratch our old goat, Ginger, behind her ears, pat the orange tabby, Huck, and say good morning to Jessie and her three pups. They are still squirmy and warm, snuggling in for breakfast.

10 We feed the animals and then load up the truck with everything we need: axes, clippers, small saw, twine, gloves. Our neighbor has trees down and has offered the wood to anyone who wants to come and chop it up. With the winter weather we're expecting, we can use all the firewood he can spare. The more we can get by on fireplace heat this winter, the better.

Go On

11 “Woo-hoo, you feel that, Chris? Fall is here for sure!” my dad rubs his hands together and starts the truck.

12 I nod in agreement and reach up to tuck my nose into my sweatshirt collar, then my hands go into my sweatshirt pocket.

13 Dad laughs. “Don’t worry. In no time at all, you’ll be sweating.”

14 At Mr. Arnold’s place, there are three trees down: two apple trees and one huge old oak that got dragged down when the apples blew down in our first storm of the season. The holes their roots left behind are enormous, and I want to crawl into them and explore, but Dad has other plans for me.

15 “Okay, Chris, we’re going to start with the lower branches, here. We’ll strip the branches and work our way up the tree, then we can chop up the trunk.” We dig in, Dad correcting my axe strokes from time to time, interrupting my swing to show me where to hit the branch just right so that I’ll get a cleaner cut. He was right: in no time I’m sweating enough to take my sweatshirt off, but my breath comes out of my mouth steaming in the frosty air.

16 By noon we’ve stripped off the lower branches and have the truck full of wood, about a cord’s worth. We’ll need about four more to get through the winter, but we thank Mr. Arnold and promise to be back tomorrow.

17 On the ride home, I nearly fall asleep, so my dad reaches over and gives me a playful punch in the arm. “That went twice as fast today with your help, son. You’re getting pretty strong,” he says and I feel positively mighty.

18 I watch the orchards as we pass. There are so many shades of orange and red that I can’t possibly record them all, so I breathe deep and flood my nose to best recall the memories of this day.

- 6** The following question has two parts. First, answer part A. Then, answer part B.

Part A

What is one theme of "The Scent of Memory"?

- A** Scientists have proven that smell is an important scent.
- B** The harvest is an unpleasant time with big rewards.
- C** Life on a farm is better than life elsewhere.
- D** Thinking about the past is a powerful source of emotion.

Part B

Which sentence from the "The Scent of Memory" **best** supports the answer to part A?

- A** "Scientists say that, more than sight, sound, touch, or taste, the sense of smell can trigger memory."
- B** "For me, the smell of wood smoke always makes me think of autumn."
- C** "On the ride home, I nearly fall asleep, so my dad reaches over and gives me a playful punch in the arm."
- D** "There are so many shades of orange and red that I can't possibly record them all, so I breathe deep and flood my nose to best recall the memories of this day."

- 7** Select **three** sentences that should be included in a summary of "The Scent of Memory."

- A** A boy describes the many pleasures in his life on a farm.
- B** Thinking about the smell of wood smoke, a man recalls an autumn day in his youth.
- C** His best memories are of the barn, the goat, the cat, the dog, and chopping wood.
- D** His mother and sister stay at home, while he and his father share a harvest with neighbors.
- E** He wakes up early and has breakfast with his family before heading out with his father.
- F** He and his father feed the animals in the barn and then chop wood on a neighbor's farm.
- G** He sweats from working so hard, but his breath still looks like steam in the cold air.

Go On

8 Read this sentence from paragraph 5 of “The Scent of Memory.”

Even with raisins and brown sugar, it’s hard to swallow.

What does the phrase “hard to swallow” suggest about the narrator?

- A** He has a sore throat.
- B** He does not like oatmeal.
- C** He prefers plain oatmeal.
- D** He is not hungry.

9 In paragraph 17 of “The Scent of Memory,” why does the narrator **most likely** say that he feels “positively mighty”?

- A** He recognizes that he has grown taller in the past year.
- B** He believes that his father would not have been able to do the work himself.
- C** He is pleased that his father recognizes his helpfulness and ability.
- D** He has accomplished something he thought was impossible.

