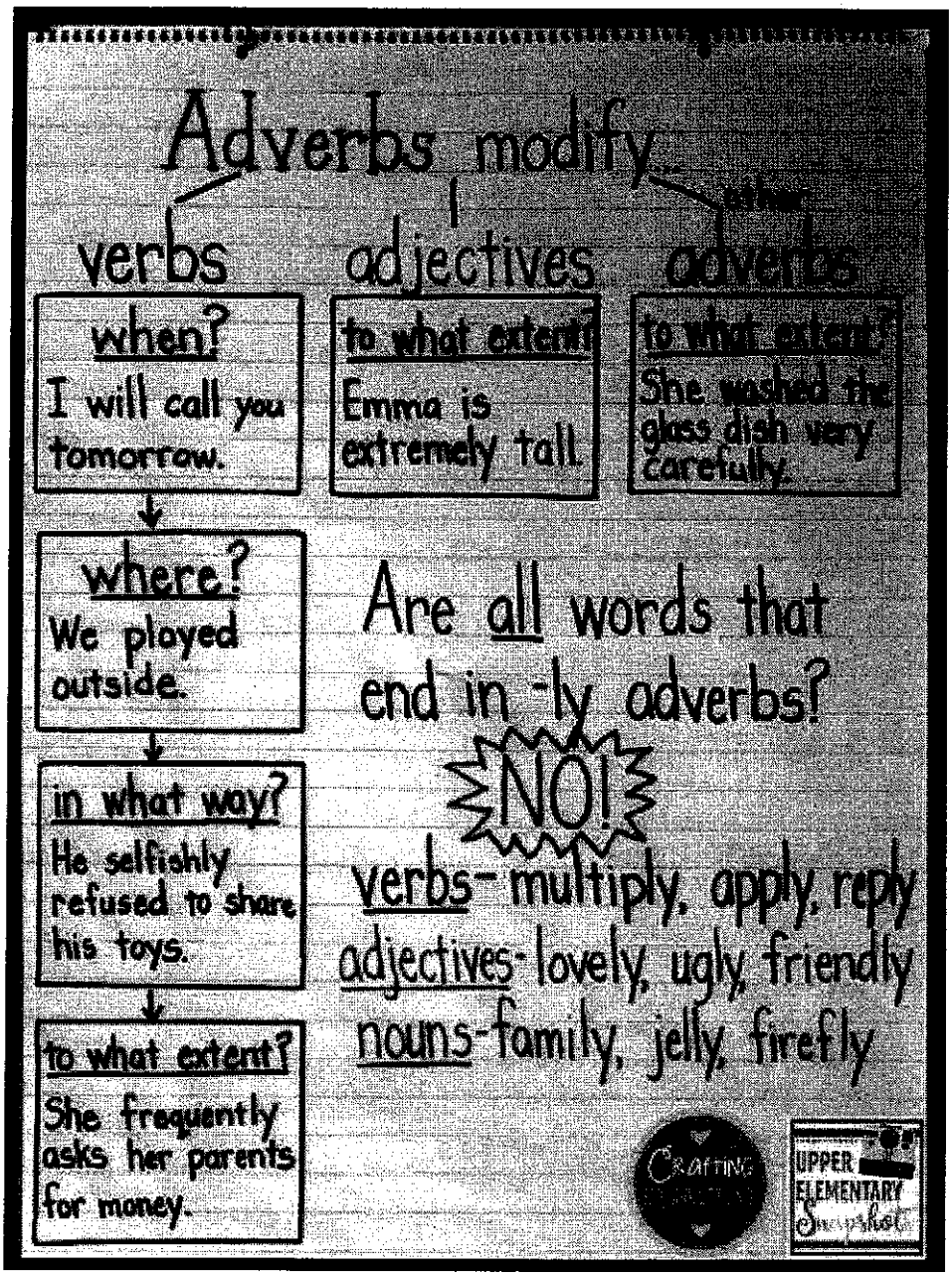

Adverbs modify
verbs
adjectives
other adverbs
when?
I will call you tomorrow.
to what extent?
Emma is extremely tall.
to what extent?
She washed the glass dish very carefully.
where?
We played outside.
in what way?
He selfishly refused to share his toys.
to what extent?
She frequently asks her parents for money.
Are all words that end in -ly adverbs?
NO!
verbs- multiply, apply, reply
adjectives- lovely, ugly, friendly
nouns- family, jelly, firefly
CRAFTING
UPPER ELEMENTARY Snapshot

4.L.1.A.d
Communicate using conventions of English language. Grammar In speech and written form, apply standard English grammar to: **use adverbs in writing**

Name_____

Level 20

Identify the adverb

1.The cat swiftly caught the mouse under his paws.

2. Jenna rides her bicycle well

3. It is snowing outside, so we need to dress warmly.

Level 30

Select the correct form of the adverb for the sentence.

4. He (correct, correctly) defined the terms.

5. He measured the floor (exact, exactly).

6. Mike wrote too (slow, slowly) on the exam.

7. Talk (softly, soft) or don't talk at all.

Select the correct superlative form of the adverb far in the sentence below.

8. My mother said we would discuss the problem __*further/farther*__ when we got home.

9. She would not go one step ____*further/farther*_____ until she had a drink of water.

10. James went _____*further/farther*_____ down the road to find a gas station.

4.L.1.A.d
Communicate using conventions of English language. Grammar In speech and written form, apply standard English grammar to: **use adverbs in writing**

Choose the best adverb to improve the student's writing in the paragraph.

11.

extremely eventually hardly especially slowly

Conserving Water

Conserving water is a great way to help the earth. Without our water, plants, humans, and animals, would not be able to live. We need to save water because we will [redacted] run out of it. Then we will have to use and drink saltwater. It is extremely expensive to filter salt water. This is why we need to save water. What can you do to save water?

12.

Quickly furthest farthest calmly safely safe

I think the cooking club is the best because it could help you later in your life. Like how to follow a recipe and how to cook [redacted]. The club could also show how to choose healthy food, work as a team, and use kitchen equipment.

Where is the best place to add the adverb *joyfully* in the sentence?

13. We laughed when we heard the good news.

We		laughed		when		we		heard		the		good		news.

Where is the best place to add the adverb *carefully* in the sentence?

14. I walked over the broken pieces of glass.

I		walked		over		the		broken		pieces		of		glass

4.L.1.A.d
Communicate using conventions of English language. Grammar In speech and written form, apply standard English grammar to: **use adverbs in writing**

Where is the best place to add the adverb *finally* in the sentence?

15. After many hours, we arrived at our destination.

After		many		hours		we		arrived		at		our		destination

Level 40

Write a story using adverbs correctly. Use at least 7 adverbs and underline them in your story.

ON top of
PREPOSITIONS
When a preposition is linked to a noun or pronoun (the object) it's called a "prepositional phrase"
over the river and through the woods to Grandmothers house we go.
BEHIND the banner
• prepositions often tell position, but can also tell when & how something happens, or even who owns something.
• prepositions are found before nouns or pronouns to show how they relate to the words around them.
OVER the rainbow
NOW PLAYING: THE PREPOSITION SONG ~ "YANKEE DOODLE"
aboard about above across against along around amid among after at except for during down behind below beneath beside between before beyond by in from off over on of until unto upon under underneath since up like near past throughout through with within without outside toward inside into to

Prepositional Phrases Post Test
4.L.1.A.f f. use prepositions

Name_____

Level 20

Circle the preposition in the sentence

1. The captain aboard the ship whistles
2. We read a story about bears.
3. The shelf above the desk holds books.

Level 30

Which preposition best completes the sentence?

Example A: I went (aboard / across) the cruise ship just in time. Answer: aboard

4. My mom looked (beyond /after) me when I was young.
5. I sat (over / between) my two best friends at the assembly.
6. Someone tapped my shoulder, so I looked (past / behind) me.
7. My father had to crawl (about / under) the house to look for the raccoon.

Which sentence contains a prepositional phrase?

8. A. The presents before her were wrapped beautifully.
   B. The tree was beautiful.
   C. The family sang songs loudly.
   D. The dog chased the cat, and the cat chased the mouse.

9. A. The magma is flowing quickly.
   B. The magma below the surface is boiling hot.
   C. The volcano erupted violently.
   D. Volcanoes are my favorite subject.

Prepositional Phrases Post Test
4.L.1.A.f f. use prepositions

10. A. The line was long, but I waited patiently.
    B. I waited in line, but my sister was angry.
    C. The person behind me is last.
    D. The person is wearing a red hat.

Underline the prepositional phrase in the sentence.

11. I leaned against the wall because my legs were hurting.

12. John looked across the lake at the houses on the other side.

13. Since I am tall, I can see over many people in the audience.

Which preposition best illustrates the relationship between <u>my brother</u> and <u>the sky</u>?

14. My brother pointed (*down / up/ along / above*) towards the sky at the bird.

Which preposition best illustrates the relationship between <u>eating</u> and <u>the play</u>?

15. (*Before / After / Near / Since*) we finish eating, we will go watch a play.

Day 17 Compound Sentences
Invitation to Notice

4th grade standards

4.L.1.A.g. recognize the difference between and use coordinating conjunctions and subordinating conjunctions h. produce and expand the complete simple and compound four types of sentences i. correct sentence fragments and run on sentences in writing

4.L.1.B.c. insert a comma before a coordinating conjunction in a compound sentence

INTRODUCTION

What you want students to walk away knowing about compound sentences:

• Compound sentences are made when two or more sentences are combined with a comma and a coordinating conjunction.
• Coordinating conjunctions can be remembered with the mnemonic FANBOYS—for, and, nor, but, or, yet, so.
• Compound sentences can be represented in a formula: Sentence , + one of the FANBOYS + sentence = Compound Sentence.

Misunderstandings you may need to clarify:

• Confusion that any sentence with one of the FANBOYS is a compound sentence
• Confusion that any sentence with one comma is a compound sentence
• Confusion that compound sentences can't be combined with any other sentence form

In a nutshell:

- Show students the compound sentence from Frindle.
- Ask students what they notice.
- Guide the discussion to the keypoint: **This looks like two sentences in one.**
- Show students Figure 9.1
- Be prepared to give this time and immerse students with many examples of compound sentences

Nick Allen had plenty of ideas, and he knew what to do with them.
—Andrew Clements, Frindle (1998)

BUILDING THE COMPOUND SENTENCE PATTERN

Sentence	,	for and nor but or yet so	sentence	.

Nick Allen had plenty of ideas, and he knew what do to with them.

To help illustrate the pattern of the compound sentence, I draw a representation of a basic compound sentence pattern based on a graphic found in *Acts of Teaching* (Carroll and Wilson 1993). I intentionally use the terms *sentence* rather than *independent clause* and *FANBOYS* rather than *coordinating conjunctions* to simplify the pattern. To build concepts, students need to begin as simply as possible, building the pattern and its exceptions over time.

Post Test
4.L.1.B.c Insert a comma before coordinating conjunction in a compound sentence

Name_____

Level 20

Identify the compound sentence.

1. A. José wants to be an astronaut when he grows up. Maria wants to be a nurse.
   B. José wants to be an astronaut and a nurse when he grows up.
   C. José wants to be an astronaut when he grows up, and Maria wants to be a nurse.
   D. Jose wants to be an astronaut but not a nurse.

2. A. The tigers at the zoo are always sleeping, but the penguins are fun to watch.
   B. The tigers at the zoo are always sleeping but are fun to watch.
   C. The tigers and penguins at the zoo are always sleeping.
   D. The tigers at the zoo are always sleeping.

Level 30

Where does a comma need to be placed in this sentence? Write the comma in between the correct words to form a compound sentence.

1. Chloe and her friends went to the movie theater but they didn't buy any popcorn.
2. Grandma is a terrific cook and we love staying at her house.
3. A small kitten followed me home so I gave it a bowl of milk.
4. Would you like to go to the movies or would you rather stay home tonight?

Post Test

4.L.1.B.c Insert a comma before coordinating conjunction in a compound sentence

Name_____

What is the best way to punctuate the sentence?

5. A. Mr. Sanchez, loved his new office but he didn't like the view.
   B. Mr. Sanchez loved his new office, but he didn't like the view.
   C. Mr. Sanchez loved his new office but, he didn't like the view.
   D. Mr. Sanchez, loved his new office but he, didn't like the view.

6. A. Ivana's bicycle had a flat tire so she, had to walk to the grocery store.
   B. Ivana's bicycle had a flat tire so she had, to walk to the grocery store.
   C. Ivana's bicycle had a flat tire, so she had to walk to the grocery store.
   D. Ivana's bicycle had a flat tire so, she had to walk to the grocery store.

Level 40

Write a paragraph about a time you had to wait for something. Use at least 3 compound sentences in your writing using 3 different coordinating conjunctions/ FANBOYS

Drawing Conclusions Nonfiction Name: _____
Post test
4.R.1.A.b Drawing conclusions by providing textual evidence of what the text says explicitly

Robo-Helpers

Move over, C-3PO and R2-D2. In 2005, there was another droid1 in town. A team of scientists developed a robot that learned to walk like a young child. The robot, called Toddler, improved its step and balance with each stride. Toddler, along with two other robots, was unveiled in February 2005 at the meeting of the American Association for the Advancement of Science. All three robots had a humanlike gait, or way of walking. Toddler, the most advanced robot of the group, could learn to walk in about 20 minutes, or 600 steps.

Circuit City

While these weren't the first robots to strut their stuff, scientists say they were different from previous versions of walking robots. Previous versions of walking robots needed a motor to power every movement in their legs, knees, and ankles. They required large amounts of energy to move—about 10 times as much as the three 2005 robot models. Each of the 2005 robots could catch itself if it fell as it moved forward. This was essentially the same way a person learns to walk. The walking robots also swung their arms forward at every step to help with balance, just like a person does.

Not Just a Toy

Why have scientists been developing robots with the ability to walk like humans? Scientists say that walking robots are more than high-tech toys. They hope that walking robots may one day be able to perform tasks that are difficult or hazardous2 for humans, including dangerous space missions. Scientists also believe that this type of technology will lead to medical breakthroughs in the future. The latest technology may be used to help create new types of robotic limbs for people who have lost their arms or legs. "This is the foundation for what we may see in [robotics] in the future," said scientist Michael Foster, who oversaw the development of the walking robots.

Level 20

1. Which idea is supported by evidence from the text?

a. Robots are helpful to humankind.

b. Robots are dangerous.

c. Robots are things from the future.

d. Robots are nothing like humans.

2. **Provide evidence in the text that robots are like humans. Underline the sentence in the text.**

They required large amounts of energy to move—about 10 times as much as the three 2005 robot models. Each of the 2005 robots could catch itself if it fell as it moved forward. This was essentially the same way a person learns to walk. The walking robots also swung their arms forward at every step to help with balance, just like a person does. .

Level 30

3. One reason why it might be important that the robots use less energy is that

a. it is less expensive and easier to maintain.

b. it makes less noise.

c. it is less likely to break.

d. it is easier for anyone to make a robot.

4. What can you conclude about robots today? What makes you think this?

_____

_____

_____

_____

_____

5. From this article, you can conclude that ***the author seems to be hopeful that the walking robots will end up helping people.*** Choose the **details** that support this conclusion. Choose all that apply.

Outer Space—A Nice Place to Visit?

Where will you go on your next vacation? Disneyland? Sea World? Outer space? That's right; tourists are now paying big bucks to travel into space with astronauts! The first space tourist was Dennis Tito, an American businessman. In 2001, he paid about $20 million to ride on a Russian rocket to the International Space Station. The Space Station circles 220 miles above Earth. Tito stayed on the station for a week, hanging out with astronauts and eating space food.

6. It is probably so expensive to travel to space because

a. astronauts want to make a lot of money.

b. astronaut food is very expensive.

c. space equipment and fuel is expensive.

d. there are high taxes on space travel.

7. Read the sentences from the passage. What can be concluded from the details in the sentence?

How safe is space travel? Apart from the risk of crashing, space tourists have some special things to worry about. Earth's atmosphere protects us from dangerous radiation1 from the sun. Space travelers are exposed to more of the sun's rays. But for tourists spending only a few days or weeks in space, the radiation probably isn't harmful.

Level 40

Green Machines

Low-cost laptops to help improve education for world's poor.

Can you imagine a day when every student has a laptop computer? Nicholas Negroponte can. He hopes to make that happen with the One Laptop per Child (OLPC) program. The nonprofit organization he founded aims to provide laptops to elementary students in poor countries. If everything goes according to plan, by 2007 up to 7 million children in Thailand, Nigeria, Brazil, and Argentina will have their own laptops. After that, the organization hopes to bring the program to China, Egypt, and Mexico.

The program is starting small. Beginning October and into November [2006], 500 children in Thailand will receive computers. Thailand's Prime Minister Thaksin Shinawatra recently promised that every elementary student in his country will receive a free computer "instead of books." Textbooks can be expensive, but the new laptops might cut those costs. The computers are designed to connect to the Internet. "Books will be found and can be read on computers," Thaksin says.

Nicknamed "the green machine," each computer will initially cost about $140, but OLPC's goal is to reduce the cost to $100. The machine was designed by the Massachusetts Institute of Technology's Media Laboratory to meet the needs of developing countries. For instance, the laptops run on electricity produced by hand cranks. That is important because some people in poor areas lack electric power. The laptops don't appeal to developing nations only, however. A number of U.S. educators are also interested in the machines. They see the laptops as useful tools for children whose families can't afford computers.

After reading Robo helpers and Green Machines, which connection can be made about technology? Use details from each passage to support your answer.

Name _____ Essay _____ Date _____ Period _____

Synthesis Essay Rubric

	4 Advanced	3 Proficient	2 Basic	1 Below Basic
Content: 4 papers must have 4's in each area	clearly synthesizes the content from several sources dealing with a single issue, paraphrasing the ideas and connecting them to other sources and related topics to demonstrate comprehension.	synthesizes content from several sources dealing with a single issue, paraphrasing the ideas and connecting them to other sources and related topics to demonstrate comprehension.	synthesizes some of the content from several sources dealing with a single issue, but paraphrasing demonstrates limited comprehension	demonstrates minimal synthesis of information
	demonstrates a thorough comprehensive grasp of the text.	demonstrates a comprehensive grasp of the text.	demonstrates a limited grasp of the text	demonstrates minimal grasp of the text
	accurately and coherently provides specific textual details and examples to support the thesis and main ideas from two or more sources.	accurately and coherently provides general textual details and examples to support the thesis and main ideas from one or more sources.	provides few if any textual details and examples to support the thesis and main ideas from at least one source	provides no textual details or examples to support the thesis and main ideas
	thoughtfully anticipates and addresses the reader's potential misunderstandings, biases, and expectations.	anticipates and addresses the reader's potential misunderstandings, biases, and expectations.	may address the reader's potential misunderstandings, biases, and expectations, but in a limited manner	does not address the reader's potential misunderstandings, biases, and expectations.
Style	provides a variety of sentence types and uses precise, descriptive language.	provides a variety of sentence types and uses some descriptive language.	provides few, if any, types of sentences and uses predictable language.	provides no sentence variety and uses limited vocabulary.
	contains few, if any, errors in the conventions of the English language. Errors are first draft in nature.	may contain some errors in the conventions of the English language. Errors do not impede understanding.	contains few, if any, errors in the conventions of the English language. Errors may impede understanding.	contains serious errors in the conventions of the English language. Errors impede understanding.

Comments: _____

_____

Drawing Conclusions Nonfiction Name: _____
Pretest
4.R.1.A.b Drawing conclusions by providing textual evidence of what the text says explicitly

Read the passage below. Answer the questions that follow.

Students Get Healthy!

A U.S. law requires that schools provide healthy choices for students.
Public schools across the country have been on a health kick since 2010. Thanks to a federal law, students said farewell to fatty foods and hello to better eating habits in school. They also have been exercising more during the school day.

New School Rules
It's up to schools to decide how they comply with the law. Many districts mandate, or require, schools to provide healthy choices for lunch. In Tennessee, most schools removed sugary snacks and soft drinks from vending machines. In their place are more nutritious choices, such as granola bars, nuts, water, and juice.
In Florida, Missouri, and Texas, some schools have rules that restrict desserts such as cupcakes and lollipops from parties. Instead, school officials encourage teachers and parents to provide more nutritious treats.
To get kids to exercise more, the northwestern Minnesota district of Perham Dent added more physical activity to the school day. Many school districts also make sure that kids have recess every day.

A Growing Problem
The goals of the law are to promote good health and to combat obesity. Obesity is the condition of being very overweight. Being obese can lead to serious health problems later in life. Experts say the percentage of children aged 6-11 years old who were obese more than doubled from 1980 to 2012, and the percentage of obese young people aged 12-19 years old quadrupled in the same time period. "We know that adults who are very overweight get sick more often and lose time at work," Julia Lear, the director of the Center for Health and Health Care in Schools, told WR News. "The best thing to do is get kids in the habit of getting lots of exercise and eating healthy meals."

Level 20

1. Which phrase explains what schools meant by being on a "health kick"?

   A. starting kick-boxing programs
   B. investing more into soccer
   C. making more healthy choices
   D. wanting to "kick" away healthy lifestyles

2. Which details support the idea that obesity is unhealthy?

   A. Being obese can lead to serious health problems later in life.
   B. "The best thing to do is get kids in the habit of getting lots of exercise and eating healthy meals."
   C. "We know that adults who are very overweight get sick more often and lose time at work."
   D. Many school districts also make sure that kids have recess every day.

Level 30

3. Choose **two** statements from the text below that support this inference: "Schools such as Florida, Missouri, Texas, and Minnesota care about preventing childhood obesity."

   A. The schools prohibited unhealthy desserts from school parties.
   B. All school districts in the states created a law that students must have recess everyday.
   C. They only give students candy for rewards.
   D. The schools encouraged structured exercise throughout the day.

4. What can you conclude about children today? What makes you think this?

_____

_____

_____

_____

_____

5. From this article, you can conclude that health is a concern in school districts across the United States. Choose the **details** that support this conclusion. Choose all that apply.

A. Many districts mandate, or require, schools to provide healthy choices for lunch.
B. Public schools across the country have been on a health kick since 2010.
C. "We know that adults who are very overweight get sick more often and lose time at work," Julia Lear, the director of the Center for Health and Health Care in Schools, told WR News.
D. In Florida, Missouri, and Texas, some schools have rules that restrict desserts such as cupcakes and lollipops from parties.
E. It's up to schools to decide how they comply with the law.

Spiders and a Balanced Diet

People aren't the only animals that know how to look for a healthful meal. Scientists have discovered that insects and spiders go out of their way to eat balanced diets.

A team of scientists studied three different predators- a beetle and two types of spiders. Predators are animals that kill and eat other animals.

First, scientists fed the bugs unbalanced diets. The researchers gave some bugs food high in fat and fed others only foods high in protein.

For the next meal, the scientists let the beetles and spiders choose what they wanted to eat. All of them picked foods that contained the nutrients their previous meal had lacked.