10 How does the author develop the narrator’s point of view in “The Scent of Memory”?

- A** by having the narrator recall a specific day from his childhood
- B** by having the narrator use only the sense of smell to describe a memory
- C** by having the narrator alternate between past and present to show the past’s influence
- D** by having the narrator reflect on how his life has changed a great deal since his youth

11

Read the following poem about October:

October is the lovely girl who draws her sisters' envy:
Mild in temper, fair of heart, and much admired by many.
Her sisters dress more modestly, but she is always bold,
clothed in red and violet, crowned with green and gold.

One theme of "The Scent of Memory" is that autumn is a special time of year with plentiful harvests and beautiful colors. The poem also shares this theme. Compare and contrast how "The Scent of Memory" and the poem present the theme stated above. Use details from the texts to support your answer.

Go On

Understanding Ratio Concepts

► Complete each problem about ratio relationships.

- 1 Ms. Omar runs the school tennis club. She has a bin of tennis balls and rackets. For every 5 tennis balls in the bin, there are 3 tennis rackets. Draw a model to show the ratio of tennis balls to tennis rackets.

Write the following ratios.

tennis balls to tennis rackets _____

tennis balls to total pieces of tennis equipment _____

- 2 Christian has a collection of 18 shark teeth. He identified them as 6 tiger shark teeth, 8 sand shark teeth, and the rest as bull shark teeth.

What does the ratio 6 : 8 represent in this situation?

What does the ratio 4 : 18 represent in this situation? Explain your reasoning. Include a model in your explanation.

- 3 How are part-to-part ratios different from part-to-whole ratios?

Using Equivalent Ratios

► **Solve each problem.**

1 Josie is training for a race. The ratio of the number of minutes she runs to the number of miles she runs is 24 to 3. She plans to run 10 miles. How many minutes will it take her?

2 A chef planning for a large banquet thinks that 2 out of every 5 dinner guests will order his soup appetizer. He expects 800 guests at the banquet. Use equivalent ratios to estimate how many cups of soup he should prepare.

3 Fred is making a fruit salad. The ratio of cups of peaches to cups of cherries is 2 to 3. How many cups of peaches will Fred need to make 60 cups of fruit salad?

4 A community garden center hosts a plant giveaway every spring to help community members start their gardens. Last year, the giveaway supported 50 families by giving away 150 plants. Based on this ratio, how many plants will the center give away this year in order to support 65 families?

5 The first week of January, there are 49 dogs and 28 cats in an animal shelter. Throughout the month, the ratio of dogs to cats remains the same. The last week of January, there are 20 cats in the shelter. How many dogs are there?

6 A wedding planner uses 72 ivy stems for 18 centerpieces. When she arrives at the venue, she realizes she will only need 16 centerpieces. How many ivy stems should she use so that the ratio of ivy stems to centerpieces stays the same?

Using Unit Rates to Find Equivalent Ratios

► Solve each problem. Show your work.

- 1 Rachel mows 5 lawns in 8 hours. At this rate, how many lawns can she mow in 40 hours?
- 2 A contractor charges \$1,200 for 100 square feet of roofing installed. At this rate, how much does it cost to have 1,100 square feet installed?
- 3 It takes Jill 2 hours to run 14.5 miles. At this rate, how far could she run in 3 hours?
- 4 Bobby catches 8 passes in 3 football games. At this rate, how many passes does he catch in 15 games?
- 5 Five boxes of crackers cost \$9. At this rate, how much do 20 boxes cost?
- 6 It takes a jet 2 hours to fly 1,100 miles. At this rate, how far does it fly in 8 hours?

Using Unit Rates to Find Equivalent Ratios

continued

- 7 It takes Dan 32 minutes to complete 2 pages of math homework. At this rate, how many pages does he complete in 200 minutes?

- 8 Kendra gets a paycheck of \$300 after 5 days of work. At this rate, how much does she get paid for working 24 days?

- 9 Tim installs 50 square feet of his floor in 45 minutes. At this rate, how long does it take him to install 495 square feet?

- 10 Taylin buys 5 ounces of tea leaves for \$2.35. At this rate, how much money does she need to buy 12 ounces of tea leaves?