The bugs that had been fed high-protein meals picked high-fat prey. The ones that had gotten high-fat meals chose high-protein prey.

It turns out that even creepy-crawlies, especially those with eight legs, watch what they eat!

6. Which sentence best supports why spiders probably eat a balanced diet?

A. They are not able to get enough exercise.
B. They do not want to become too big.
C. They know what foods their bodies need.
D. All of the above.

7. Read the sentences from the passage. What can be concluded from the details in the sentence?

"For the next meal, the scientists let the beetles and spiders choose what they wanted to eat. All of them picked foods that contained the nutrients their previous meal had lacked. The bugs that had been fed high-protein meals picked high-fat prey. The ones that had gotten high-fat meals, chose high-protein prey.

_____

_____

_____

_____

_____

Social Studies

Famous Missourians

There are so many famous people who have ties to Missouri. Your task is to become an expert on one famous Missourian. Use these websites to explore many different famous Missourians and pick one.
https://historicmissourians.shsmo.org/historicmissourians/name/

https://www.sos.mo.gov/Kids/history/famousmissourians

https://missourilegends.com/

Here is a list of many, but not all, famous Missourians.

- John Ashcroft (born 1942), U.S. Attorney General and Senator (2006)
- David Rice Atchison (1807-1886), U.S. Senator, President pro-tempore of the Senate (1991)
- Josephine Baker (1906-1975), entertainer and civil rights activist (1995)
- Bob Barker (born 1923), television personality (2007)
- Tom Bass (1859-1934), horse trainer (1999)
- Thomas Hart Benton (1889-1975), painter and muralist (1985)
- George Caleb Bingham (1811-1879), painter (2010)
- Susan Elizabeth Blow (1843-1916), educator (1983)
- Omar Bradley (1893-1981), World War II military commander (1992)
- Jack Buck (1924-2002), sportscaster (2006)
- Dale Carnegie (1888-1955), author and educator (2006)
- George Washington Carver (1864-1943), scientist, botanist and educator (1983)
- Champ Clark (1850-1921), Speaker of the U.S. House of Representatives (2000)
- Walter Cronkite (1916-2009), broadcast journalist (1999)
- Walt Disney (1901-1966), film and animation innovator (1993)
- Alexander Doniphan (1808-1887), state legislator and militia leader (2008)
- Rose Philippine Duchesne (1769-1852), missionary and educator (2006)
- Betty Grable (1916-1973), actress (2009)
- Joyce C. Hall (1891-1982), businessman (1995)
- Mel Hancock (1929-2011), former U.S Congressman (2014)

- Warren E. Hearnes (1923-2009), former Missouri governor (2010)
- Robert A. Heinlein (1907-1988), science fiction author (2016)
- Edwin Hubble (1889-1953), astronomer (2003)
- Lamar Hunt (1932-2006), sportsman (2008)
- Edward D. "Ted" Jones, Jr. (1925-1990), businessman (2015)
- Scott Joplin (1868-1917), ragtime composer and pianist (1992)
- Ewing Kauffman (1916-1993), businessman and sportsman (1997)
- Emmett Kelly (1898-1979), circus performer and clown (1996)
- Rush Limbaugh (born 1951), political talk radio host and author (2012)
- James Smith McDonnell (1899-1980), businessman (2010)
- Virginia Minor (1824-1894), women's suffrage activist (2014)
- Stan Musial (1920-2013), baseball player (2000)
- John Neihardt (1881-1973), poet and philosopher
- Reinhold Niebuhr (1892-1971), pastor, author and political activist (1996)
- Buck O'Neil (1911-2006), baseball player (2012)
- Charlie Parker (1920-1955), jazz saxophonist and composer (1994)
- James Cash Penney (1875-1971), businessman (1994)
- Marlin Perkins (1905-1986), zoologist (2004)
- John J. Pershing (1860-1948), World War I military commander (1995)
- Ginger Rogers (1911-1995), dancer and actress
- Sacajawea (1788-1812), interpreter and guide (1993)
- Dred Scott (1790-1858), slave and civil rights figure, (2012)
- Andrew Taylor Still (1828-1917), physician, "father of osteopathic medicine" (2014)
- Harry S. Truman (1884-1972), U.S. President (1991)
- Mark Twain (1835-1910), author and humorist (1982)
- Laura Ingalls Wilder (1867-1957), author (1993)

Once you have chosen your famous Missourian, you need to be able to teach your classmates about them. You can write an informational paper, do an imovie, a slide presentation, create a model, dress up as your person,the possibilities are endless. You must include the following:

- Birthdate and death date (if they are dead)
- Early life (parents, siblings, school...)
- Adult life (spouse, children, job)
- Contribution (author, inventor...)
- At least 5 interesting facts.

A Night at the Museum

As a final project, students will be participating in a living wax museum. A living wax museum is where students dress up like their person that was researched, memorize a monologue, and tell people about their person. This is a project that would have been shared with many students at Robinson Elementary.

Your assignment is to use your research about a famous Missourian to create a presentation and costume to fill the role of your person in the wax museum.

WHAT YOU WILL NEED:

1.) A Google Slides presentation with a minimum of 7 slides describing the life of your famous Missourian. Your slides must include your famous person's early life, adulthood, Missouri connection, famous quote, and a timeline of events.

2.) A short, memorized speech to deliver when guests come to your booth. This would have been developed in class but may need to be practiced at home as well. It should be something that is spoken by you as that person. You may attempt to sound as that person would have sounded when they spoke. You must include their name, what they are famous for, their connection to Missouri.

3.) A costume you can wear to become this person – This is supposed to be the fun part of the project. Please don't feel like you have to go out and spend money on an elaborate costume. Homemade costumes are wonderful! (i.e. clothes they already have in their closet). This assignment will need to be completed at home.

4.) A pose – This will be your position in the wax museum. It should represent your character and it should be comfortable to you.

Famous Missourian Speech

Create a speech you will memorize for Night at the Museum.

You must include the following:

Who you are?
What you are famous for?
What is your connection to Missouri?

Night at the Museum: Famous Missourian RUbric

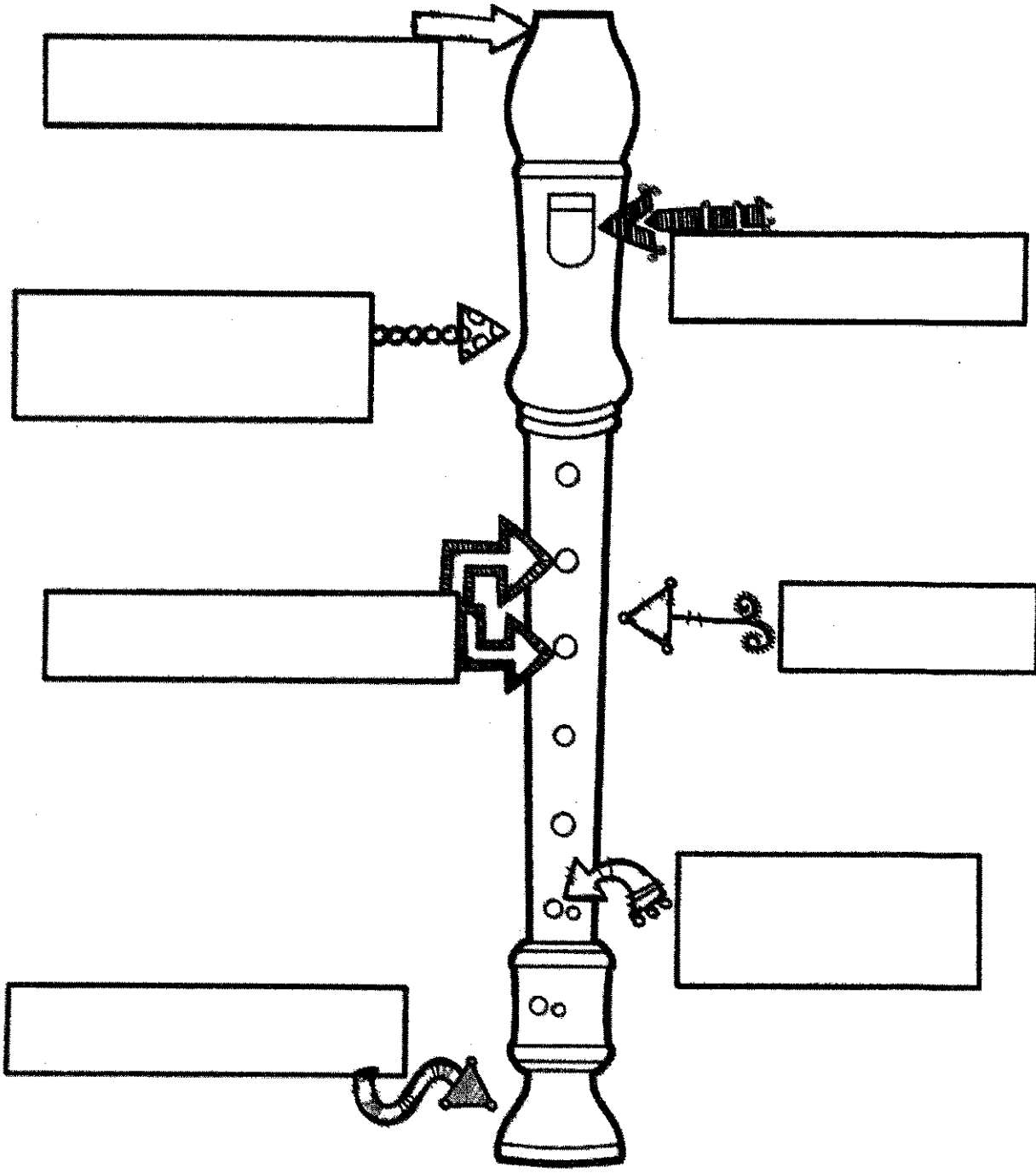
Category	4	3	2	1
Quality of Information in Powerpoint	Information clearly relates to the main topic. It includes several supporting details and/or examples.	Information clearly relates to the main topic. It provides 1-2 supporting details and/or examples.	Information clearly relates to the main topic. No details and/or examples are given.	Information has little or nothing to do with the main topic.
Organization	Information is very organized with well-constructed information and subheadings.	Information is organized with well-organized content.	Information is organized, but content isn't relevant.	The information appears to be disorganized.
Grammar Mechanics	No grammatical, spelling or punctuation errors.	Almost no grammatical, spelling or punctuation errors.	A few grammatical spelling, or punctuation errors.	Many grammatical, spelling, or punctuation errors.
Graphics	Graphics are neat, accurate and add to the reader's understanding of the topic.	Graphics are accurate and add to the reader's understanding of the topic.	Some graphics are accurate and some add to the understanding of the topic.	Diagrams are not accurate OR don't add to the reader's understanding of the topic.
Sources	All sources are accurately documented in the desired format. Print & digital sources were used.	All sources are accurately documented, but a few are not in the desired format. Print and digital sources were used.	Some sources are accurately documented, but many aren't in desired format. Only used either a print and/or a digital source.	Sources are not accurately documented.
Speaking When Presenting (Monologue)	The speaker's tone was clear to the audience, and presented in a very creative way.	The speaker's tone while presenting was clear to the audience.	The speaker's tone while presenting wasn't clear to the audience.	The speaker didn't speak to the audience during the presentation.
Costume Attire	The attire represented the Famous Missourian in a creative way.	The attire represented the Famous Missourian	The attire doesn't reflect the Famous Missourian.	No attire worn.
Participation (Wax Figure)	The student played the role of their Famous Missourian throughout the entire performance.	The student most of the time played the role of their Famous Missourian throughout the entire performance.	Some of the time the student played the role of their Famous Missourian.	No attempt was made to play the role of their Famous Missourian.

Music

Name _____ Class _____ Date _____

LABEL THE recorder

Directions: Label the parts of the recorder.



Copyright 2016 Tracy King. All rights reserved.

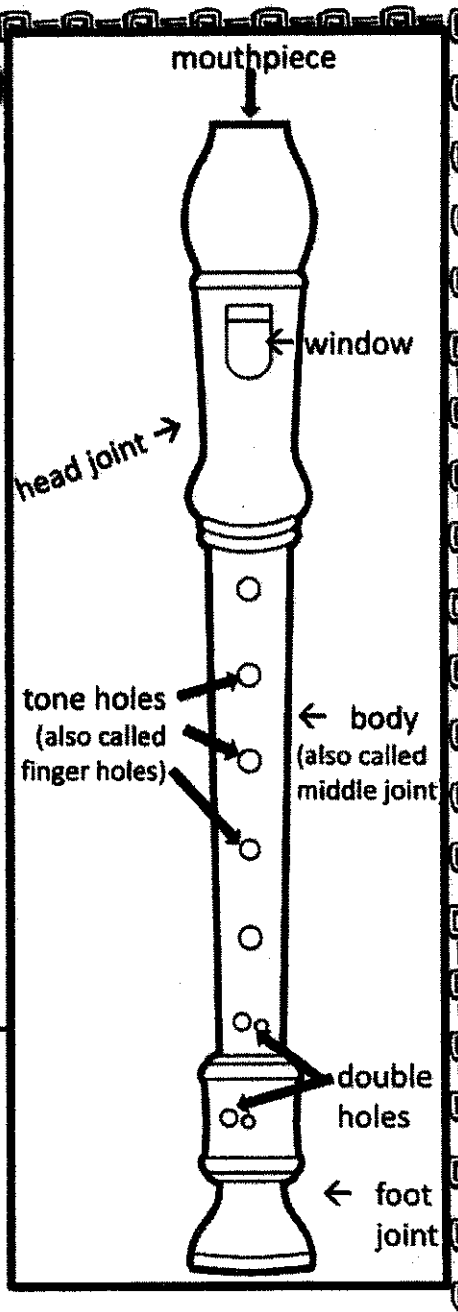
Name _____ Class _____ Date _____

Recorder

The recorder is a woodwind instrument. It comes from an ancient family of instruments called the internal duct flutes. For hundreds of years, it was the most popular woodwind instrument. During the 16th century, several composers wrote music for the solo recorder and for recorder groups. Bach and Handel were the best known of these Baroque Era composers.

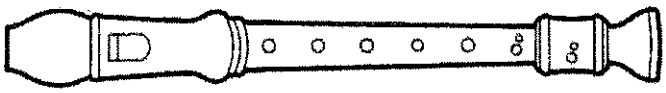
It is likely that recorders came to America with some of the first settlers. Made of wood, they were light and easy to carry. They made a good instrument for travel. Around 1925, the recorder began to make a comeback. It became popular again because of a renewed interest in music from the Baroque and Renaissance periods.

Today, more than 3.5 million plastic recorders are manufactured per year. Recorders are played in many elementary schools and can be a wonderful instrument to learn on its own or as an introductory band instrument. Some communities have recorder groups or societies where many people come together to play recorder music.



***Directions**: Use the information from the passage above to answer the following questions.*

1. What ancient family of instruments does the recorder come from? _____
2. Name two famous composers that wrote music for the recorder. _____
3. How did recorders come to America? _____
4. Why did recorders become popular again around 1925? _____
5. How many recorders are manufactured each year? _____



Copyright 2016 Tracy King. All rights reserved.

P.E

This is an interval training program that you can try. The plan for this program is for you to go from no exercise (the couch) to being able to run a 5K (3.2Miles). The best part about this program is that you don't have to run a specific distance, you just have to run for a specific amount of time. You can do this anywhere that it would be safe for you to run.

The Couch to 5k Training Plan

Week	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
1	5 min walk 2 min jog 5 min walk	Relax!	5 min walk 2 min jog 5 min walk	Relax!	5 min walk 3 min jog 5 min walk	Relax!	Relax!
2	5 min walk 3 min jog 5 min walk	Relax!	5 min walk 4 min jog 5 min walk	Relax!	5 min walk 5 min jog 5 min walk	Relax!	Relax!
3	5 min walk 6 min jog 5 min walk	Relax!	4 min jog 5 min walk 4 min jog 5 min walk	Relax!	5 min walk 7 min jog 5 min walk	Relax!	Relax!
4	5 min walk 7 min jog 5 min walk	Relax!	5 min walk 8 min jog 5 min walk	Relax!	5 min walk 9 min jog 5 min walk	Relax!	Relax!
5	5 min walk 9 min jog 5 min walk	Relax!	6 min jog 5 min walk 6 min jog 5 min walk	Relax!	5 min walk 10 min jog 5 min walk	Relax!	5 min walk 11 min jog 5 min walk
6	5 min walk 11 min jog 5 min walk	Relax!	13 min jog 5 min walk	Relax!	15 min jog 5 min walk	Relax!	Relax!
7	15 min jog 5 min walk	Relax!	8 min jog 5 min walk 8 min jog 5 min walk	Relax!	16 min jog 5 min walk	Relax!	17 min jog 5 min walk
8	17 min jog 5 min walk	Relax!	18 min jog 5 min walk	Relax!	20 min jog 5 min walk	Relax!	Relax!
9	20 min jog	Relax!	12 min jog 5 min walk 12 min jog	Relax!	24 min jog	Relax!	25 min jog
10	25 min jog	Relax!	27 min jog	Relax!	30 min jog	Relax!	Race Day!

Art

4th Grade Art at Home Choice Board 2

Choose one activity per week to complete if desired. Use whatever materials you have permission to use at home. Have fun and be creative! Photograph your work and upload it to Seesaw if you can. I would love to see your creations!

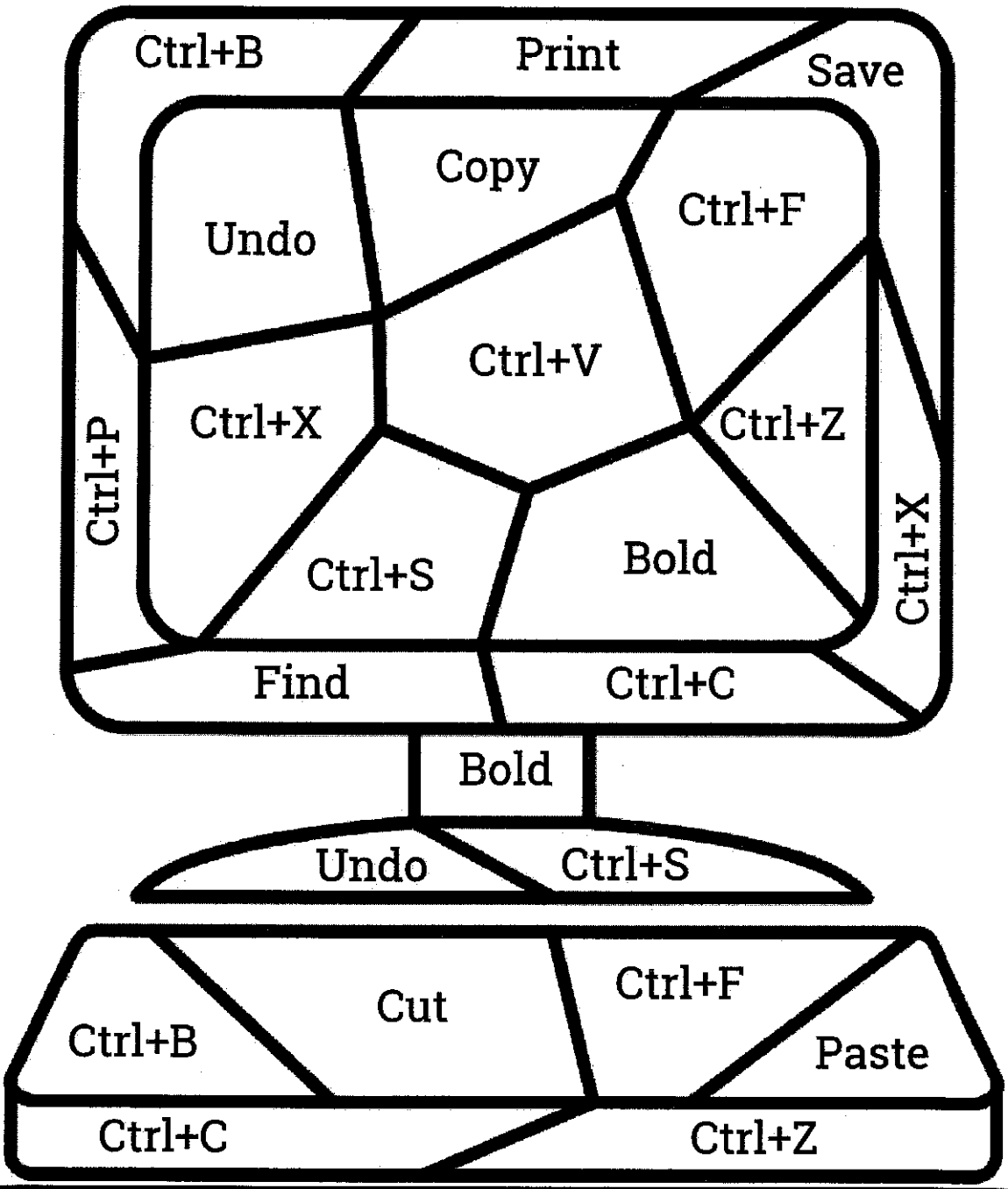
ALWAYS get permission before you gather and use household materials!

Listen to a read aloud and then design a bookmark about the book.	Make a face out of found objects. Then photograph or draw your creation.	Make a simple flip book animation.	Make a sketchbook and fill it with drawings
Draw or paint the view from your window in all four seasons.	Trace your hand. Fill it with at least 5 different patterns.	Draw your name using fancy, scary, or funny looking letters, then color them in.	Thumbprint Art: Dip your thumb lightly into paint and press it onto paper. What can you turn it into?
Draw a picture of your house. Use as many details as possible.	Brighten someone's day by making a work of art just for them.	Self Portrait. Draw or paint a picture of yourself.	Draw a perfectly odd monster in a perfectly ordinary situation.
Learn the color words in as many new languages as you can!	Make a sculpture out of an empty box and other found objects.	Recycle a shallow tray into a birdfeeder and then draw the birds that come to visit.	Make an animal sculpture out of aluminum foil.