- 11 In problem 10, how would your work be different if you were asked how many ounces of tea leaves Taylin could buy with \$10?

Using Unit Rates to Compare Ratios

► Solve each problem. Show your work.

- 1 Shawn sells 36 vehicles in 4 weeks. Brett sells 56 vehicles in 7 weeks. Who sells more vehicles per week?

- 2 The table shows the gas mileage of two vehicles. Which vehicle travels more miles per gallon?

Car	Miles	Gallons
Pickup Truck	120	8
Minivan	180	10

- 3 Joe and Chris each have a lawn mowing business. Joe charges \$40 to mow 2 acres. Chris charges \$30 to mow 1.2 acres. Who charges more per acre?

- 4 The table shows the time it took two athletes to run different races. Who ran faster?

Athlete	Seconds	Meters
Ellen	28	200
Lindsay	60	400

Using Unit Rates to Compare Ratios *continued*

- 5 Branden and Pete each play running back. Branden carries the ball 75 times for 550 yards, and Pete has 42 carries for 380 yards. Who runs farther per carry?

- 6 The table shows the price of two cereal brands and the number of ounces per box. Which is the better price per ounce?

Cereal	Ounces	Price
Brand A	18	\$2.50
Brand B	24	\$3.50

- 7 Describe two different ways you could change the values in the table so that the answer to problem 6 is different.

Name _____

Ancient Rome

Roman Engineering

Romans built roads, arches, aqueducts and bridges. They also invented concrete which was used in many of their building projects.

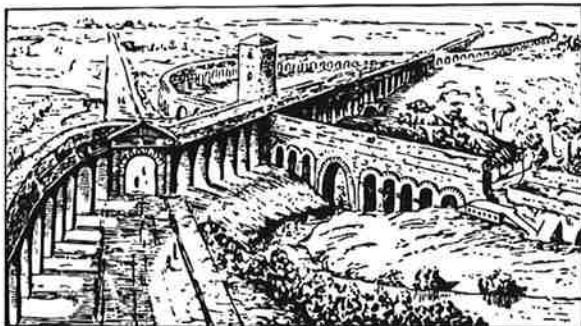
Roads allowed goods and services to be transported between towns and cities. Roads also made it easier to move soldiers and supplies as the empire expanded. Road were built with concrete, which was a Roman invention. Mixing lime and volcanic sand made a strong, durable material that dried solid and which was capable of supporting a great deal of weight. Roads were slightly humped in the middle so that rain would flow down to the sides of the roads, preventing flooding.

An arch is a curved, symmetrical structure made of brick, stone, or concrete. Most arches are composed of wedge shaped blocks supported by a wooden frame. When the top center stone, called the keystone, is inserted, the wooden scaffolding can be removed and both sides of the arch apply equal pressure to the keystone, allowing it to stand. Though the arch was not invented by the Romans, they did figure out how to increase the amount of weight it could support.

Aqueducts were long channels, usually underground, that were built to enable the supply of water into cities. This water was used for drinking, public baths, and sewers. Though the homes of some wealthy people had running water, most Romans would bring their own buckets to a public place, like a fountain, to get the water they needed

Bridges were built with stone and concrete, and arches were used to make them strong. The largest bridge built by ancient Romans was Trajan bridge over

the river Danube, and it was over 3700 feet long and 62 feet high. Over 900 bridges were built in the Roman empire.



Name _____ **Ancient Rome**

QUESTIONS: Roman Engineering

Circle the correct answer.

1. The Romans invented:
 - A. the arch
 - B. bridges
 - C. concrete
 - D. roads

2. Roads were _____ to prevent flooding.
 - A. made from concrete
 - B. capable of supporting a lot of weight
 - C. symmetrical in structure
 - D. slightly humped in the middle

3. Romans:
 - A. figured out how to increase the amount of weight an arch could support
 - B. invented the arch
 - C. had no running water
 - D. seldom built bridges

4. Aqueducts were used to:
 - A. carry water
 - B. strengthen bridges and buildings
 - C. prevent flooding
 - D. allow Romans to cross bodies of water

5. The top center stone of an arch is called the:
 - A. Danube
 - B. keystone
 - C. aqueduct
 - D. concrete

10.1 Properties of Matter

Lesson Objectives

- Define matter, mass, and volume.
- Identify physical properties of matter.
- List examples of chemical properties of matter.