Technology

Name: _____ Date: _____

Technology **Color** By **Shortcut**

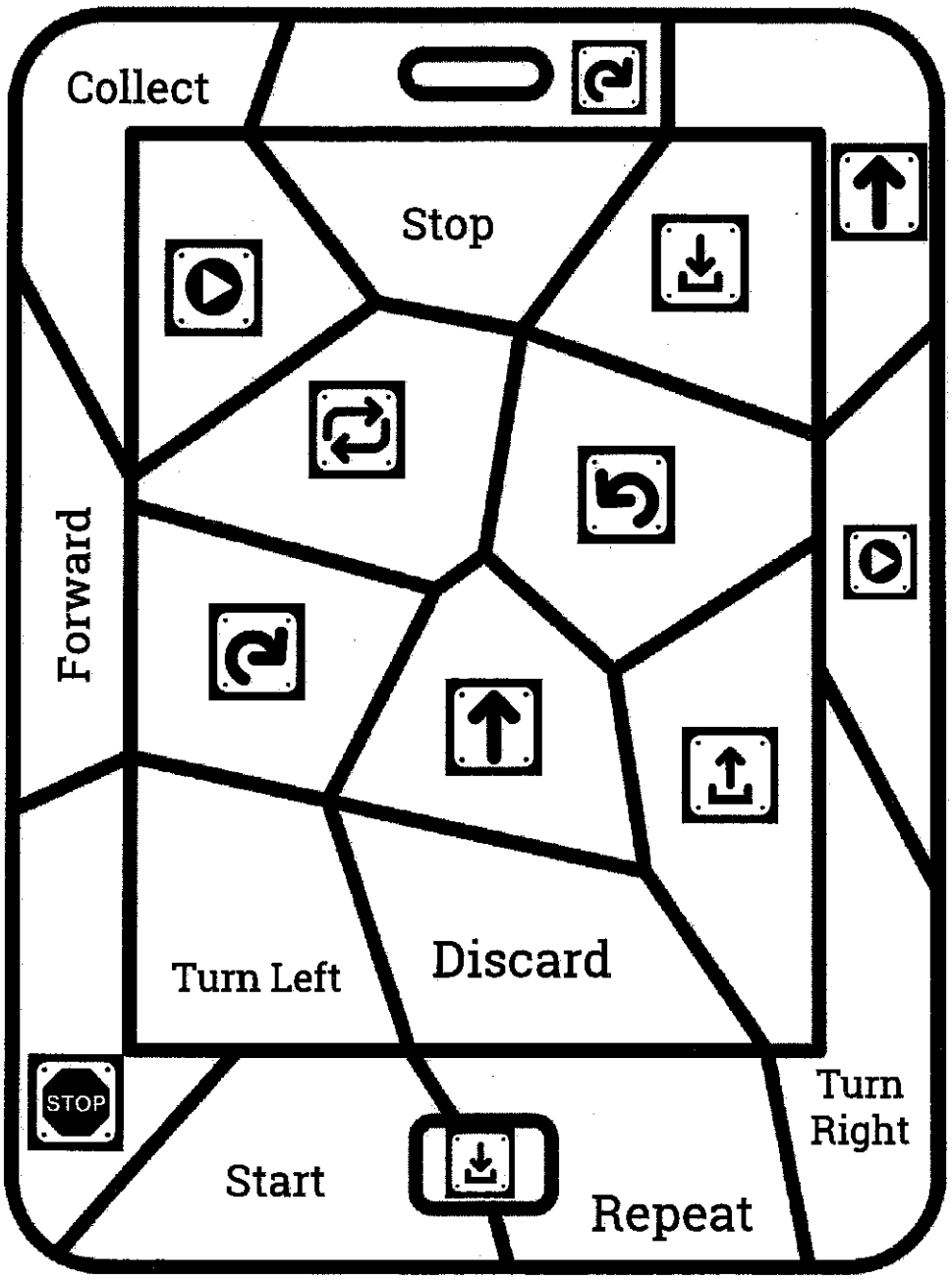


RED	Ctrl+C Copy	**GREEN**	Ctrl+Z Undo	**PURPLE**	Ctrl+S Save
ORANGE	Ctrl+V Paste	**LIGHT BLUE**	Ctrl+P Print	**PINK**	Ctrl+F Find
YELLOW	Ctrl+B Bold	**DARK BLUE**	Ctrl+X Cut		

© Brittany Washburn

Name: _____ Date: _____

Technology **Color** By **Coding**



RED	Discard	**GREEN**	Repeat	**PURPLE**	Turn Right
ORANGE	Collect	**LIGHT BLUE**	Start	**PINK**	Turn Left
YELLOW	Forward	**DARK BLUE**	Stop		

© Brittany Washburn

Library

4th Grade Library Choice Board #2

Please select at least one of these (hopefully fun!) activities to complete.

Let me know which one you choose to do either message me in Canvas or SeeSaw.

Please message me if you have questions or just want to say, "Hi!"

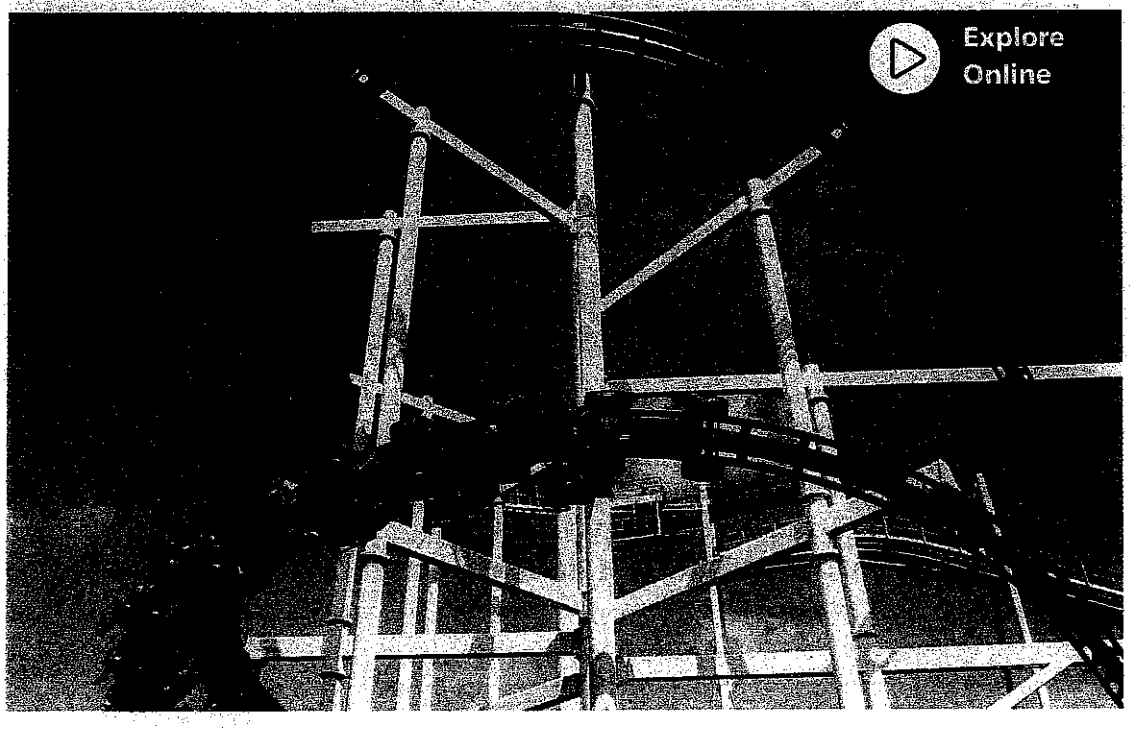
Choice #1- Library Skills	See if you can answer some of these facts about the library. Be sure to send me a pic of your worksheet answers. Just for fun! Library Skills
Choice #2-Non-Fiction	Go to https://www.pebblegonext.com/modules and find a non-fiction book on a subject that interests you. Username: engaged password: learning
Choice #3- Fables	Do the short fable activity and create a storyboard with the worksheet attached of your very own fable. Fable Activity ASend me a picture of your storyboard when you are finished!
Choice #4- Virtual Field Trip	Check out one of these awesome websites under the Explore tab and take a virtual field trip. Explore - Virtual Field Trips

Things That Move Have Energy

Science

Energy and Things That Move!

Imagine riding on a huge roller coaster with lots of drops and turns. Are you excited? Are you nervous? Think about inching slowly up the hills—and plunging to the valleys below! But what does this all have to do with energy? Think about the roller coaster and energy in this photo.

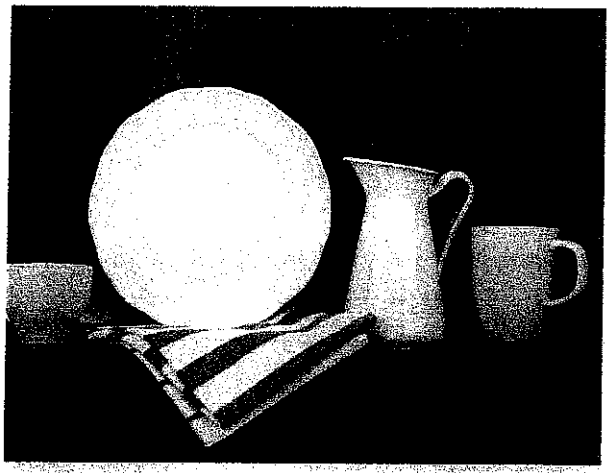


The coaster is still as the passengers buckle their seat belts, but it's getting ready to move. As the coaster climbs the hill, it slows down. At the top, there's a pause. As the coaster starts to nudge over the top of the hill, it moves faster. The riders can feel the whoosh of air on their faces as the coaster drops. The coaster's speed changes as it climbs and drops.

2. Does this roller coaster have energy? When does it have energy? How do you know?

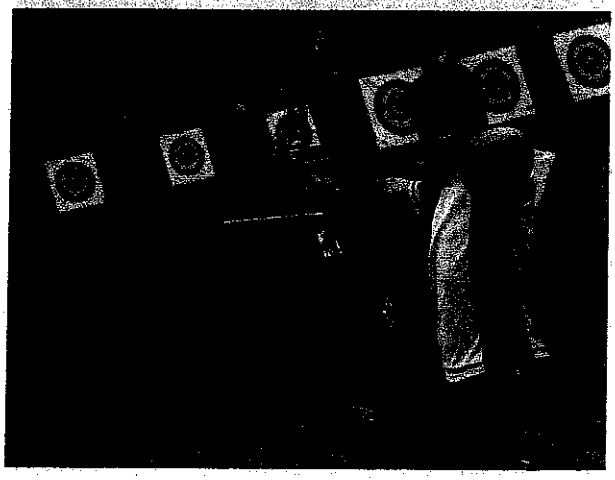
What do a moving car, a stretched rubber band being released, and a rolling ball have in common? They all have motion energy! Anything that is moving has motion energy. Objects can also have stored energy, like the roller coaster on the hill, because of their position. That energy beomes motion when it races down!

© Houghton Mifflin Harcourt • Image Credits: (t) ©illusob/iStock/getty Images Plus/Getty Images



There might be a dish on the edge of a shelf, ready to fall. Even before the dish falls, it has energy, because of its position up on the shelf.

When you swing on a swing set, you have motion energy. At the top of each swing, you stop moving but have stored energy to move again.



When an archer pulls back on the string to shoot an arrow, energy is being stored. What will happen when the archer lets go of the string?

A rolling soccer ball has motion energy. Kicking it adds to that energy, making it move even faster, and scoring a goal!

3. Choose the best phrase to complete the sentences.

have motion energy	**become motion energy**	**speed up**

The objects that are moving _____. The objects that are about to move have energy that can _____.

© Houghton Mifflin Harcourt • Image Credits: (tl) ©karandaev/Getty Images; (tl) ©pilotka/Getty Images; (br) ©StockByte/Getty Images; (tr) ©Blend Images/LWA/Jay Newman/Alamy

Swifter and Stronger!

Do you think the speed of an object affects its energy? Look at the pictures. In one, a slow-moving ball strikes a gong. In the other, a fast-moving ball strikes a gong. The more the gong moves, the more energy the ball transfers to the gong.

Is the ball swung slowly or quickly? How does the gong react?

Is the ball swung slowly or quickly? How does the gong react this time?

4. Choose the best words to complete the sentences about objects of the same weight.

all	**faster**	**slower**
can	**cannot**	**never**

_____ objects transfer more energy to the object they hit.

_____ objects transfer less energy to the object they hit.

The speed of an object _____ show(s) the amount of energy the object has.

HANDS-ON Apply What You Know

Bang a Gong

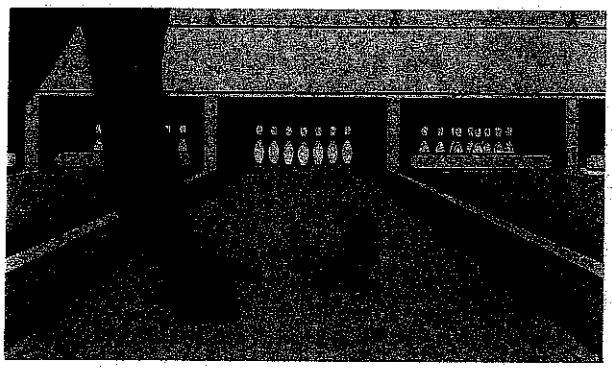
5. Gather materials to experiment with what you have seen in the pictures. Set up the materials and test. Tell how your setup was the same and how it was different. What does this show you about the relationship between speed and energy?

© Houghton Mifflin Harcourt

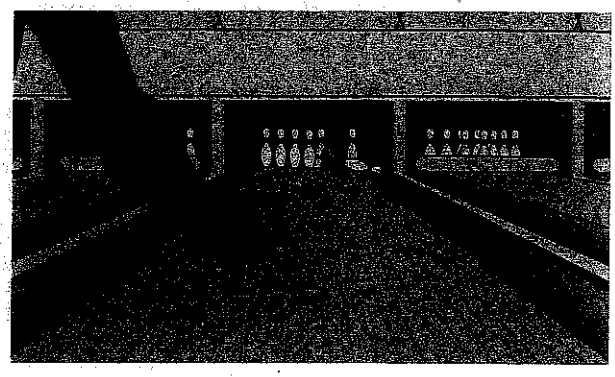
The Faster They Are Hit, the Harder They Fall

You noticed that the faster you threw a ball, the more energy it had. The increased energy made the gong move more. Now think back to the pool game. If the cue ball moved slowly toward the group of balls at the end, what would happen? What if the cue ball were moving very fast?

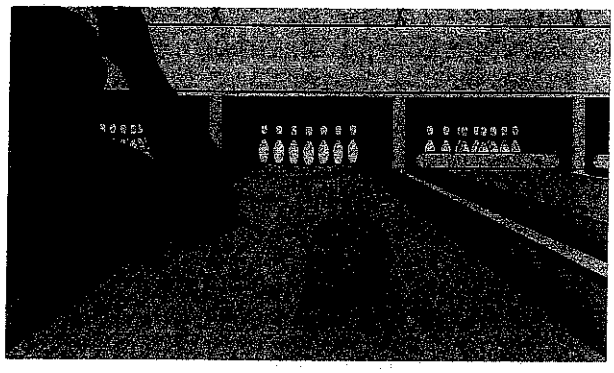
A game of bowling is a lot like a pool game. You roll the bowl toward the pins, trying to knock down as many as you can. How does energy change your bowling score? Let's find out!



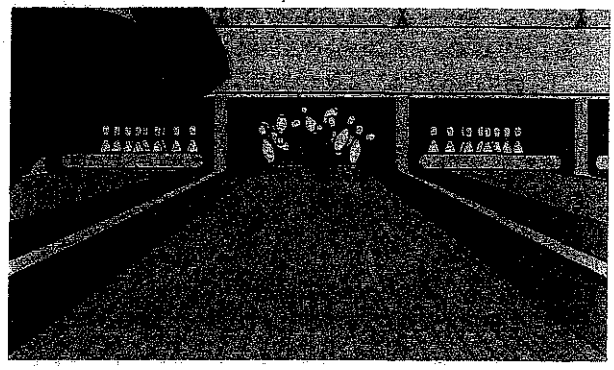
Slide a bowling ball slowly toward the pins.



When the ball hits the pins, how many pins fall down? Do they topple over or fly from the other pins?



Now move the ball more quickly. How many pins fall?



What else do you notice about the pins when a ball thrown quickly hits them?

6. Use the slow and fast bowling ball example to explain the relationship between speed and energy.

© Houghton Mifflin Harcourt

Motion Energy and Size: It's a Big Deal!

You already know that the speed of an object affects its energy. But what about size? If you wanted to knock down bowling pins, would you use a bowling ball or a tennis ball? That's right! You'd use a bowling ball because it's heavier. The heavier ball will have more energy than a lighter ball and will knock down more pins.

Look at the two vehicles. Imagine that they are both moving at 80 km/h (about 50 mph). Which do you think has more energy? If the speed is the same, how does one have more energy than the other?

HANDS-ON Apply What You Know

Flour Power

7. Try the activity you see in the pictures on the next page. Change one thing you saw. Repeat what was done in the picture, and record your results. How were the results the same, and how were they different? What does this show you about the relationship between speed and energy?

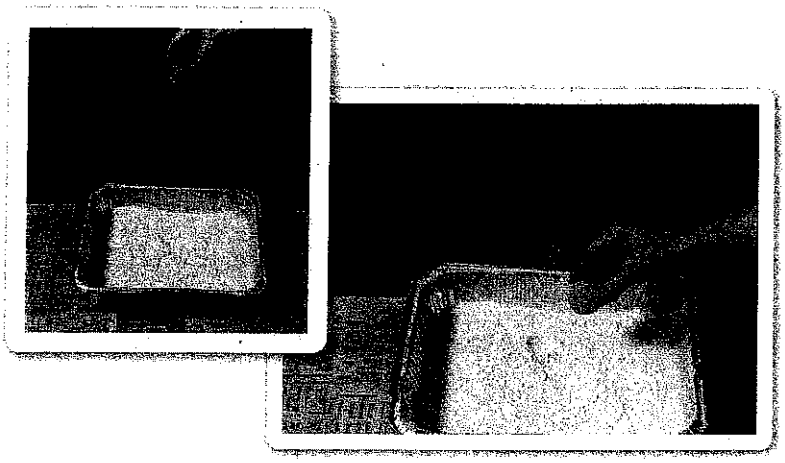
EVIDENCE NOTEBOOK Explain what would happen to the flour if the balls you used were heavier. Explain what would happen if the balls were lighter.

Language SmArts

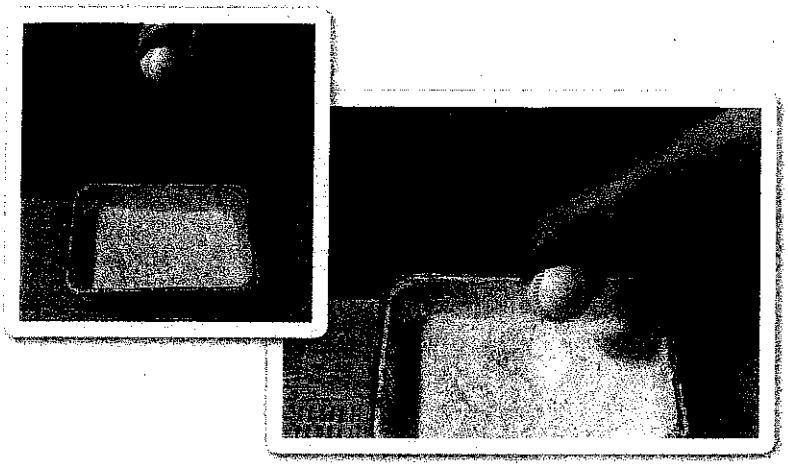
Cause and Effect

8. Explain how weight can affect collisions.

© Houghton Mifflin Harcourt • Image Credits: (t) ©AFP Footage/Getty Images; (tr) ©Driendl Group/Getty Images



Notice the table tennis ball above the pan of flour. What happens when the ball hits the flour? Only a little of the flour moves. The ball didn't have much energy to transfer to the flour.



This baseball is dropped from the same height but is heavier than the table tennis ball. It also falls at the same speed. The crater left by the baseball is larger than the crater left by the table tennis ball. That's because the heavier ball had more energy to transfer.

Putting It Together

9. Explain why there is more damage when objects moving quickly collide than when they are moving slowly.

© Houghton Mifflin Harcourt

HANDS-ON ACTIVITY

Test It! Stored Energy in a Rubber Band

Objective

Collaborate to compare amounts of stored energy. You know that energy is stored in a rubber band—but how much energy?

What question will you investigate to meet this objective?

Materials

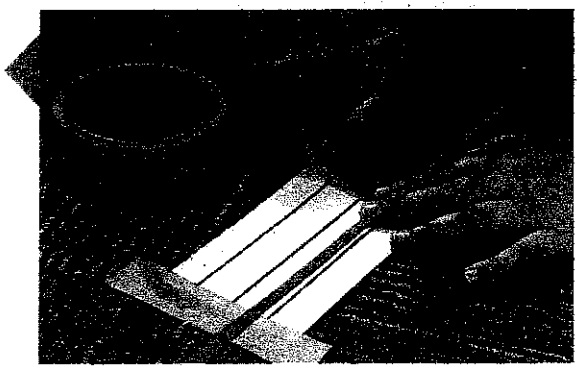
- safety goggles
- giant rubber band
- chair
- tape
- ruler
- toy car or truck
- meterstick

Procedure

STEP 1 CAUTION: Wear safety goggles. Cut a giant rubber band in half, and tie the ends around the legs of a chair. Place two metersticks in front of the chair. They should be 20 cm apart and in parallel lines to serve as a track for the toy.

What roll does the rubber band play in this investigation?

STEP 2 Tape an index card to the floor behind the rubber band. Mark lines on the card that are 2 cm and 4 cm behind the rubber band. Choose a third distance and mark it on the card.



What do the marks represent?

© Houghton Mifflin Harcourt

STEP 3 Place a toy car or truck against the rubber band. Pull the toy back to the 2 cm mark, and release it. Measure the distance the toy travels. Record the data. Repeat this step two more times.

Why do you repeat this step at the 2 cm mark?

STEP 4 Repeat Step 3 using the 4 cm mark and the third distance you selected.

How might your result change if the 4 cm mark had been measured incorrectly and it was actually 6 cm?

STEP 5 Record your results in the table.

Distance Toy Travels					
Rubber band stretched 2 cm		**Rubber band stretched 4 cm**		**Rubber band stretched ___ cm**	
Trial	Distance (cm)	Trial	Distance (cm)	Trial	Distance (cm)
1		1		1	
2		2		2	
3		3		3	

© Houghton Mifflin Harcourt

Analyze Your Results

STEP 6 Use the data you collected to answer these questions. Write your answers in the table.

Were your results similar for all the trials with the rubber band stretched back 2 cm? What about 4 cm and the distance you chose?	
If your results were inconsistent across the trials, what do you think caused those differences?	
With which of the stretching distances did the toy travel the longest distance?	
Compare your data with the data of another group. Are the other data the same? If not, why do you think they are different?	

Draw Conclusions

STEP 7 Make a claim about how much stored energy exists in a rubber band based on your experiment. Cite evidence.

STEP 8 Compare the third distance you selected with the other groups in your class. What conclusions can you draw about the distances selected?

STEP 9 What is one question you have about stored energy?

© Houghton Mifflin Harcourt

Wonderful Springs

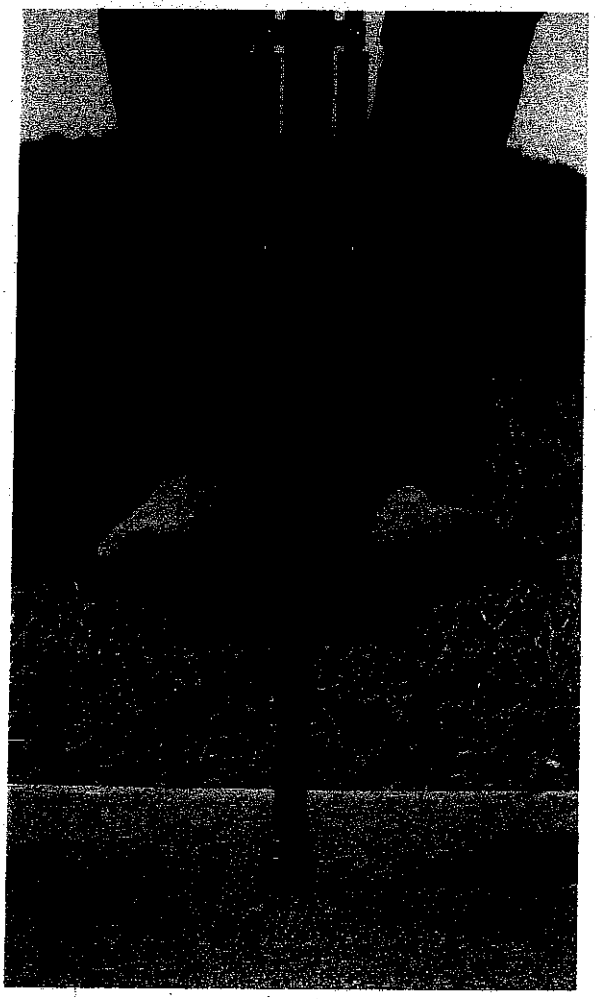
Ready to GO!

Earlier, you found out that anything that is moving has energy. A ball on top of a hill has the potential to move. When it does, it has energy of motion. You know that if you pull a rubber band back farther and farther, you can let it go—and it will go far! Energy is stored in the rubber band.

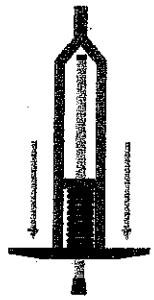
Many objects with bands and springs have stored energy that can be released to make them move!

Springtime!

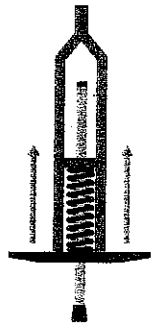
10. Circle the picture that has no stored energy.



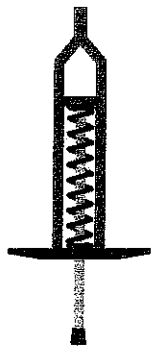
As the pogo stick compresses, energy is being stored in the spring. The spring has the potential to push up and become motion.



At the bottom of the jump, the spring is fully compressed. All the energy is stored in the spring.



As the pogo stick goes up, the energy in the spring is released and becomes motion energy.



At the top of the jump, the spring has transferred all the energy that was stored in it to motion energy.

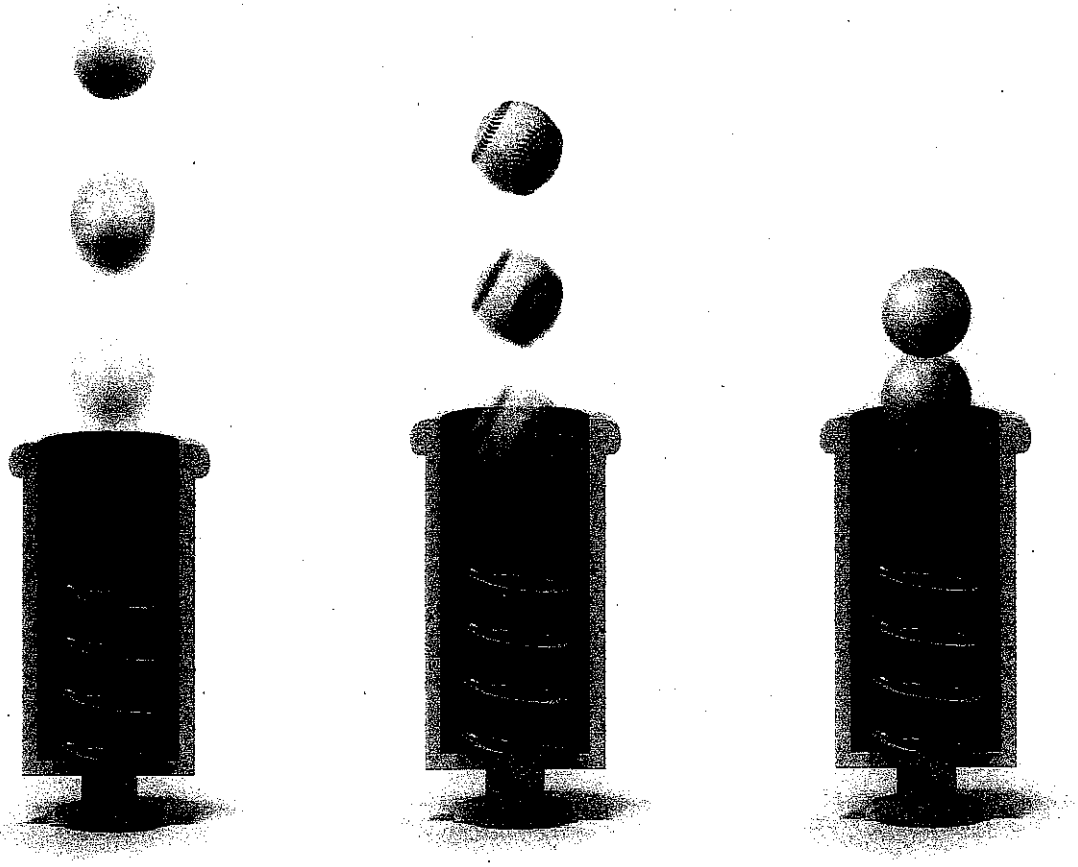
© Houghton Mifflin Harcourt

The Bigger, the Better

In the hands-on investigation, you saw that the farther you pulled back the rubber band, the more energy you released to move the car. But what if you replaced the small car with a larger car or one made of heavier steel? How far would the car travel then?

Mass and Energy

11. Take a look at these spring setups. Consider the relative weights of the balls and the relative amounts of stored energy in the springs. Then predict which balls will travel the least distance, the middle distance, and the greatest distance.



foam ball **baseball** **steel ball**

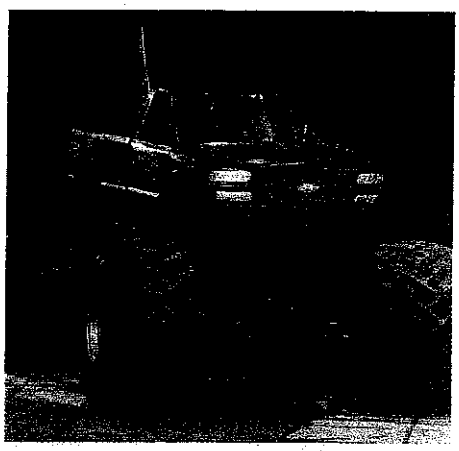
© Houghton Mifflin Harcourt

Engineer It!

Shocking

Buckle up! It's going to be a bumpy ride! When an uneven path causes a vehicle to bounce into the air, the vehicle experiences a collision every time it hits the ground. The motion energy from those collisions jolts the vehicle and the riders inside.

Cars and trucks have springs near the tires. When a spring is compressed, it absorbs and stores energy. The springs in an off-road truck are big and can store a lot of collision energy. That cuts down on the amount of energy that gets transferred to the riders every time the truck hits the ground after bouncing into the air.



12. Describe what it would feel like to ride on a bumpy path in a car that did not have springs to absorb energy.

Language SmArts

Recall from Experience

13. Considering the examples you have seen so far, identify another object that is able to absorb and store energy that is useful to you.

Putting It Together

14. Choose the best word or phrase to complete each sentence in the paragraph.

stored energy	**energy of motion**	**no energy at all**	
more compressed	**less compressed**	**lighter**	**heavier**

A compressed spring or a rubber band stretched out both have _____.

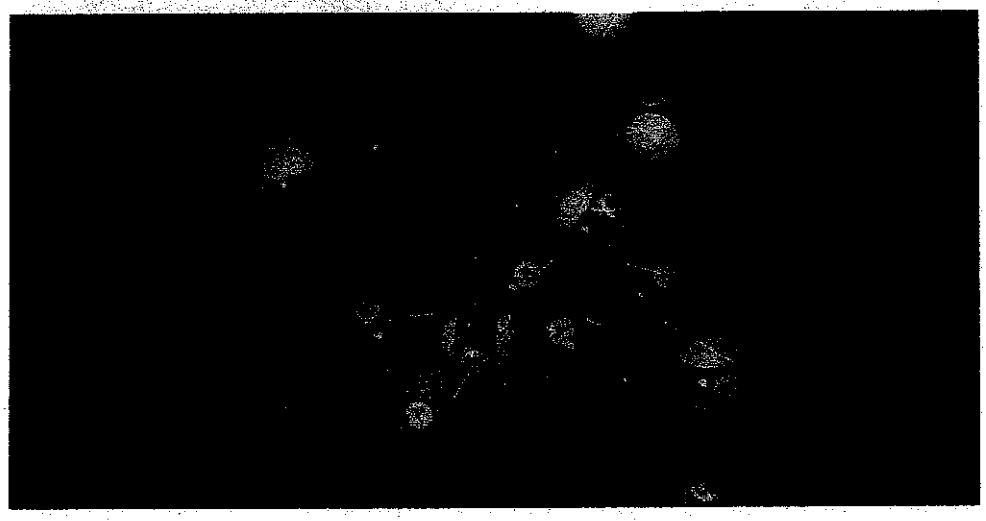
An object will travel farther when the compression energy launching it is _____. If two objects are launched by a rubber band with the same amount of compression, the object that is _____ will travel farther.

© Houghton Mifflin Harcourt • Image Credits: ©EvrenKalinbacak/Alamy

Collisions

Scatter!

What is a collision? A collision happens when two objects bump into each other. Think about a game of pool. When the cue ball hits the other balls, there are collisions. When these happen, energy is transferred. The total energy of all the balls is the same, but energy transfers to make the balls move in different directions. When a cue ball hits one of the balls, its motion slows. It transfers energy to the other balls and then moves in a different direction.



Language SmArts

Cause and Effect

15. Describe what happens to the other balls that are cued up when the cue ball hits them. Explain the transfer of energy.

If you were going to collide with something, would you rather collide with something moving quickly or slowly? A slow-moving object has less energy, so the collision has less of an impact. A fast-moving object has more energy—so the object it collides with moves fast, too! You can see this in sports. If you want a soccer ball to go fast, you kick it hard!

EVIDENCE NOTEBOOK You see collisions every day. List some examples in your evidence notebook.

© Houghton Mifflin Harcourt • Image Credits: ©David Leah/The Image Bank/Getty Images

What Happens Next?

Take a look at these images, and think about them. Does a ball move faster and farther in a bunt or with a full swing? What do these images tell you about speed in collisions? View each image to see what happens before, during, and after a baseball collision.

The pitcher sends the ball hurtling toward the plate. The batter puts his bat out to bunt the ball, hoping to make the ball collide with the bat.

The ball has collided with the bat, causing the ball to change direction. It still has motion energy, but the motion of the ball has changed.

The batter has hit the ball. The collision has changed the direction of the ball. The collision has also added more motion energy to the ball.

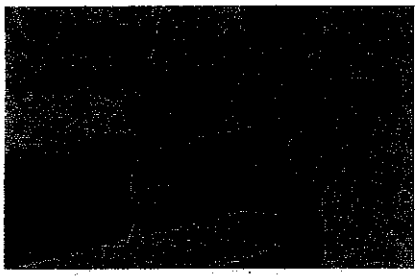
The outfielder can only watch the ball soar far overhead because the batter has hit a mighty home run.

16. Which collision between the ball and the mitt has the least amount of energy: a caught bunt or a caught fly ball?

© Houghton Mifflin Harcourt • Image Credits: (tl) ©Getty Images Sport Classic/G. Fiume/Getty Images; (tr) ©Getty Images Sport Classic/Rob Carr/Getty Images; (bl) ©Ed Zurga/stringer/Getty Images; (br) ©Tom Szczerbowski/Stringer/Getty Images

Too Hot to Handle!

Have you ever hit a nail with a hammer? That collision makes a lot of noise! What else did you notice about the nail—besides the fact that it went into the wood? If you had touched the nail, it would have been warm. The hammer would be warm, too! What causes the nail and hammer to heat up?



When a screw and wood collide, energy is transferred. Thermal imaging shows a difference in temperature. As the drill pushes the screw, it causes motion and heat energy!

What Happens to Energy in a Drop?

If you took a steel ball and dropped it, some of the energy would go right into the ground. A steel ball isn't springy—it won't bounce much. A tennis ball will. Look at what happens to the energy in a bouncing ball.

A tennis ball dropped toward the ground bounces back high, but not as high as the height from which it was dropped. Why? Some of the energy is transferred to the ground, and the rest to heat and sound energy.

HANDS-ON Apply What You Know

Rebounce

Hold a meterstick perpendicular to the ground. Have a partner hold a tennis ball parallel to the meterstick and drop it. Observe the ball as it bounces. Take turns doing this several times. Where does the energy go when the ball collides with the ground?

Putting It Together

17. What conclusion can you draw about energy transfer based on what you observed with the tennis ball?

© Houghton Mifflin Harcourt • Image Credits: (t) ©Joseph Giacomin/Cultura/Getty Images; (b) ©Marcel/Getty Images

Discover More

Check out this path . . . or go online to choose one of these other paths.

People in Science & Engineering

- Bump!
- Collision Game!

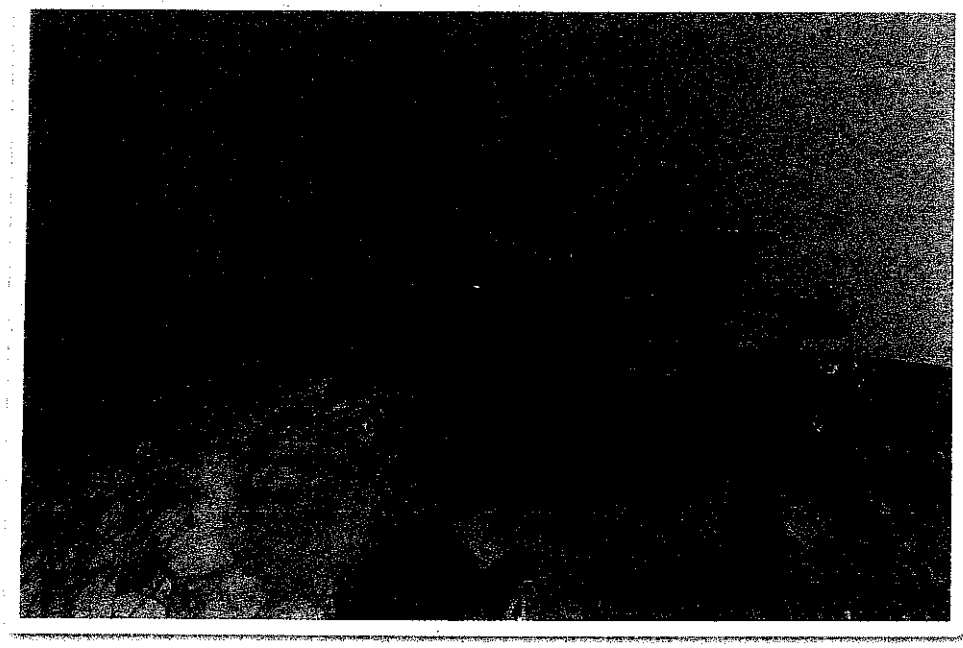
People in Science & Engineering

Amanda Steffy

When we drive on roads, we think about the interaction of the tires with the ground. How do we design tires that don't heat up too much? How do we handle roads that aren't perfectly flat?

Now imagine that you design tires for a vehicle on Mars. That's what Amanda Steffy does! She is an engineer for NASA's Jet Propulsion Laboratory (JPL). Her team tests the wheels and tires of the Mars rovers in different conditions. To do this, Steffy and team had to recreate the surface of Mars in California!

Amanda Steffy works for NASA's Jet Propulsion Laboratory.

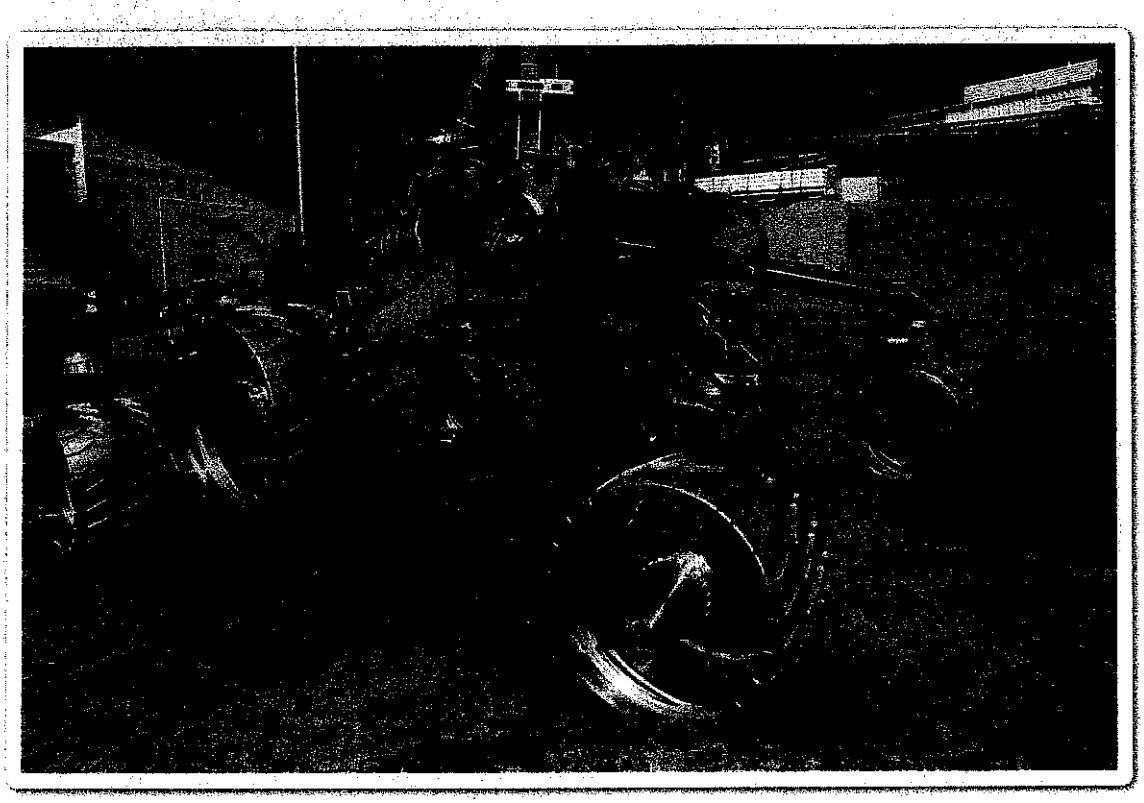


The tires of the Mars Rover were designed for rough terrain.

© Houghton Mifflin Harcourt • Image Credits: ©NASA

The surface of Mars is different than what scientists believed it to be. Some of the rocks are sharp and can cut the tires. Some rocks are held tight to the ground while other rocks are very loose.

When a rover tire hits a loose rock, the tire spins faster, but if it hits a sharp rock held tight to the ground, the sharp rock can damage the tire. Amanda tests tires until they fail to find those designs that will hold up on the rough surface of Mars. Understanding these collisions on Earth helps scientists guide the rover on Mars.



Rovers are tested on rough terrain similar to that on Mars.

18. What factors do Amanda Steffy and other scientists who work on vehicles like the Mars rovers need to consider about the energy of motion as they work?

19. How is Amanda Steffy's work related to collisions? Write a few ideas below.

© Houghton Mifflin Harcourt • Image Credits: ©Stocktrek Images/Getty Images

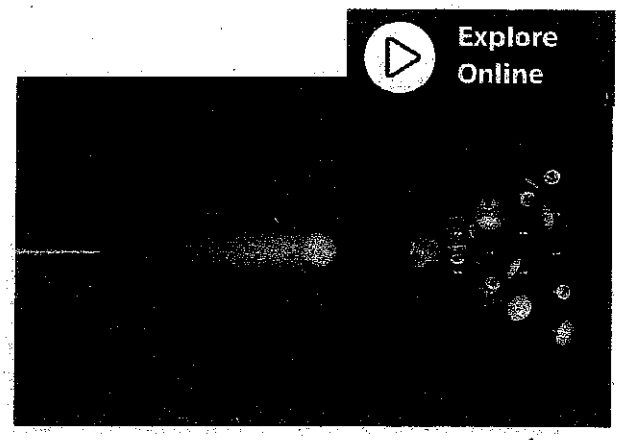
LESSON 3

Lesson Check

Name _____

Can You Explain It?

1. What will happen when the ball hits the group of balls? Write a few sentences below to explain what happens to all the balls on the pool table. Be sure to do the following:
   - Describe the motion and collisions.
   - Identify energy transfers.
   - Mention heat or sound.



EVIDENCE NOTEBOOK Use the information you've collected in your Evidence Notebook to help you cover each point above.

Checkpoints

2. A soccer ball sits in the grass. A girl pulls her leg back to kick the soccer ball. She kicks! What happens next? Circle all the correct answers.
   - **a.** The ball travels in one direction while the leg continues to travel.
   - **b.** The ball travels in one direction while the leg stops.
   - **c.** The collision of the leg and ball makes the ball travel quickly.
   - **d.** The collision of the leg and ball produces a noise.
   - **e.** The ball travels in one direction while the leg moves backwards.

© Houghton Mifflin Harcourt • Image Credits: (t) ©mevans/E+/Getty Images

3. A child plays hopscotch. When she jumps on the ground, which of the following things happen? Circle all the correct answers.
   - **a.** The ground absorbs some of the energy.
   - **b.** The collision produces light energy.
   - **c.** The collision produces heat energy.
   - **d.** The collision produces sound energy.
   - **e.** The girl continues to bounce, going higher each time.

4. Which of the following have energy of motion? Circle all the correct answers.
   - **a.** an electric lamp that has just been plugged in
   - **b.** a child jumping on a trampoline
   - **c.** a fish swimming in an aquarium
   - **d.** the warmth of the sun
   - **e.** a baseball player hitting a ball with a bat

5. A roller coaster moves to the top of a hill where it stops. What happens to the energy when the coaster stops?
   - **a.** The energy becomes motion energy.
   - **b.** The energy is stored energy.
   - **c.** The energy converts to heat energy.
   - **d.** The weight of the roller coaster causes it to collide with another car.

6. An archer is shooting an arrow with a bow. He pulls the string far back, lets the arrow go, and watches it fly far. On his second try, he uses a lighter arrow while pulling the string on the bow back a distance equal to his first try. Tell what happens next. How do you know?