Vocabulary

- chemical property
- density
- flammability
- mass
- matter
- physical property
- reactivity
- volume
- weight

Introduction

Here's a riddle for you to ponder: What do you and a tiny speck of dust in outer space have in common? Think you know the answer? Read on to find out.

What is Matter?

Both you and the speck of dust consist of atoms of matter. So does the ground beneath your feet. In fact, everything you can see and touch is made of matter. The only things that aren't matter are forms of energy, such as light and sound. Although forms of energy are not matter, the air and other substances they travel through are. So what is matter? **Matter** is defined as anything that has mass and volume.

Mass

Mass is the amount of matter in a substance or object. Mass is commonly measured with a balance. A simple mechanical balance is shown in **Figure 10.1**. It allows an object to be matched with other objects of known mass. SI units for mass are the kilogram, but for smaller masses grams are often used instead.

**FIGURE 10.1**

This balance shows one way of measuring mass. When both sides of the balance are at the same level, it means that objects in the two pans have the same mass.

Mass versus Weight

The more matter an object contains, generally the more it weighs. However, weight is not the same thing as mass. **Weight** is a measure of the force of gravity pulling on an object. It is measured with a scale, like the kitchen-scale in **Figure 10.2**. The scale detects how forcefully objects in the pan are being pulled downward by the force of gravity. The SI unit for weight is the newton (N). The common English unit is the pound (lb). With Earth's gravity, a mass of 1 kg has a weight of 9.8 N (2.2 lb).

**FIGURE 10.2**

This kitchen scale measures weight. How does weight differ from mass?

Problem Solving

Problem: At Earth's gravity, what is the weight in newtons of an object with a mass of 10 kg?

Solution: At Earth's gravity, 1 kg has a weight of 9.8 N. Therefore, 10 kg has a weight of $(10 \times 9.8 \text{ N}) = 98 \text{ N}$.

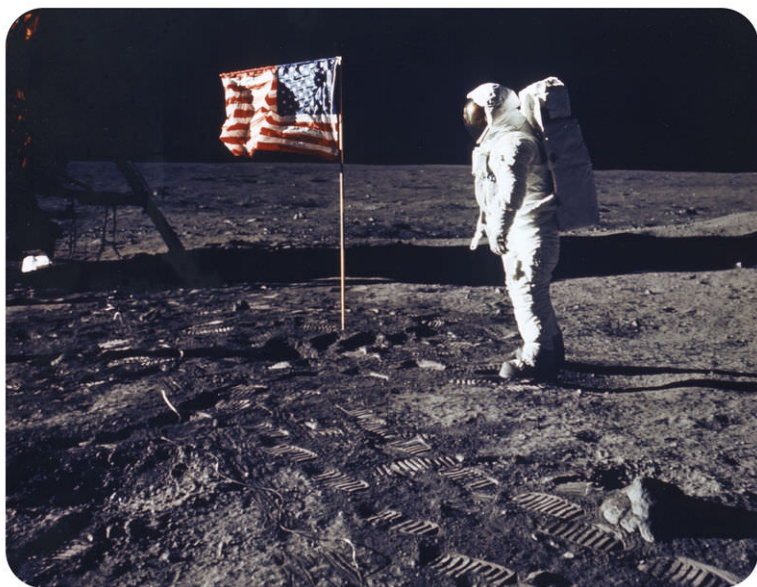
You Try It!

Problem: If you have a mass of 50 kg on Earth, what is your weight in newtons?

An object with more mass is pulled by gravity with greater force, so mass and weight are closely related. However, the weight of an object can change if the force of gravity changes, even while the mass of the object remains constant. Look at the photo of astronaut Edwin E. Aldrin Jr taken by fellow astronaut Neil Armstrong, the first human to walk on the moon, in **Figure 10.3**. An astronaut weighed less on the moon than he did on Earth because the moon's gravity is weaker than Earth's. The astronaut's mass, on the other hand, did not change. He still contained the same amount of matter on the moon as he did on Earth.