© Houghton Mifflin Harcourt • Image Credits: (t) ©Ed Zurga/stringer/Getty Images

LESSON 3

Lesson Roundup

A. You and a friend are sitting on the ground a few meters apart. You each have a basketball and roll them toward each other. The ball that your friend rolls is moving faster. Write a few sentences to tell what happens next.

_____

_____

_____

B. Which of these types of energy changes in a collision? Circle all that are correct.

a. heat

b. sound

c. motion

d. stored

e. electrical

C. Which of these is a collision? Circle all the answers you think are correct.

a. a baseball player bunting the ball

b. a rubber band snapping

c. a ball player missing a catch as the ball sails overhead

d. a hockey player hitting a hockey puck with a stick

e. two cars driving down a highway

f. a mallet hitting a croquet ball

D. Choose the phrase that makes the sentence correct.

tennis ball	**bowling ball**	**table tennis ball**

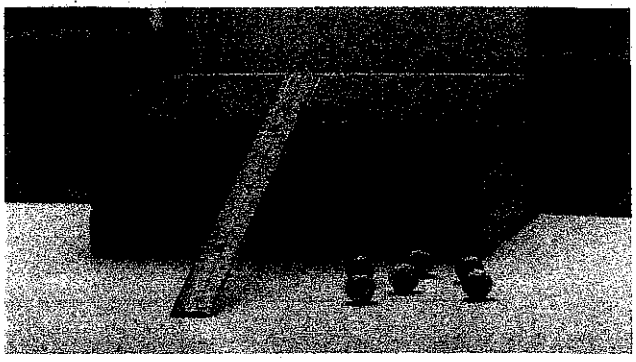
If a spring is compressed at the same compression and is used to launch a table tennis ball, a tennis ball, and a bowling ball on the same flat surface, the _____ will go the farthest distance.

© Houghton Mifflin Harcourt

ENGINEER IT!

Energy Transfers All Around

The publisher you work for is putting together a book called "Energy Transfers All Around." Your team has been assigned to write a section about how objects transfer energy. To do that, you'll need to set up some experiments, run them, and collect and analyze their data. Then you'll create a multimedia presentation that reports on your procedures, results, and conclusions.



This shows one way to investigate energy transfer. Can you find others?

DEFINE YOUR TASK: What form will your completed project take?

Before beginning, review the checklist at the end of this Unit Performance Task. Keep those items in mind as you proceed.

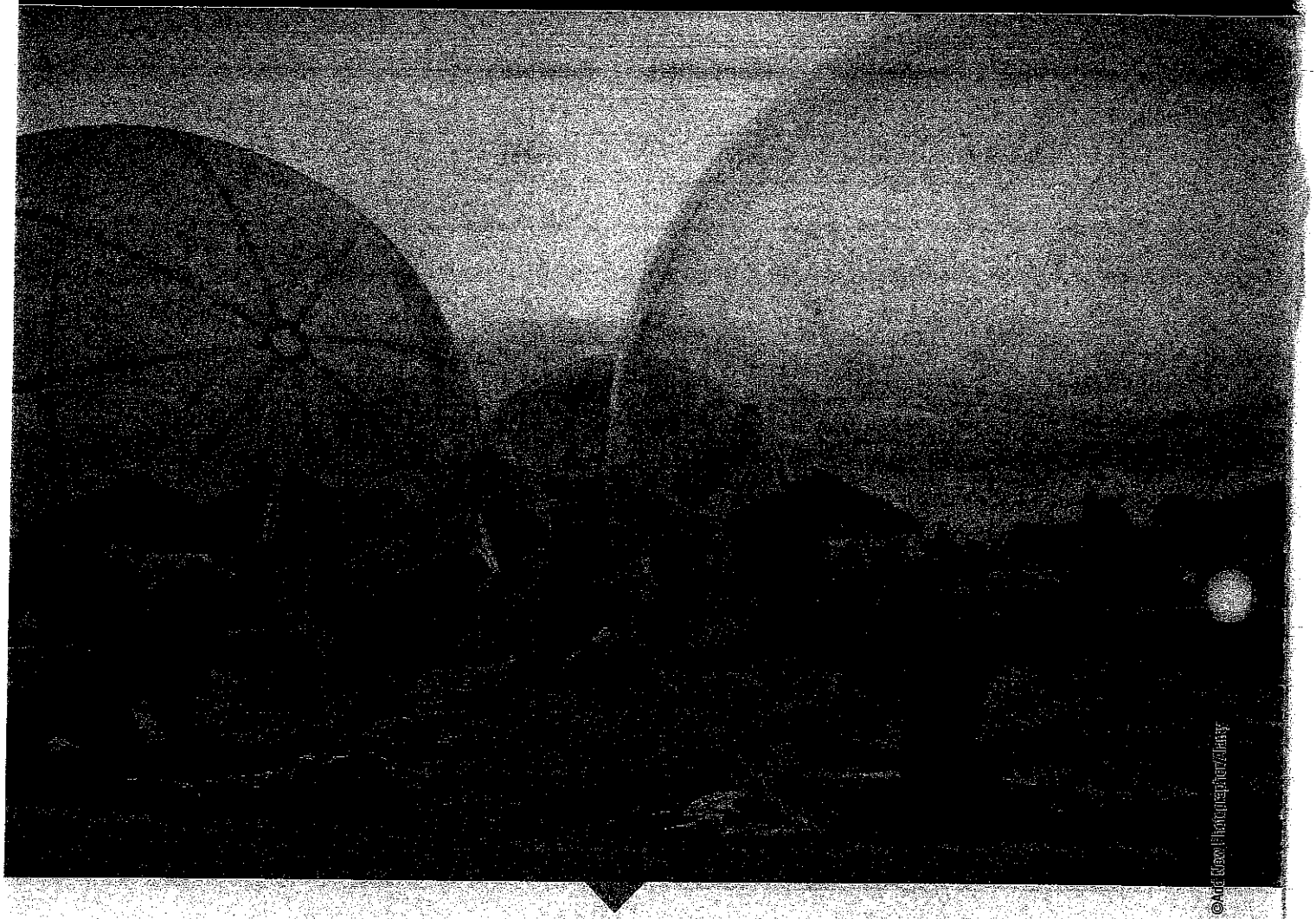
RESEARCH: Use online or library resources to learn about the principle of physical energy transfer. Search the Internet for simple experiments that explore that principle. Describe and cite your sources.

EXAMINE DATA: Examine the experiments you have found for ideas your team can use to investigate energy transfer. Focus on simple activities using marbles, model cars, or other rolling objects. Tell which approaches seem best to you, and state why.

© Houghton Mifflin Harcourt

LESSON 3

How Do Collisions Show Energy?



These bubble balls allow bumping game players to bump, roll, and flip over without getting hurt.

© Houghton Mifflin Harcourt • Image Credits: ©Age Fotostock/Alamy

By the end of this lesson . . .

you'll be able to explain how energy changes when objects in motion collide.

LESSON 2

Lesson Roundup

A. Decide which kinds of energy transfer are involved in each example below. Sort each example into the correct column in the table. Some examples might fall into more than one category.

orchestra	teakettle	solar panels	fireworks

Sound	Light	Heat

B. Select the best answer to complete this sentence. A good way to use light energy to produce heat is to use a _____.

a. microwave oven

b. battery

c. hand warmer

d. solar cooker

C. Sound will travel fastest through _____.

a. fog

b. air

c. salt water

d. a metal railing

D. Choose the words that make the sentences correct.

cooler	warmer	high	low

When a warmer object touches a cooler object, heat transfers from the _____ object to the _____ object. The sound of a jackhammer transfers _____ energy, while a whisper transfers _____ energy.

© Houghton Mifflin Harcourt

Name _____

4.G.1

Draw Points, Lines, and Rays

Lesson 1

ESSENTIAL QUESTION
How are different ideas about geometry connected?

Math

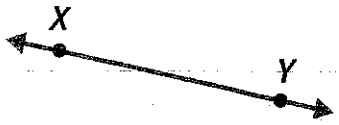
A **point** is an exact location that is represented by a dot. A **line** is a straight set of points that extends in opposite directions without ending.

Math in My World

Tools Tutor

Example 1

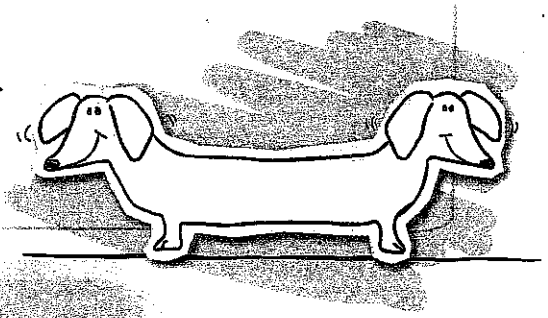
Molly drew the figure shown. Identify the figure she drew.



The figure extends in opposite directions. The arrows indicate that it extends without ending. It is a line.

This line is labeled with point X and point Y. There are different ways to represent this line, such as line XY or $\overleftrightarrow{XY}$.

So, Molly drew _____.



Key Concept Lines, Rays, Line Segments

Words	Models
A line is a straight set of points that extends in opposite directions without ending.	A B line AB or $\overleftrightarrow{AB}$
A **ray** is a part of a line that has one **endpoint** and extends in one direction without ending.	endpoint A B ray AB or $\overrightarrow{AB}$
A **line segment** is a part of a line between two endpoints.	endpoint A B line segment AB or $\overline{AB}$

Copyright © The McGraw-Hill Companies, Inc.

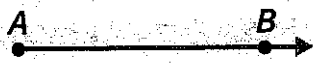
Example 2

Draw a figure that could be represented by $\overline{CD}$.

$\overline{CD}$ represents a line segment with endpoints C and D.

My Drawing!

Example 3

Identify the figure at the right. 

The figure has one endpoint and extends in one direction without ending. It is a ray.

The endpoint is A. The ray extends in the direction of point B.

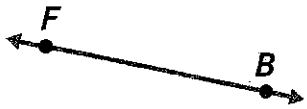
So, the figure is _____.

Guided Practice

Identify each figure.

1.

_____

2. 

_____

3.

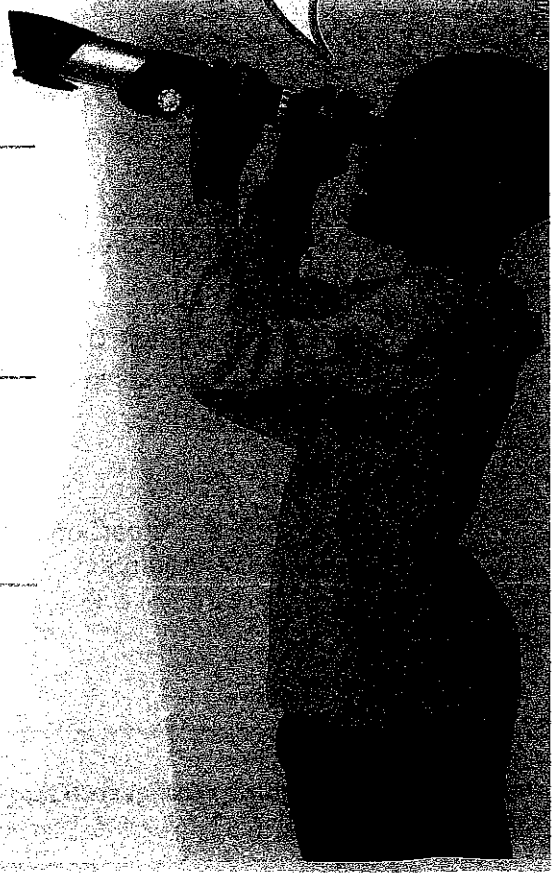
_____

4.

_____

Talk MATH

How are lines and line segments alike? How are they different?



Copyright © The McGraw-Hill Companies, Inc. The McGraw-Hill Companies

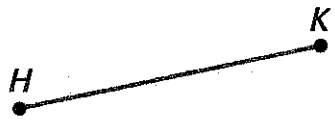
Name _____

Independent Practice

Identify each figure.

5.

_____

6. 

_____

7.

_____

8.

_____

Draw each figure.

9. point T

10. $\overleftrightarrow{YZ}$

11. $\overrightarrow{CR}$

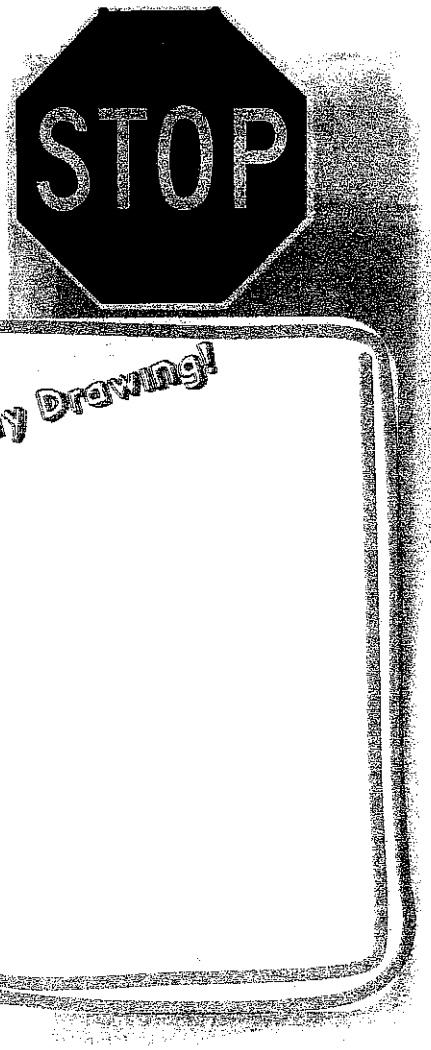
12. $\overline{AW}$

13. $\overleftrightarrow{SN}$

14. $\overrightarrow{TJ}$

Copyright © The McGraw-Hill Companies, Inc.

Real World Problem Solving



15. Identify the figure that is shown on the stop sign.

_____

16. Mathematical PRACTICE 5 **Use Math Tools** Use a pencil to draw a different type of traffic sign than a stop sign. Then use a crayon or marker to show a line segment on the sign.

17. Mathematical PRACTICE 4 **Model Math** Name three real-world examples of line segments.

_____

_____

_____

HOT Problems

18. Mathematical PRACTICE 5 **Use Math Tools** Draw a line segment that is greater than 2 inches and less than 5 inches.

19. **Building on the Essential Question** Explain the similarities and differences of lines and line segments.

_____

_____

_____

Copyright © The McGraw-Hill Companies, Inc. Comstock Images/Alamy

Name

4.G.1

Draw Parallel and Perpendicular Lines

Lesson 2

ESSENTIAL QUESTION
How are different ideas about geometry connected?

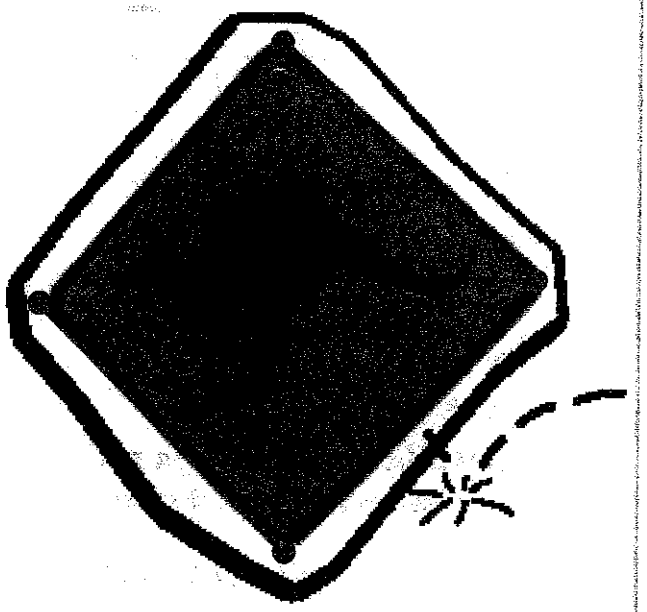
You can describe lines, rays, and line segments by the way they cross each other or do not cross each other.

Math in My World

Tools Tutor

Example 1

Oliver was riding in the car and saw this sign. Describe how the outlined line segments cross each other or do not cross each other.



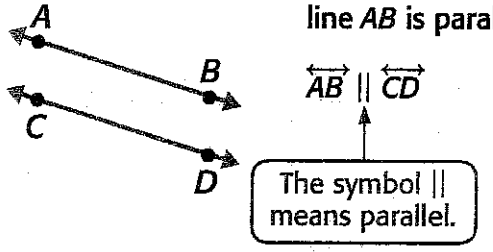
Parallel lines are always the same distance apart. They do not meet or cross each other.

So, Oliver saw a figure with _____ line segments.

Key Concept Types of Lines

Words Parallel lines are always the same distance apart. They do not meet.

Model



line *AB* is parallel to line *CD*

$\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$

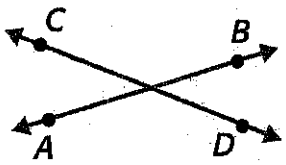
The symbol || means parallel.

Copyright © The McGraw-Hill Companies, Inc. Brand X Pictures/PunchStock

Key Concept Types of Lines

Words Lines that meet or cross each other are called **intersecting** lines.

Model

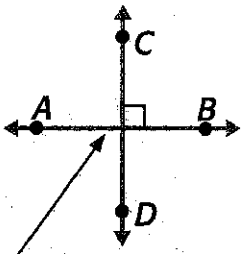


line *AB* intersects line *CD*

$\overleftrightarrow{AB}$ intersects $\overleftrightarrow{CD}$

Words Lines that meet or cross each other to form square corners are called **perpendicular** lines.

Model



line *AB* is perpendicular to line *CD*

$\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$

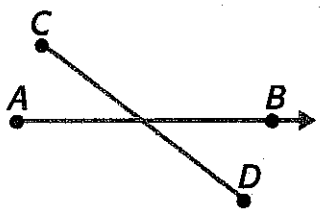
The symbol $\perp$ means perpendicular .

The symbol ¬ means square corner.

Example 2

Tutor

Describe the figure. Use *parallel, perpendicular,* or *intersecting*. Use the most specific term.



The figure shows ray *AB* and line segment *CD*.

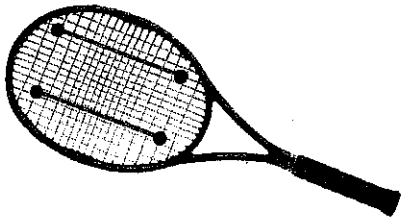
The figures cross each other but do not form square corners.

$\overrightarrow{AB}$ and $\overline{CD}$ are _____.

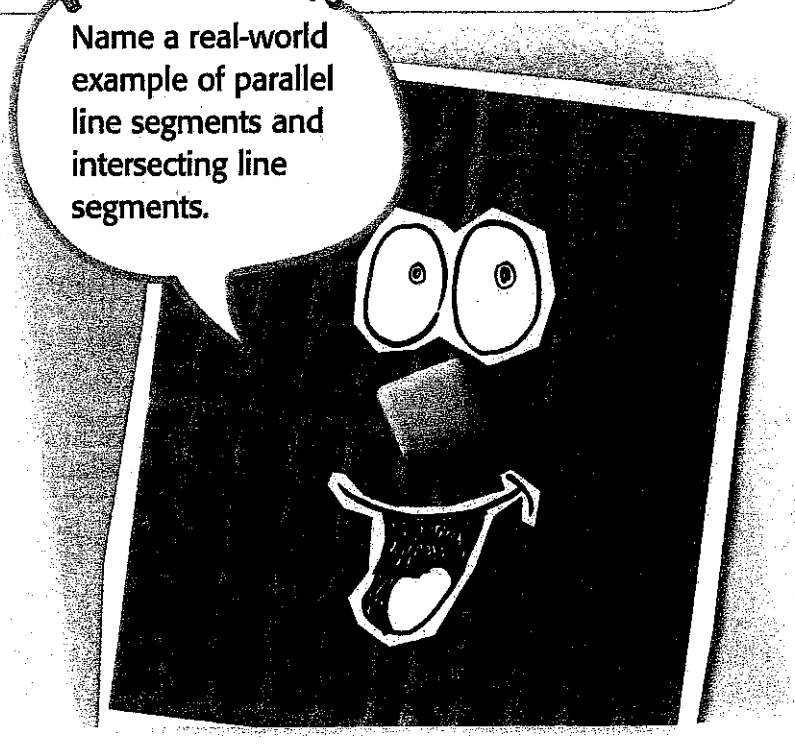
Guided Practice

Check

1. Describe the line segments outlined on the tennis racquet.



_____



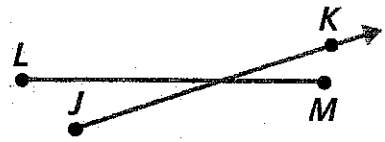
Copyright © The McGraw-Hill Companies, Inc. (t)Brand X/ImageState, Burke Triolo Productions/Brand X Pictures/PunchStock

Name _____

Independent Practice

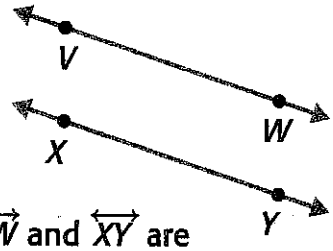
Describe each figure. Use *parallel, perpendicular,* or *intersecting.* Use the most specific term.

2.



$\overline{LM}$ and $\overrightarrow{JK}$ are _____.

3.



$\overleftrightarrow{VW}$ and $\overleftrightarrow{XY}$ are _____.

Draw an example of each figure.

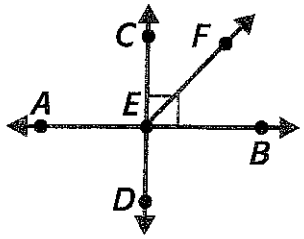
4. $\overleftrightarrow{DE} \parallel \overleftrightarrow{FG}$

5. $\overleftrightarrow{RS}$ intersects $\overleftrightarrow{TU}$

6. $\overleftrightarrow{NO} \perp \overleftrightarrow{PQ}$

7. $\overrightarrow{JK} \parallel \overrightarrow{LM}$

8. Circle the statement that is true about the figure below.



Line *AB* is parallel to ray *EF*.

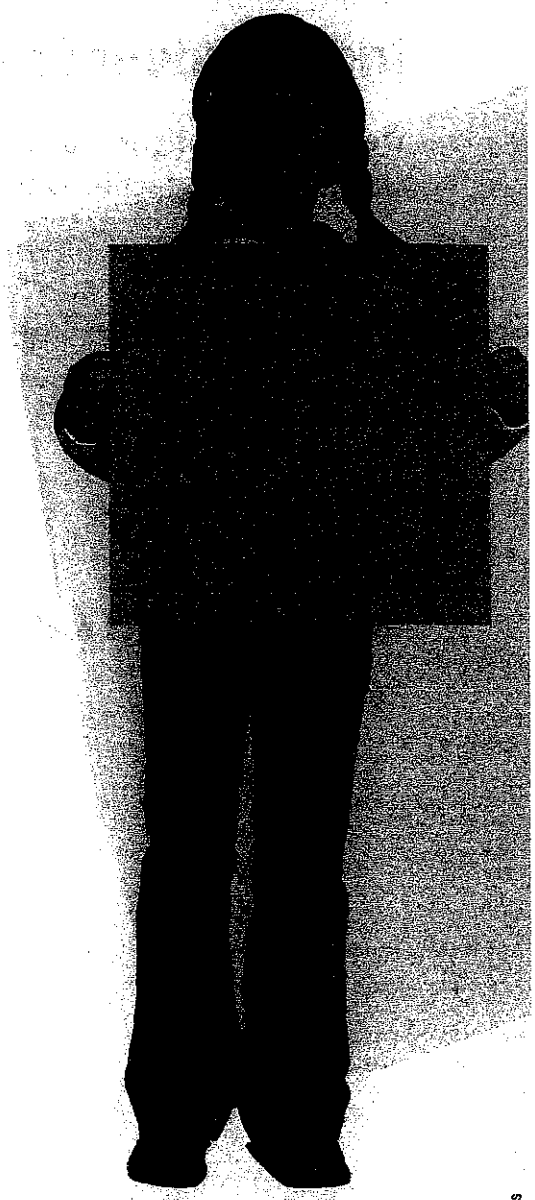
Line *AB* is perpendicular to line *CD*.

Line *CD* is parallel to ray *EF*.

Line *CD* is parallel to line *AB*.

Copyright © The McGraw-Hill Companies, Inc.

Problem Solving



Mathematical PRACTICE 4 Model Math **On a map, streets can be represented by line segments. Use the map to answer Exercises 9–11.**

9. Identify two streets that appear to be parallel to Washington Avenue.

_____

10. Tell whether Hayes Avenue and Capital Lane appear to be parallel, intersecting, or perpendicular lines. Explain.

_____

_____

11. Are there any streets that are intersecting but not perpendicular? Explain.

_____

_____

_____

HOT Problems

12. **Mathematical PRACTICE 2 Stop and Reflect** Tell whether each statement is *true* or *false*.

- If two lines are parallel, they are always the same distance apart. _____
- If two lines are parallel, they are also perpendicular. _____

13. **Building on the Essential Question** Describe a real-world example of when it is necessary that line segments are parallel.

_____

_____

Copyright © The McGraw-Hill Companies, Inc. Thomas Northcut/Photodisc/Getty Images

Name _____

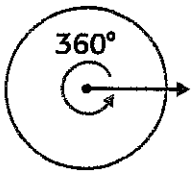
4.G.1, 4.MD.5, 4.MD.5a, 4.MD.5b

Classify Angles

Lesson 4

ESSENTIAL QUESTION
How are different ideas about geometry connected?

Angles can be measured in a more precise way than turns. The unit used to measure an angle is called a **degree (°)**. A circle is made up of 360°.



An angle that turns through $\frac{1}{360}$ of a circle is called a **one-degree angle**. That means that 360 one-degree angles sharing the same endpoint make a circle. The angle below turns through 3 one-degree angles. So, it measures 3°.

Math in My World

Watch Tutor

Example 1

David waits by the crosswalk sign on his way to school. The angle outlined on the sign turns through 50 one-degree angles. Find the measure of the angle.

The angle turns through 50 one-degree angles.

That means that 50 one-degree angles sharing the same endpoint make the angle.

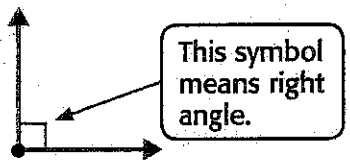
So, the angle has a measure of _____°.

Copyright © The McGraw-Hill Companies, Inc. Emma Lee/Life File/Getty Images

Angles can be classified as *right*, *acute*, or *obtuse*.

Key Concept Types of Angles

A **right angle** measures 90°.



An **acute angle** measures greater than 0° and less than 90°.

An **obtuse angle** measures greater than 90° but less than 180°.

Example 2

Classify the angle as *right*, *acute*, or *obtuse*.

The angle is 90°.

So, it is a _____ angle.

Example 3

Classify the angle as *right*, *acute*, or *obtuse*.

The angle is greater than 90° and less than 180°.

So, it is a(n) _____ angle.

Guided Practice

1. The angle shown turns through 94 one-degree angles. Find the measure of the angle.

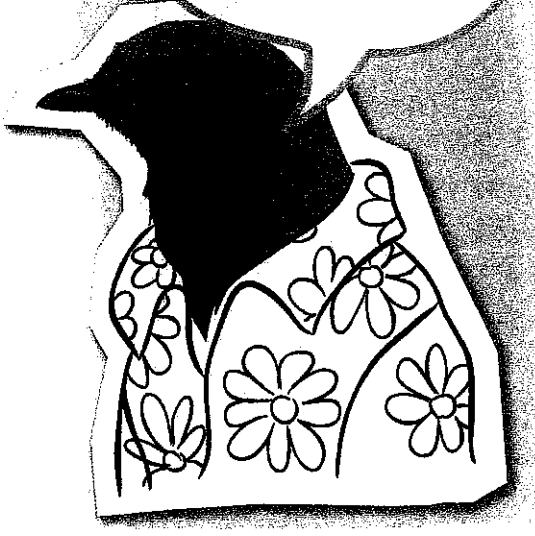
_____

2. Classify the angle shown as *right*, *acute*, or *obtuse*.

_____

Talk MATH

How many one-degree angles does a right angle turn through?



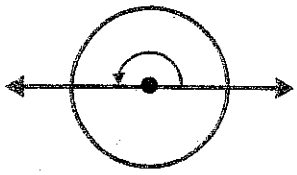
Copyright © The McGraw-Hill Companies, Inc. (l)The McGraw-Hill Companies, (r)Purestock/Getty Images

Name _____

Independent Practice

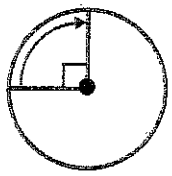
Write the measure of the angle in degrees and as a fraction of a full turn.

3.



_____

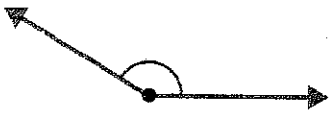
4.



_____

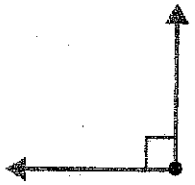
Classify each angle as *right*, *acute*, or *obtuse*.

5.



_____

6.



_____

7.

_____

8.

_____

Draw an example of each figure.

9. an acute angle

10. an obtuse angle

11. An angle that measures 30° turns through how many one-degree angles? _____

12. Classify the angle in Excercise 11 as *acute*, *right*, or *obtuse*. _____

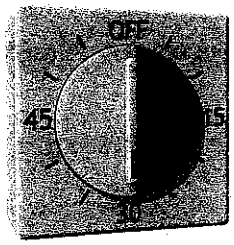
13. An angle that measures 100° turns through how many one-degree angles? _____

14. Classify the angle in Excercise 13 as *acute*, *right*, or *obtuse*. _____

Copyright © The McGraw-Hill Companies, Inc.

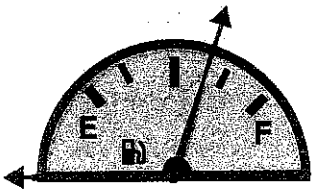
Problem Solving

15. The timer is set to 30 minutes. Through how many degrees will the dial have turned when the timer goes off? What fraction of a full turn is shown by the angle?



_____

16. Classify the angle shown on the gas gauge.



_____

HOT Problems

17. Mathematical PRACTICE 6 **Be Precise** Draw three angles that satisfy the clues below.

- The first angle is a right angle.
- The second angle turns through more one-degree angles than the first angle.
- The third angle turns through less one-degree angles than the first angle.

Classify the second and third angles as *acute*, *right*, or *obtuse*.

_____

My Drawing!

18. **Building on the Essential Question** How is a one-degree angle helpful in classifying angles?

_____

_____

_____

Copyright © The McGraw-Hill Companies, Inc.

Name _____

4.G.1, 4.MD.7

Solve Problems with Angles

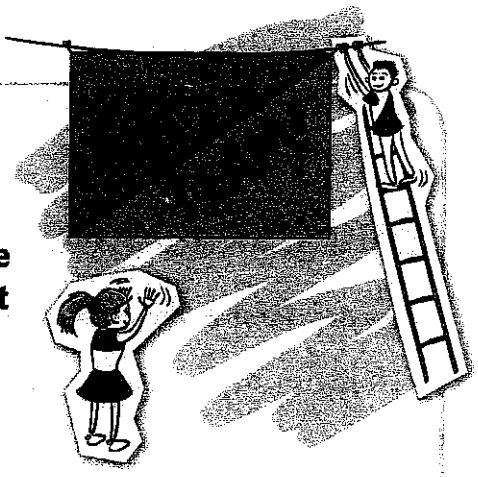
Lesson 7

ESSENTIAL QUESTION
How are different ideas about geometry connected?

An angle can be decomposed, or broken, into non-overlapping parts. The angle measure of the whole is the sum of the angle measures of the parts.

Math in My World

Tools Tutor

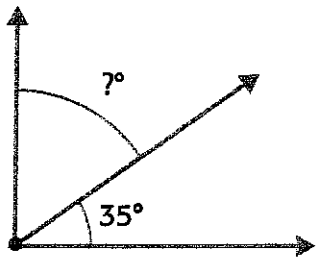


Example 1

Rachel and Dean made a sign out of fabric like the one shown to hang in the school gymnasium. The blue piece has a 35° angle. The red piece is attached to the longest side of the blue piece. Together, the pieces form a right angle. What is the angle shown on the red piece?

One Way Make a model.

Draw a 90° angle. Mark off a 35° angle. Measure the other angle.



The other angle has a measure of _____.

Another Way Use an equation.

The 90° angle measure is the sum of two parts. One angle is 35°.
Find the unknown angle measure.
Let r represent the unknown angle measure.

$35 + r = 90$

Since $35 + r = 90$, you know that $90 - 35 = r$. ← Addition and subtraction are inverse, or opposite, operations.

$r = 90 - 35$

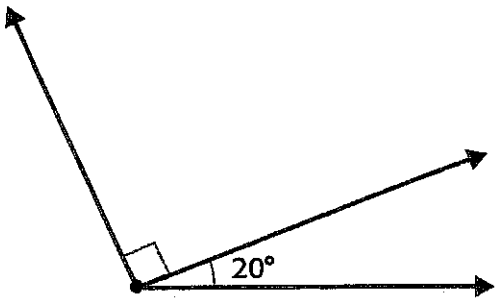
$r =$ _____

So, the angle shown on the red piece measures _____.

Copyright © The McGraw-Hill Companies, Inc.

Example 2

Find the combined measure of the angle shown.



One of the angles is 20°. The symbol on the other angle shows that it is a right angle. Therefore, it is 90°.

To find the combined measure of the angle, add the angle measures of the parts.

Let a represent the combined angle measure.

$a = 20° + 90°$

$a =$ _____

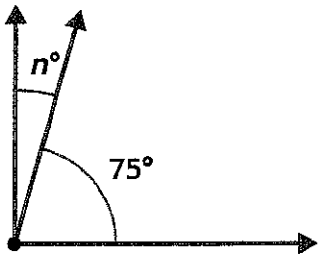
So, the combined measure of the angle is _____.

Guided Practice

Check

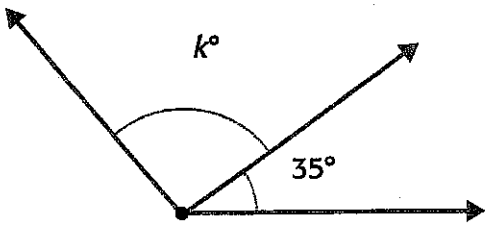
Algebra Find each unknown.

1. The combined angle measure is 90°.



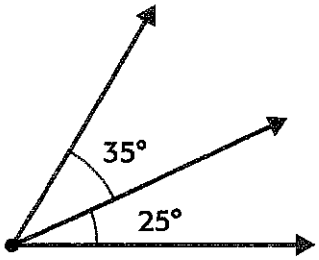
$n =$ _____

2. The combined angle measure is 130°.



$k =$ _____

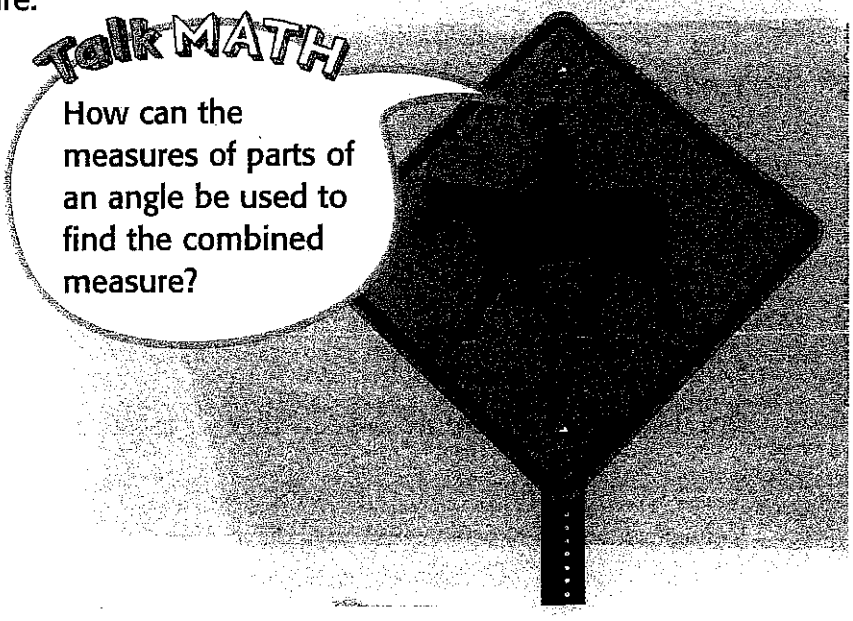
3. Find the combined angle measure.



combined measure = _____

Talk MATH

How can the measures of parts of an angle be used to find the combined measure?

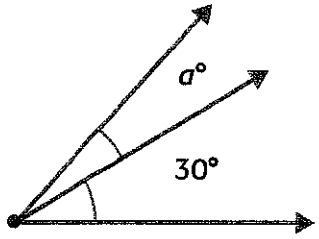


Name _____

Independent Practice

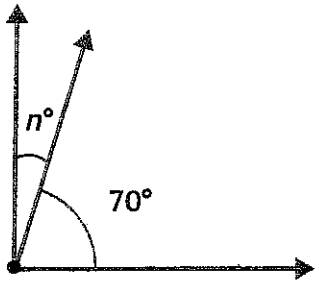
Algebra **Find each unknown.**

4. The combined angle measure is 50°.



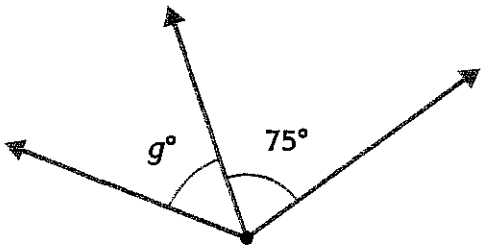
$a =$ _____

5. The combined angle measure is 90°.



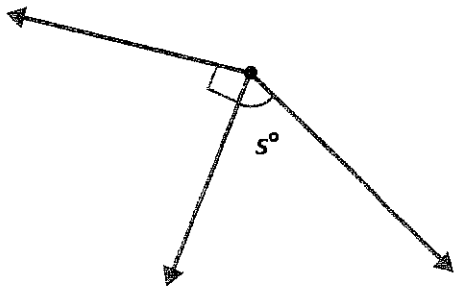
$n =$ _____

6. The combined angle measure is 125°.



$g =$ _____

7. The combined angle measure is 150°.



$s =$ _____

8. Draw a triangle with one right angle.

Find the combined measure of the three angles.

_____

9. Draw a triangle with one obtuse angle.

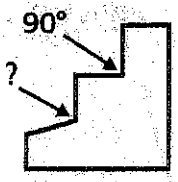
Find the combined measure of the three angles.

_____

Copyright © The McGraw-Hill Companies, Inc.

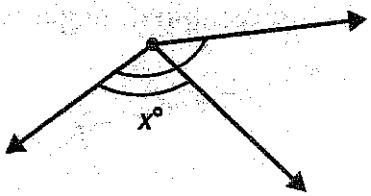
Real World! Problem Solving

10. The steps on a staircase should be 90°. One of the steps is crooked. The angle formed is 15° too large. What is the angle of that step?



My Work!

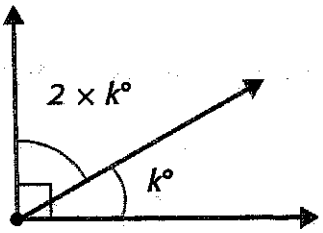
11. Mathematical PRACTICE 4 **Model Math** The combined measure of the angles is 150°. One angle measures 50°. Find the value of x.



HOT Problems

12. Mathematical PRACTICE 2 **Understand Symbols** Find the value of k.

$k =$ _____



13. **Building on the Essential Question** How is addition related to angle measurement?

Name _____

4.G.1, 4.G.2

Triangles

Lesson 8

ESSENTIAL QUESTION

How are different ideas about geometry connected?

There are many different kinds of triangles. You can classify triangles by the measure of their angles.

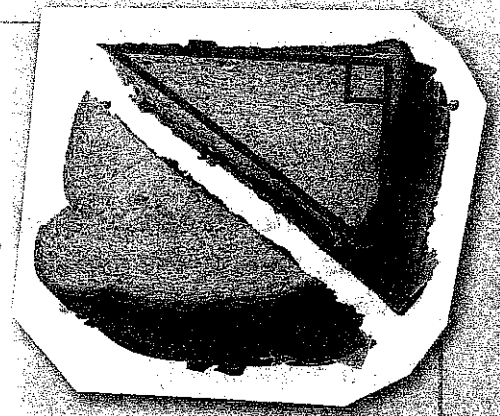
Real World Math in My World

Tutor

Example 1

This sandwich is cut in half. Classify the triangle represented by the half sandwich as *right*, *acute*, or *obtuse*. Determine if any of the sides are perpendicular.

Lunch time!



A **right triangle** has one right angle.

How many right angles are there? _____

The two sides that form the right angle are perpendicular.

An **acute triangle** has three acute angles.

How many acute angles are there? _____

An **obtuse triangle** has one obtuse angle.

How many obtuse angles are there? _____

So, the triangle is a(n) _____ triangle.

Key Concept Classify Triangles by Angles

An obtuse triangle has one obtuse angle.

An acute triangle has three acute angles.

A right triangle has one right angle. The two sides that form the right angle are perpendicular.

Copyright © The McGraw-Hill Companies, Inc. The McGraw-Hill Companies

You can also identify vertices and line segments in triangles.

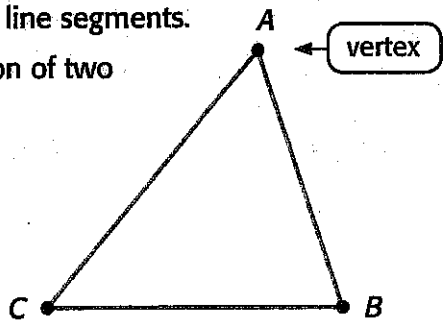
Key Concept Vertices and Line Segments in Triangles

A triangle has three vertices and three line segments.

Each point is formed by the intersection of two line segments.

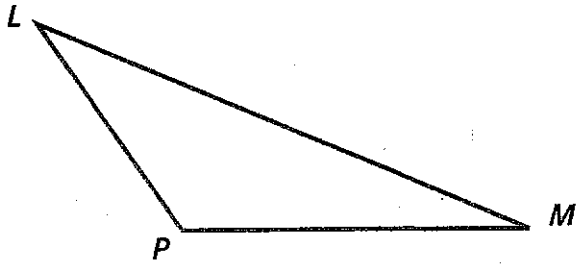
Vertices: A, B, C

Line Segments: $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$



Example 2

Classify the triangle as *right*, *acute*, or *obtuse*. Identify the vertices and line segments of the triangle.



The triangle is a(n) _____ triangle

because it has one _____ angle.

There are _____ vertices. List them below.

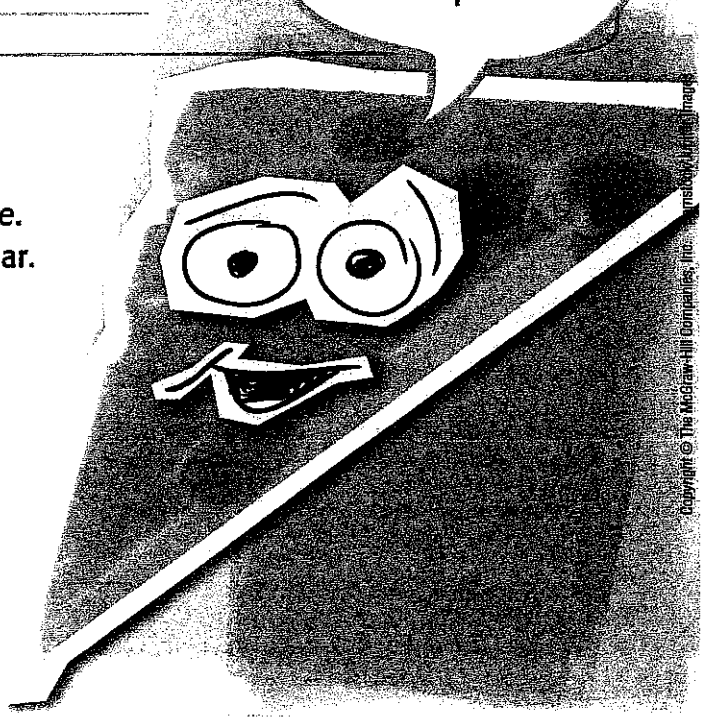
Vertices: _____

There are _____ line segments. List them below.

Line Segments: _____

Talk MATH

Is it possible for a triangle to have a pair of parallel sides? Explain.



Guided Practice

1. Classify the triangle as *acute*, *right*, or *obtuse*. Determine how many sides are perpendicular.

The triangle is _____.

_____ sides are perpendicular.

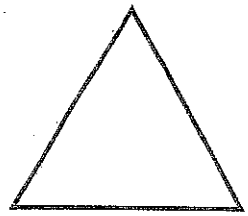
Copyright © The McGraw-Hill Companies, Inc.

Name _____

Independent Practice

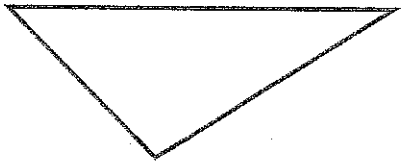
Classify each triangle as *acute*, *right*, or *obtuse*.
Circle the triangles that have any perpendicular sides.

2.



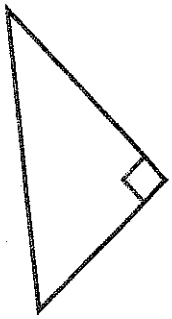
_____

3.



_____

4.