The amount of space matter takes up is its **volume**. How the volume of matter is measured depends on its state.

- The volume of liquids is measured with measuring containers. In the kitchen, liquid volume is usually

**FIGURE 10.3**

If the astronaut weighed 175 pounds on Earth, he would have weighed only 29 pounds on the moon. If his mass on Earth was 80 kg, what would his mass have been on the moon?

measured with measuring cups or spoons. In the lab, liquid volume is measured with containers such as graduated cylinders. Units in the metric system for liquid volume include liters (L) and milliliters (mL).

- The volume of gases depends on the volume of their container. That's because gases expand to fill whatever space is available to them. For example, as you drink water from a bottle, air rushes in to take the place of the water. An "empty" liter bottle actually holds a liter of air. How could you find the volume of air in an "empty" room?
- The volume of regularly shaped solids can be calculated from their dimensions. For example, the volume of a rectangular solid is the product of its length, width, and height ($l \times w \times h$). For solids that have irregular shapes, the displacement method is used to measure volume. You can see how it works in **Figure 10.4** and in the video below. The SI unit for solid volumes is cubic meters (m^3). However, cubic centimeters (cm^3) are often used for smaller volume measurements.

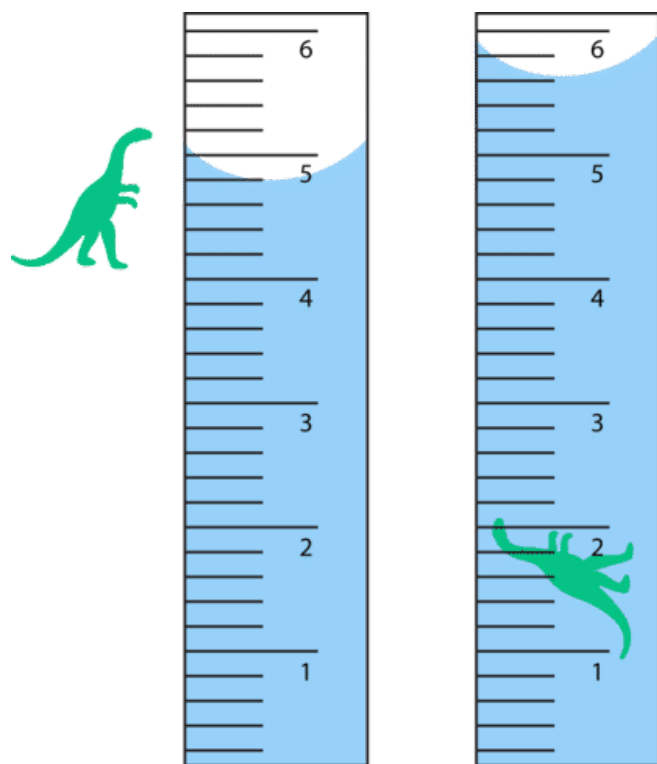
http://www.youtube.com/watch?v=q9L52maq_vA

Physical Properties of Matter

Matter has many properties. Some are physical properties. **Physical properties** of matter are properties that can be measured or observed without matter changing to a different substance. For example, whether a given substance normally exists as a solid, liquid, or gas is a physical property. Consider water. It is a liquid at room temperature, but if it freezes and changes to ice, it is still water. Generally, physical properties are things you can see, hear, smell, or feel with your senses.

Examples of Physical Properties

Physical properties include the state of matter and its color and odor. For example, oxygen is a colorless, odorless gas. Chlorine is a greenish gas with a strong, sharp odor. Other physical properties include hardness, freezing and boiling points, the ability to dissolve in other substances, and the ability to conduct heat or electricity. These properties are demonstrated in **Figure 10.5**. Can you think of other physical properties?



Displacement Method for Finding Volume

1. Add water to a measuring container such as a graduated cylinder. Record the volume of the water.
2. Place the object in the water in the graduated cylinder. Measure the volume of the water with the object in it.
3. Subtract the first volume from the second volume. The difference represents the volume of the object.

FIGURE 10.4

The displacement method is used to find the volume of an irregularly shaped solid object. It measures the amount of water that the object displaces, or moves out of the way. What is the volume of the toy dinosaur in mL?