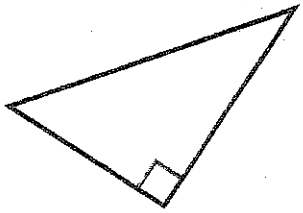


_____

5.

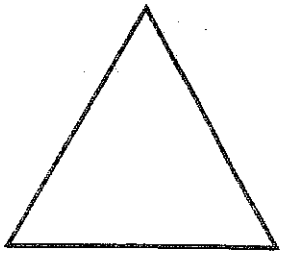
_____

6.



_____

7.



_____

8. Draw three line segments that form a right triangle.

9. Draw three line segments that form an obtuse triangle.

10. Which exercises on this page show right triangles?

_____

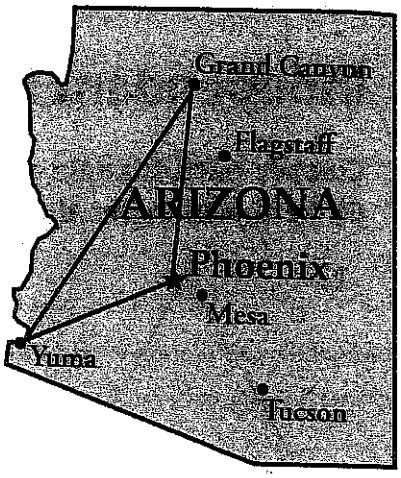
11. Which exercises on this page show figures with perpendicular line segments?

_____

Copyright © The McGraw-Hill Companies, Inc.

Real World Problem Solving

For Exercises 12 and 13, refer to the map of Arizona at the right.



12. Classify the triangle formed by Phoenix, Yuma, and the Grand Canyon as *acute*, *right*, or *obtuse*.

_____

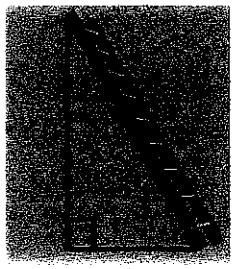
Mathematical PRACTICE 6

13. Explain to a Friend Explain how you classified the triangle.

_____

_____

14. Ved noticed that a triangle was formed by the ladder and the wall. Classify the triangle as *acute*, *right*, or *obtuse*.

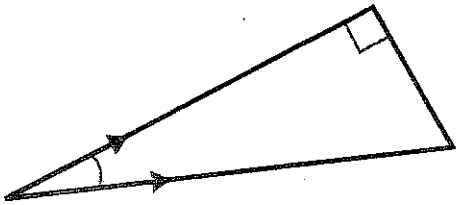


_____

HOT Problems

Mathematical PRACTICE 3

15. Find the Error Ben said that the triangle shown is an acute triangle because the angle shown is acute. Find and correct his mistake.



_____

_____

16. Building on the Essential Question Is it possible for a triangle to have two obtuse angles? Explain.

_____

_____

_____

Copyright © The McGraw-Hill Companies, Inc.

Name _____

4.G.1, 4.G.2

Quadrilaterals

Lesson 9

ESSENTIAL QUESTION
How are different ideas about geometry connected?

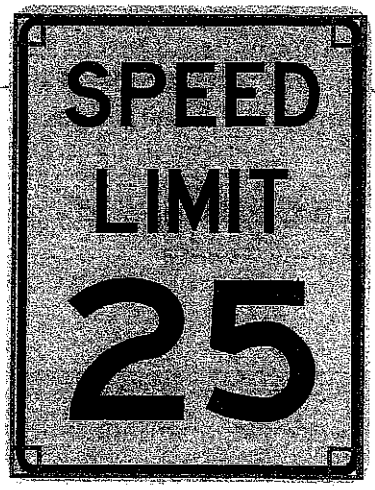
All quadrilaterals have 4 sides and 4 angles.
There are many different kinds of quadrilaterals.

Math in My World

Watch Tutor

Example 1

The speed limit sign represents a quadrilateral. Classify the angles formed by the quadrilateral. Determine if any of the sides are parallel or perpendicular.



1 **Classify the angles.**

There are _____ right angles,

_____ acute angles, and _____ obtuse angles.

2 **Determine if there are any parallel or perpendicular sides.**

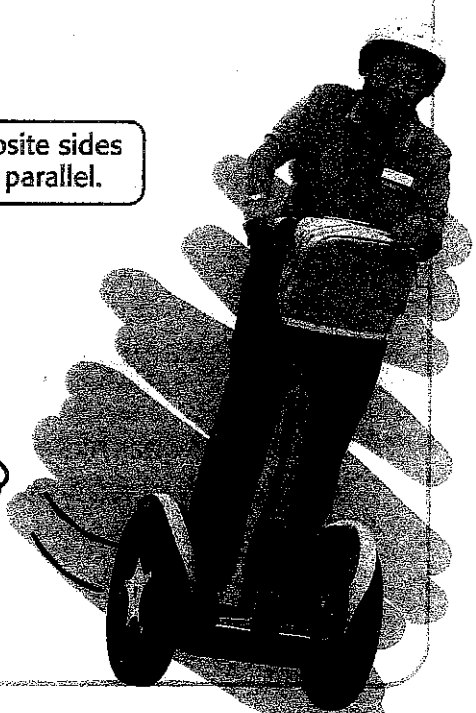
The top and _____ sides are parallel.

The left and _____ sides are parallel.

Opposite sides are parallel.

Since there are 4 right angles, the sides that form each right angle are perpendicular.

So, there are _____ pairs of perpendicular sides.



Notice that opposite sides are also equal in length.

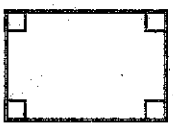
A quadrilateral with 4 right angles, opposite sides equal in length, and opposite sides parallel is a *rectangle*. A rectangle is a special kind of quadrilateral.

Copyright © The McGraw-Hill Companies, Inc. (t)PNC/Getty Images, (b)Ingram Publishing

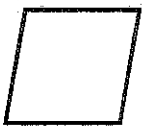
Key Concept Quadrilaterals

A **parallelogram** has opposite sides equal in length and parallel. In addition, opposite angles have the same size.

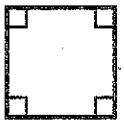
A **rectangle** has opposite sides equal in length and parallel. It has 4 right angles.



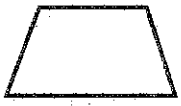
A **rhombus** has opposite sides equal in length and parallel. It has 4 equal sides.



A **square** has opposite sides equal in length and parallel. It has 4 right angles and 4 equal sides.



A **trapezoid** has exactly one pair of parallel sides.

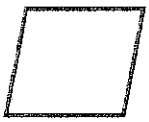


A rectangle, a square, and a rhombus each have all of the attributes, or characteristics, of a parallelogram. So, they are also parallelograms.

Example 2

Tutor

Classify the quadrilateral in as many ways as possible.

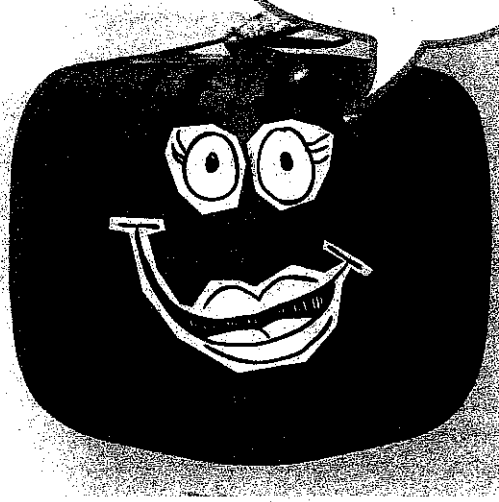


The quadrilateral has opposite sides equal in length and opposite sides parallel. It also has _____ equal sides.

So, it is a _____ and a _____.

talk MATH

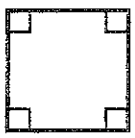
Explain why a square is also a parallelogram.



Guided Practice

Check

1. Classify the quadrilateral in as many ways as possible.



It is a _____,

a _____, a _____,

and a _____.

Copyright © The McGraw-Hill Companies, Inc. Koichi Kamoshida/Stringer/Getty Images News

Name _____

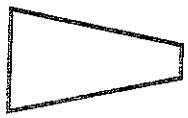
Independent Practice

Classify each quadrilateral in as many ways as possible.

2.

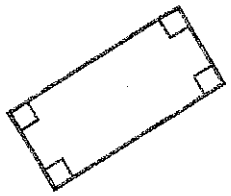
_____

_____

3. 

_____

_____

4. 

_____

_____

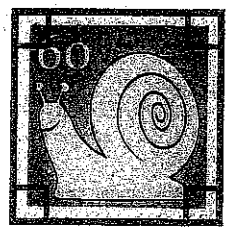
Write the type of quadrilateral that best describes each shape. Choose the most specific term.

5.

_____

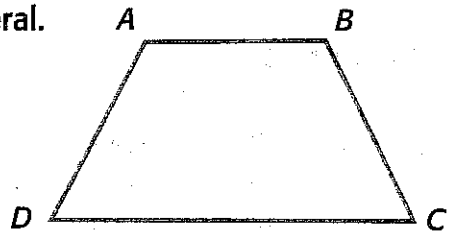
6.

_____

7. 

_____

8. Follow the steps to describe the quadrilateral.



The quadrilateral is a _____ because it has exactly one pair of _____ sides.

There are _____ vertices. List them below.

Vertices: _____

There are _____ line segments. List them below.

Line Segments: _____

Explain why the figure is not a parallelogram.

_____

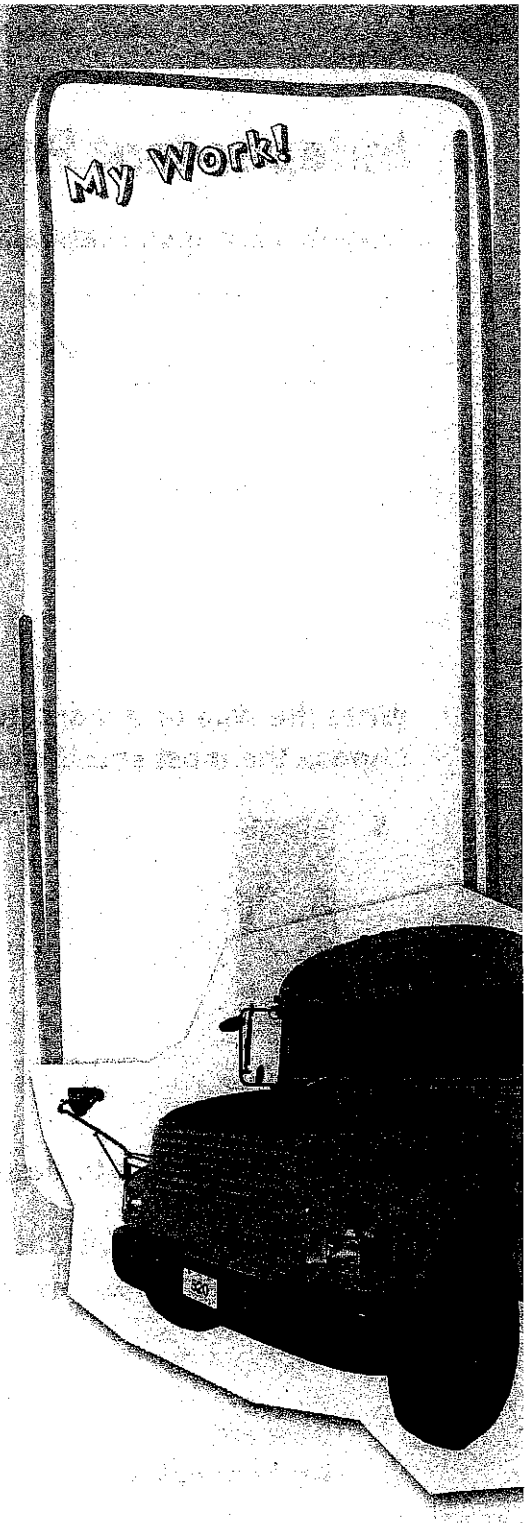
Copyright © The McGraw-Hill Companies, Inc.

Real World Problem Solving

9. A quadrilateral has opposite sides parallel and 4 right angles. Two sides are longer than the others. What is the quadrilateral?

_____

10. Draw four line segments that form a square.



11. Mathematical PRACTICE 2 **Reason** How are a square and a rhombus alike? How are they different?

_____

_____

_____

HOT Problems

Mathematical PRACTICE 7 **Identify Structure Tell whether each statement is true or false. If the statement is false, draw an example to show why it is false.**

12. A rhombus is a square. _____

13. A rectangle is a parallelogram. _____

14. **Building on the Essential Question** How can I classify quadrilaterals?

_____

_____

_____

Copyright © The McGraw-Hill Companies, Inc.
Author's image/PunchStock

Name .....

4.G.3

Draw Lines of Symmetry

Lesson 10

ESSENTIAL QUESTION
How are different ideas about geometry connected?

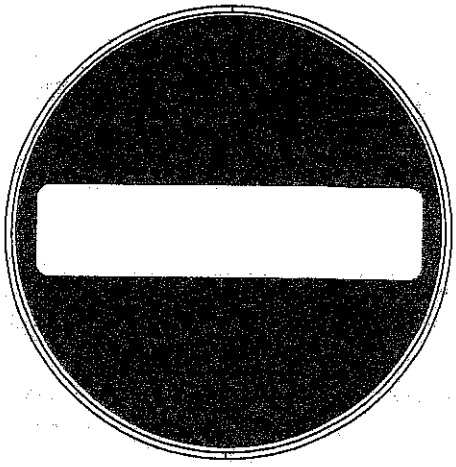
A figure has **line symmetry** if it can be folded over a line so that one half of the figure matches the other half. This fold line is called the **line of symmetry**.

Math in My World

Watch Tutor

Example 1

Determine whether the sign at the right has line symmetry. If it does, draw the line(s) of symmetry on the figure.



1 **Determine if the figure has line symmetry.**
The figure can be folded in half vertically so that the left side matches the right side.

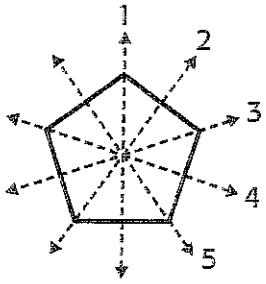
So, the figure has line symmetry.

2 **Draw the line of symmetry.**
Draw a vertical line through the center of the figure.

Some figures have more than one line of symmetry.

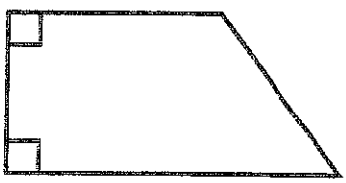
The pentagon at the right has five lines of symmetry.

Notice that the arrow ends that are not labeled are the other ends of the arrows that are labeled.



Some figures do not have any lines of symmetry.

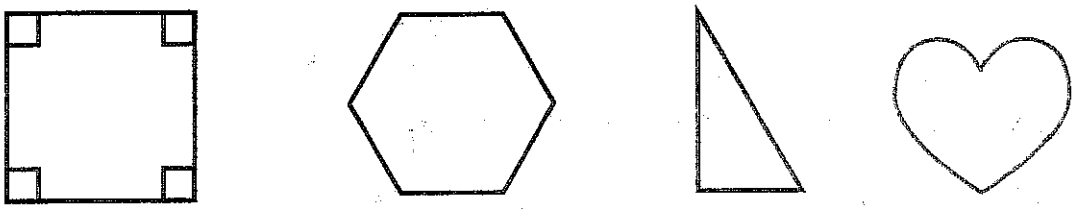
The trapezoid at the right does not have any lines of symmetry.



Copyright © The McGraw-Hill Companies, Inc. Nova Development/Art Explosion

Example 2

Circle the figures that have line symmetry. On those figures, draw all the lines of symmetry.



1 **Determine which figures have line symmetry. List them.**

_____

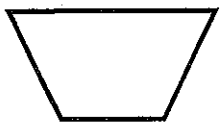
2 **Draw the lines of symmetry on those figures.**

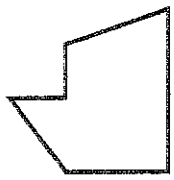
Talk MATH

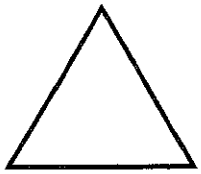
Name one of the capital letters of the alphabet that does not have any line symmetry.

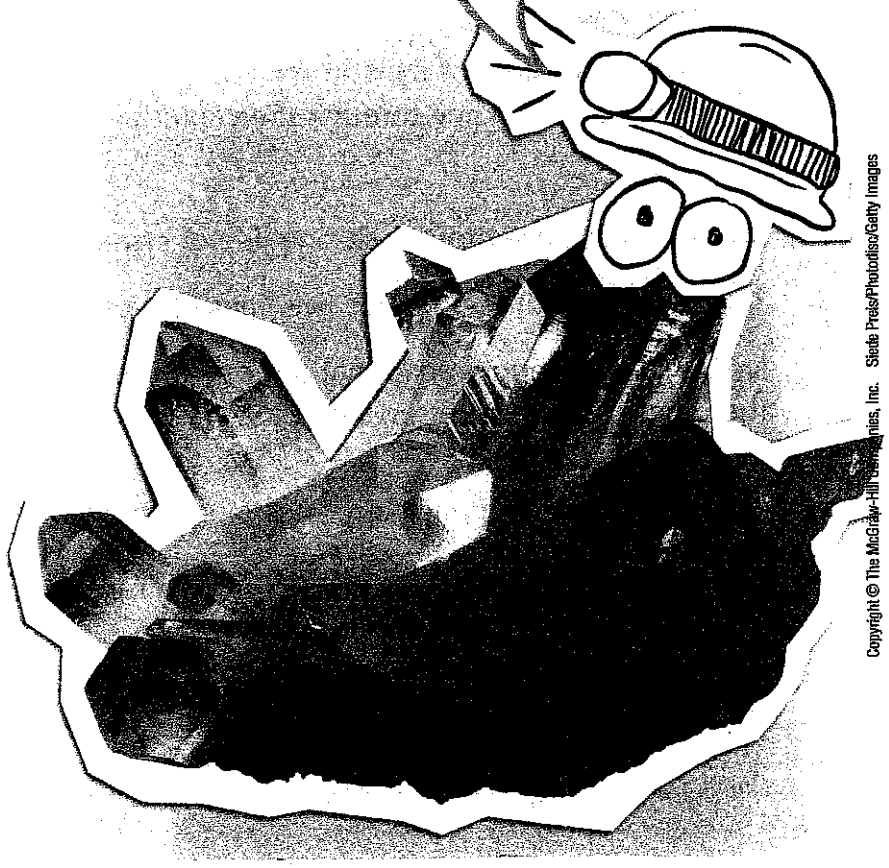
Guided Practice

Determine whether each figure has line symmetry. If it does, draw the line(s) of symmetry.

1. 

2. 

3. 

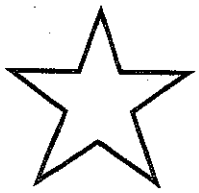


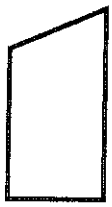
Copyright © The McGraw-Hill Companies, Inc. Stede Preis/Photodisc/Getty Images

Name _____

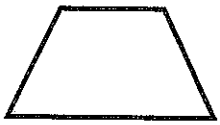
Independent Practice

Determine whether each figure has line symmetry. Write *yes* or *no*. Draw the line(s) of symmetry on the figures that have line symmetry.

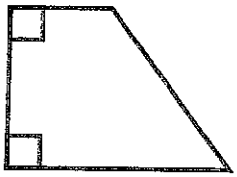
4.  _____

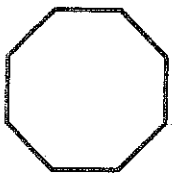
5.  _____

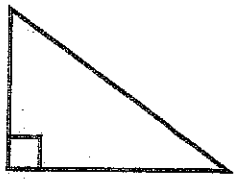
6. _____

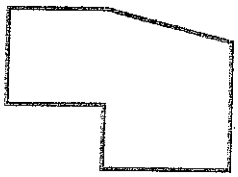
7.  _____

Circle the figures that have line symmetry. Cross out the figures that do not have line symmetry.

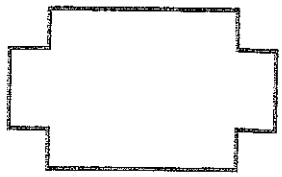
8. 

9. 

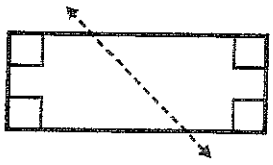
10. 

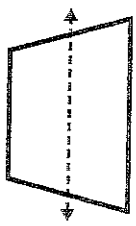
11. 

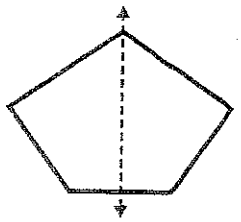
12.

13. 

Determine whether the dotted line is a line of symmetry for each figure. Write *yes* or *no*.

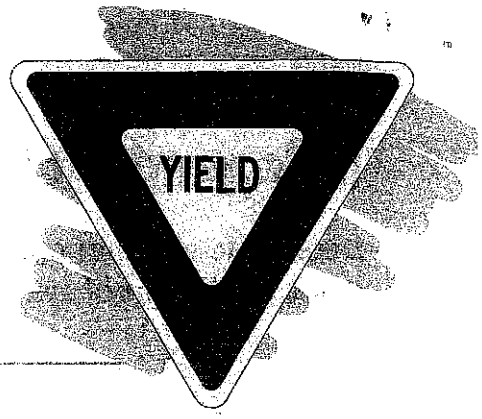
14.  _____

15.  _____

16.  _____

Copyright © The McGraw-Hill Companies, Inc.

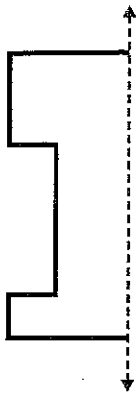
Real World Problem Solving



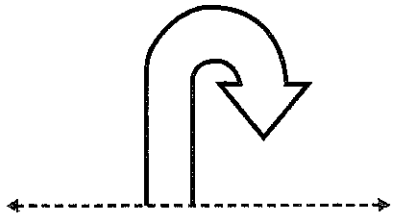
Mathematical PRACTICE 2 **17. Stop and Reflect** Layla saw this sign on her way home from school. Does this sign have line symmetry? Explain.

Draw the other half of each symmetrical shape.

18.



19.



HOT Problems

Mathematical PRACTICE 4 **20. Model Math** Draw an object that shows line symmetry and an object that does not show line symmetry. Circle the object that shows line symmetry.

My Drawing!

21. Building on the Essential Question Name a subject other than math in which symmetry is important. Explain.

Copyright © The McGraw-Hill Companies, Inc. PNC/Getty Images

THE FOLLOWING PAGES ARE THE ANSWER KEYS.

PLEASE LET YOUR PARENTS KNOW.

Drawing Conclusions Nonfiction Name: key
Pretest
4.R.1.A.b Drawing conclusions by providing textual evidence of what the text says explicitly

Read the passage below. Answer the questions that follow.