Density

Density is an important physical property of matter. It reflects how closely packed the particles of matter are. Density is calculated from the amount of mass in a given volume of matter, using the formula:

$$\text{Density } (D) = \frac{\text{Mass } (M)}{\text{Volume } (V)}$$

Problem Solving

Problem: What is the density of a substance that has a mass of 20 g and a volume of 10 mL?

Solution: $D = 20 \text{ g}/10 \text{ mL} = 2.0 \text{ g/mL}$

You Try It!

Problem: An object has a mass of 180 kg and a volume of 90 m^3 . What is its density?

To better understand density, think about a bowling ball and a volleyball. The bowling ball feels heavy. It is solid all the way through. It contains a lot of tightly packed particles of matter. In contrast, the volleyball feels light. It is full of air. It contains fewer, more widely spaced particles of matter. Both balls have about the same volume, but the bowling ball has a much greater mass. Its matter is denser.



Diamond



Talc

Hardness

Diamond is the hardest mineral. It is so hard that it is used in drill bits. Talc is the softest mineral. It is so soft that you can crumble it with your fingers.



Antifreeze



Water

Freezing & Boiling Points

Antifreeze has a higher boiling point and lower freezing point than water. It is used in a car's cooling system to keep the cooling fluid in a liquid state. If plain water were used instead, it might boil in hot weather and freeze in cold weather.



Aluminum vs. Wood



Copper vs. Plastic

Ability to Conduct Heat or Electricity

Aluminum is a good conductor of heat; wood is not. That's why this pot is made of aluminum and the spoon is made of wood. Copper is a good conductor of electricity; plastic is not. That's why the wires inside this cable are made of copper and the outside covering is made of plastic.



Sand



Sugar

Ability to Dissolve in Other Substances

This white sand may look like sugar. But it doesn't dissolve in water as sugar does.

FIGURE 10.5

These are just a few of the physical properties of matter.

KQED: Aerogel

It looks like frozen smoke, and it's the lightest solid material on the planet. Aerogel insulates space suits, makes tennis rackets stronger and could be used one day to clean up oil spills. Lawrence Livermore National Laboratory scientist Alex Gash shows us some remarkable properties of this truly unique substance. For more information on aerogel, see <http://science.kqed.org/quest/video/quest-lab-aerogel/> .



MEDIA

Click image to the left or use the URL below.

URL: <http://www.ck12.org/flx/render/embeddedobject/129637>

Chemical Properties of Matter

Some properties of matter can be measured or observed only when matter undergoes a change to become an entirely different substance. These properties are called **chemical properties**. They include flammability and reactivity.

Flammability

Flammability is the ability of matter to burn. Wood is flammable; iron is not. When wood burns, it changes to ashes, carbon dioxide, water vapor, and other gases. After burning, it is no longer wood.

Reactivity

Reactivity is the ability of matter to combine chemically with other substances. For example, iron is highly reactive with oxygen. When it combines with oxygen, it forms the reddish powder called rust (see **Figure 10.6**). Rust is not iron but an entirely different substance that consists of both iron and oxygen.



FIGURE 10.6

The iron in these steel chains has started to rust.

Lesson Summary

- Matter is anything that has mass and volume. Mass is the amount of matter in a substance. Volume is the amount of space matter takes up.
- Matter has both physical and chemical properties. Physical properties can be measured or observed without matter changing to a different substance.
- Chemical properties of matter can be measured or observed only when matter undergoes a change to become an entirely different substance.

Lesson Review Questions

Recall

1. Define matter.
2. How does mass differ from weight?
3. Describe the displacement method for measuring the volume of an object.
4. Identify two physical properties and two chemical properties of matter.

Apply Concepts

5. Create a table comparing and contrasting physical properties of tap water and table salt.
6. Apply the concept of density to explain why oil floats on water.

Think Critically

7. Some kinds of matter are attracted to a magnet. Is this a physical or chemical property of matter? How do you know?

Points to Consider

The physical and chemical properties of substances can be used to identify them. That's because different kinds of matter have different properties.

- What property could you use to tell the difference between iron and aluminum?
- How could you tell whether a liquid is honey or vinegar?