Students Get Healthy!

A U.S. law requires that schools provide healthy choices for students.
Public schools across the country have been on a health kick since 2010. Thanks to a federal law, students said farewell to fatty foods and hello to better eating habits in school. They also have been exercising more during the school day.

New School Rules
It's up to schools to decide how they comply with the law. Many districts mandate, or require, schools to provide healthy choices for lunch. In Tennessee, most schools removed sugary snacks and soft drinks from vending machines. In their place are more nutritious choices, such as granola bars, nuts, water, and juice.
In Florida, Missouri, and Texas, some schools have rules that restrict desserts such as cupcakes and lollipops from parties. Instead, school officials encourage teachers and parents to provide more nutritious treats.
To get kids to exercise more, the northwestern Minnesota district of Perham Dent added more physical activity to the school day. Many school districts also make sure that kids have recess every day.

A Growing Problem
The goals of the law are to promote good health and to combat obesity. Obesity is the condition of being very overweight. Being obese can lead to serious health problems later in life. Experts say the percentage of children aged 6-11 years old who were obese more than doubled from 1980 to 2012, and the percentage of obese young people aged 12-19 years old quadrupled in the same time period. "We know that adults who are very overweight get sick more often and lose time at work," Julia Lear, the director of the Center for Health and Health Care in Schools, told WR News. "The best thing to do is get kids in the habit of getting lots of exercise and eating healthy meals."

Level 20

1. Which phrase explains what schools meant by being on a "health kick"?

   A. starting kick-boxing programs
   B. investing more into soccer
   C. making more healthy choices
   D. wanting to "kick" away healthy lifestyles

2. Which details support the idea that obesity is unhealthy?

   A. Being obese can lead to serious health problems later in life.
   B. "The best thing to do is get kids in the habit of getting lots of exercise and eating healthy meals."
   C. "We know that adults who are very overweight get sick more often and lose time at work."
   D. Many school districts also make sure that kids have recess every day.

Level 30

3. Choose **two** statements from the text below that support this inference: "Schools such as Florida, Missouri, Texas, and Minnesota care about preventing childhood obesity."

   A. The schools prohibited unhealthy desserts from school parties.
   B. All school districts in the states created a law that students must have recess everyday.
   C. They only give students candy for rewards.
   D. The schools encouraged structured exercise throughout the day.

4. What can you conclude about children today? What makes you think this?

Answers may vary

5. From this article, you can conclude that health is a concern in school districts across the United States. Choose the **details** that support this conclusion. Choose all that apply.

A. Many districts mandate, or require, schools to provide healthy choices for lunch.
B. Public schools across the country have been on a health kick since 2010.
C. "We know that adults who are very overweight get sick more often and lose time at work," Julia Lear, the director of the Center for Health and Health Care in Schools, told WR News.
D. In Florida, Missouri, and Texas, some schools have rules that restrict desserts such as cupcakes and lollipops from parties.
E. It's up to schools to decide how they comply with the law.

Drawing Conclusions Nonfiction Name: key
Post test
4.R.1.A.b Drawing conclusions by providing textual evidence of what the text says explicitly

Robo-Helpers

Move over, C-3PO and R2-D2. In 2005, there was another droid1 in town. A team of scientists developed a robot that learned to walk like a young child. The robot, called Toddler, improved its step and balance with each stride. Toddler, along with two other robots, was unveiled in February 2005 at the meeting of the American Association for the Advancement of Science. All three robots had a humanlike gait, or way of walking. Toddler, the most advanced robot of the group, could learn to walk in about 20 minutes, or 600 steps.

Circuit City

While these weren't the first robots to strut their stuff, scientists say they were different from previous versions of walking robots. Previous versions of walking robots needed a motor to power every movement in their legs, knees, and ankles. They required large amounts of energy to move—about 10 times as much as the three 2005 robot models. Each of the 2005 robots could catch itself if it fell as it moved forward. This was essentially the same way a person learns to walk. The walking robots also swung their arms forward at every step to help with balance, just like a person does.

Not Just a Toy

Why have scientists been developing robots with the ability to walk like humans? Scientists say that walking robots are more than high-tech toys. They hope that walking robots may one day be able to perform tasks that are difficult or hazardous2 for humans, including dangerous space missions. Scientists also believe that this type of technology will lead to medical breakthroughs in the future. The latest technology may be used to help create new types of robotic limbs for people who have lost their arms or legs. "This is the foundation for what we may see in [robotics] in the future," said scientist Michael Foster, who oversaw the development of the walking robots.

Level 20

1. Which idea is supported by evidence from the text?

a. Robots are helpful to humankind.

b. Robots are dangerous.

c. Robots are things from the future.

d. Robots are nothing like humans.

2. **Provide evidence in the text that robots are like humans. Underline the sentence in the text.**

They required large amounts of energy to move—about 10 times as much as the three 2005 robot models. Each of the 2005 robots could catch itself if it fell as it moved forward. This was essentially the same way a person learns to walk. The walking robots also swung their arms forward at every step to help with balance, just like a person does. .

Level 30

3. One reason why it might be important that the robots use less energy is that

a. it is less expensive and easier to maintain.

b. it makes less noise.

c. it is less likely to break.

d. it is easier for anyone to make a robot.

4. What can you conclude about robots today? What makes you think this?

answers may vary.

5. From this article, you can conclude that ***the author seems to be hopeful that the walking robots will end up helping people.*** Choose the **details** that support this conclusion. Choose all that apply.

1. "Scientists also believe that this type of technology will lead to medical breakthroughs in the future."
2. "... one day be able to perform tasks that are difficult or hazardous for humans.
3. "... may be able to help create new types of robotic limb

Outer Space—A Nice Place to Visit?

Where will you go on your next vacation? Disneyland? Sea World? Outer space? That's right; tourists are now paying big bucks to travel into space with astronauts! The first space tourist was Dennis Tito, an American businessman. In 2001, he paid about $20 million to ride on a Russian rocket to the International Space Station. The Space Station circles 220 miles above Earth. Tito stayed on the station for a week, hanging out with astronauts and eating space food.

6. It is probably so expensive to travel to space because

a. astronauts want to make a lot of money.

b. astronaut food is very expensive.

c. space equipment and fuel is expensive.

d. there are high taxes on space travel.

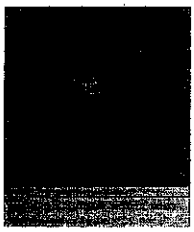
7. Read the sentences from the passage. What can be concluded from the details in the sentence?

How safe is space travel? Apart from the risk of crashing, space tourists have some special things to worry about. Earth's atmosphere protects us from dangerous radiation1 from the sun. Space travelers are exposed to more of the sun's rays. But for tourists spending only a few days or weeks in space, the radiation probably isn't harmful.

answers may vary

Example: While in space a person is exposed to more radiation, being there for a few days probably is 'okay.

Spiders and a Balanced Diet



People aren't the only animals that know how to look for a healthful meal. Scientists have discovered that insects and spiders go out of their way to eat balanced diets.

A team of scientists studied three different predators- a beetle and two types of spiders. Predators are animals that kill and eat other animals.

First, scientists fed the bugs unbalanced diets. The researchers gave some bugs food high in fat and fed others only foods high in protein.

For the next meal, the scientists let the beetles and spiders choose what they wanted to eat. All of them picked foods that contained the nutrients their previous meal had lacked.

The bugs that had been fed high-protein meals picked high-fat prey. The ones that had gotten high-fat meals chose high-protein prey.

It turns out that even creepy-crawlies, especially those with eight legs, watch what they eat!

6. Which sentence best supports why spiders probably eat a balanced diet?

A. They are not able to get enough exercise.
B. They do not want to become too big.
(C) They know what foods their bodies need.
D. All of the above.

7. Read the sentences from the passage. What can be concluded from the details in the sentence?

"For the next meal, the scientists let the beetles and spiders choose what they wanted to eat. All of them picked foods that contained the nutrients their previous meal had lacked. The bugs that had been fed high-protein meals picked high-fat prey. The ones that had gotten high-fat meals, chose high-protein prey.

Answers Will Vary

4.L.1.A.d

Communicate using conventions of English language. Grammar In speech and written form, apply standard English grammar to: **use adverbs in writing**

Name Answer key

Level 20

Identify the adverb

1. The cat (swiftly) caught the mouse under his paws.

2. Jenna rides her bicycle (well)

3. It is snowing outside, so we need to dress (warmly.)

Level 30

Select the correct form of the adverb for the sentence.

4. He (correct, (correctly)) defined the terms.

5. He measured the floor (exact, (exactly)).

6. Mike wrote too (slow, (slowly)) on the exam.

7. Talk ((softly,) soft) or don't talk at all.

Select the correct superlative form of the adverb far in the sentence below.

8. My mother said we would discuss the problem ___(further/farther)___ when we got home.

9. She would not go one step ___(further/farther)___ until she had a drink of water.

10. James went ___(further/farther)___ down the road to find a gas station.

4.L.1.A.d
Communicate using conventions of English language. Grammar In speech and written form, apply standard English grammar to: **use adverbs in writing**

Choose the best adverb to improve the student's writing in the paragraph.

11.

extremely	eventually	hardly	especially	slowly

Conserving Water

Conserving water is a great way to help the earth. Without our water, plants, humans, and animals, would not be able to live. We need to save water because we will [redacted] run out of it. Then we will have to use and drink saltwater. It is extremely expensive to filter salt water. This is why we need to save water. What can you do to save water?

eventually

12.

Quickly	furthest	farthest	calmly	safely	safe

I think the cooking club is the best because it could help you later in your life. safely Like how to follow a recipe and how to cook [redacted]. The club could also show how to choose healthy food, work as a team, and use kitchen equipment.

Where is the best place to add the adverb *joyfully* in the sentence?

13. We laughed when we heard the good news.

joyfully

We		laughed	✓	when		we		heard		the		good		news.

Where is the best place to add the adverb *carefully* in the sentence?

14. I walked over the broken pieces of glass.

carefully

I	✓	walked		over		the		broken		pieces		of		glass

4.L.1.A.d
Communicate using conventions of English language. Grammar In speech and written form, apply standard English grammar to: **use adverbs in writing**

Where is the best place to add the adverb *finally* in the sentence?

15. After many hours, we arrived at our destination.

finally

After		many		hours		we	✓	arrived		at		our		destination

Level 40

Write a story using adverbs correctly. Use at least 7 adverbs and underline them in your story.

Answers will vary

One day at the lake we quietly walked down to the shore. It was early in the morning. I yawned loudly. My mom told me to be quiet. We waited patiently for something to happen. Suddenly, a beaver poked his head out of the water. He swam happily looking for fish. His tail slapped the water hard as he dove down into the deep end.

I enjoyed that moment very much.

Prepositional Phrases Post Test
4.L.1.A.f f. use prepositions

Name Answer key

Level 20

Circle the preposition in the sentence

1. The captain aboard the ship whistles
2. We read a story about bears.
3. The shelf above the desk holds books.

Level 30

Which preposition best completes the sentence?

Example A: I went (aboard / across) the cruise ship just in time. Answer: aboard

4. My mom looked (beyond / after) me when I was young.
5. I sat (over / between) my two best friends at the assembly.
6. Someone tapped my shoulder, so I looked (past / behind) me.
7. My father had to crawl (about / under) the house to look for the raccoon.

Which sentence contains a prepositional phrase?

8. A. The presents before her were wrapped beautifully.
   B. The tree was beautiful.
   C. The family sang songs loudly.
   D. The dog chased the cat, and the cat chased the mouse.

9. A. The magma is flowing quickly.
   B. The magma below the surface is boiling hot.
   C. The volcano erupted violently.
   D. Volcanoes are my favorite subject.

Prepositional Phrases Post Test
4.L.1.A.f f. use prepositions

10. A. The line was long, but I waited patiently.
    B. I waited in line, but my sister was angry.
    C. The person behind me is last.
    D. The person is wearing a red hat.

Underline the prepositional phrase in the sentence.

11. I leaned against the wall because my legs were hurting.
12. John looked across the lake at the houses on the other side.
13. Since I am tall, I can see over many people in the audience.

Which preposition best illustrates the relationship between my brother and the sky?

14. My brother pointed (*down / up / along / above*) towards the sky at the bird.

Which preposition best illustrates the relationship between eating and the play?

15. (*Before / After / Near / Since*) we finish eating, we will go watch a play.

Post Test

4.L.1.B.c Insert a comma before coordinating conjunction in a compound sentence

Name Answer key

Level 20

Identify the compound sentence.

1. A. José wants to be an astronaut when he grows up. Maria wants to be a nurse.
   B. José wants to be an astronaut and a nurse when he grows up.
   C. José wants to be an astronaut when he grows up, and Maria wants to be a nurse.
   D. Jose wants to be an astronaut but not a nurse.

2. A. The tigers at the zoo are always sleeping, but the penguins are fun to watch.
   B. The tigers at the zoo are always sleeping but are fun to watch.
   C. The tigers and penguins at the zoo are always sleeping.
   D. The tigers at the zoo are always sleeping.

Level 30

Where does a comma need to be placed in this sentence? Write the comma in between the correct words to form a compound sentence.

1. Chloe and her friends went to the movie theater but they didn't buy any popcorn.
2. Grandma is a terrific cook and we love staying at her house.
3. A small kitten followed me home so I gave it a bowl of milk.
4. Would you like to go to the movies or would you rather stay home tonight?

Post Test

4.L.1.B.c Insert a comma before coordinating conjunction in a compound sentence

Name_____

What is the best way to punctuate the sentence?

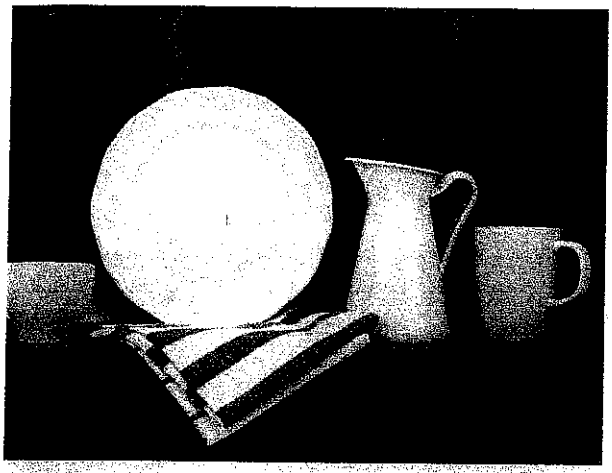
5. A. Mr. Sanchez, loved his new office but he didn't like the view.
   B. Mr. Sanchez loved his new office, but he didn't like the view.
   C. Mr. Sanchez loved his new office but, he didn't like the view.
   D. Mr. Sanchez, loved his new office but he, didn't like the view.

6. A. Ivana's bicycle had a flat tire so she, had to walk to the grocery store.
   B. Ivana's bicycle had a flat tire so she had, to walk to the grocery store.
   C. Ivana's bicycle had a flat tire, so she had to walk to the grocery store.
   D. Ivana's bicycle had a flat tire so, she had to walk to the grocery store.

Level 40

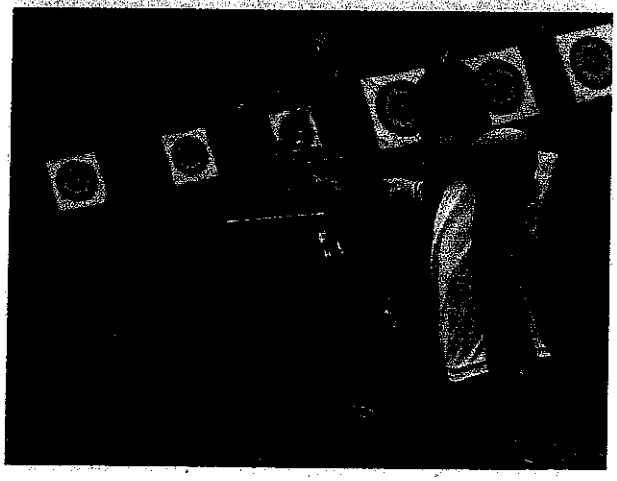
Write a paragraph about a time you had to wait for something. Use at least 3 compound sentences in your writing using 3 different coordinating conjunctions/ FANBOYS Answers will vary

Along time ago I had to wait for my baby brother to be born. (1) My mom told my dad it was time to go to the hospital, so he packed my suitcase. (2) I was supposed to go to my aunt's house, but my aunt wanted to go with us to the hospital, the hospital was nice. They gave us breakfast the next morning. (3) We could eat eggs and toast or we could get a bowl of cereal.

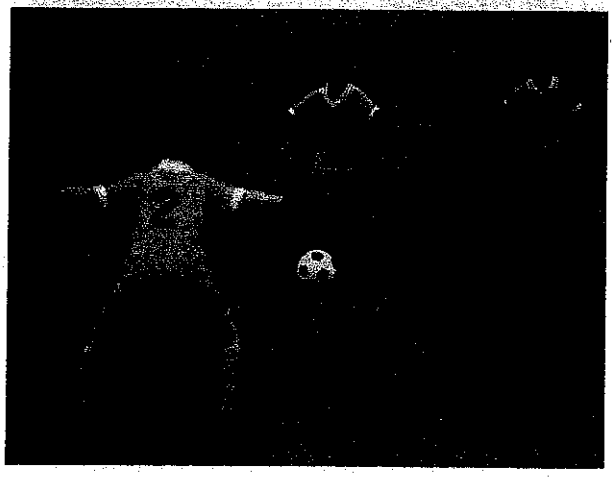


There might be a dish on the edge of a shelf, ready to fall. Even before the dish falls, it has energy, because of its position up on the shelf.

When you swing on a swing set, you have motion energy. At the top of each swing, you stop moving but have stored energy to move again.



When an archer pulls back on the string to shoot an arrow, energy is being stored. What will happen when the archer lets go of the string?



A rolling soccer ball has motion energy. Kicking it adds to that energy, making it move even faster, and scoring a goal!

3. Choose the best phrase to complete the sentences.

have motion energy	**become motion energy**	**speed up**

The objects that are moving have motion energy. The objects that are about to move have energy that can become motion energy.

© Houghton Mifflin Harcourt • Image Credits: (tl) ©karandaev/Getty Images; (bl) ©pilotka/Getty Images; (br) ©Stockbyte/Getty Images; (br) ©Blend Images/LWA/Jay Newman/Alamy

Swifter and Stronger!

Do you think the speed of an object affects its energy? Look at the pictures. In one, a slow-moving ball strikes a gong. In the other, a fast-moving ball strikes a gong. The more the gong moves, the more energy the ball transfers to the gong.

Is the ball swung slowly or quickly? How does the gong react?

Is the ball swung slowly or quickly? How does the gong react this time?

4. Choose the best words to complete the sentences about objects of the same weight.

all	**faster**	**slower**
can	**cannot**	**never**

Faster objects transfer more energy to the object they hit.

slower objects transfer less energy to the object they hit.

The speed of an object can show(s) the amount of energy the object has.

HANDS-ON Apply What You Know

Bang a Gong

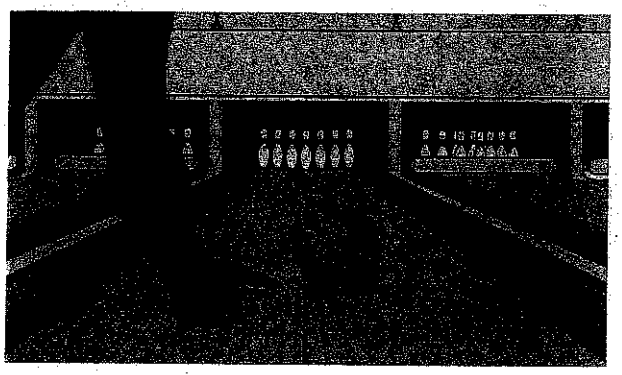
5. Gather materials to experiment with what you have seen in the pictures. Set up the materials and test. Tell how your setup was the same and how it was different. What does this show you about the relationship between speed and energy?

© Houghton Mifflin Harcourt

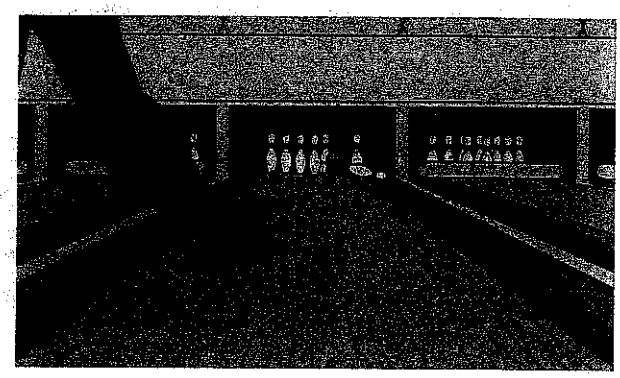
The Faster They Are Hit, the Harder They Fall

You noticed that the faster you threw a ball, the more energy it had. The increased energy made the gong move more. Now think back to the pool game. If the cue ball moved slowly toward the group of balls at the end, what would happen? What if the cue ball were moving very fast?

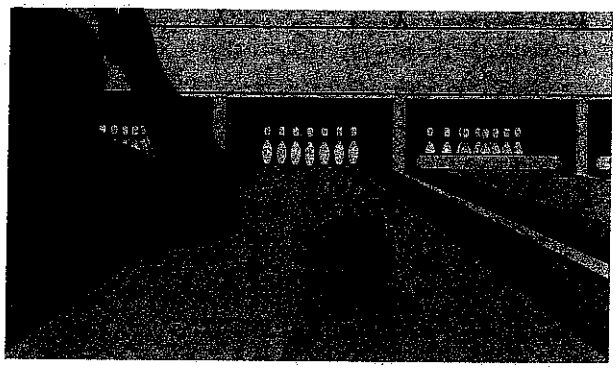
A game of bowling is a lot like a pool game. You roll the bowl toward the pins, trying to knock down as many as you can. How does energy change your bowling score? Let's find out!



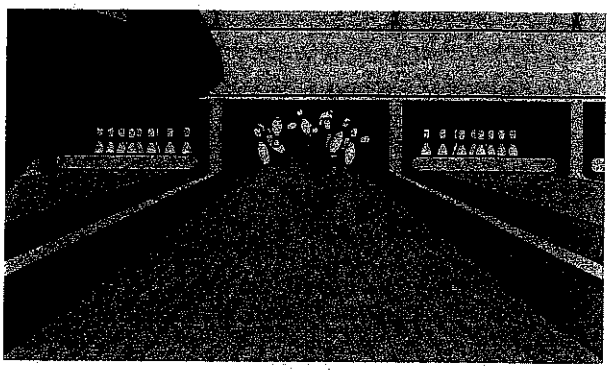
Slide a bowling ball slowly toward the pins.



When the ball hits the pins, how many pins fall down? Do they topple over or fly from the other pins?



Now move the ball more quickly. How many pins fall?



What else do you notice about the pins when a ball thrown quickly hits them?

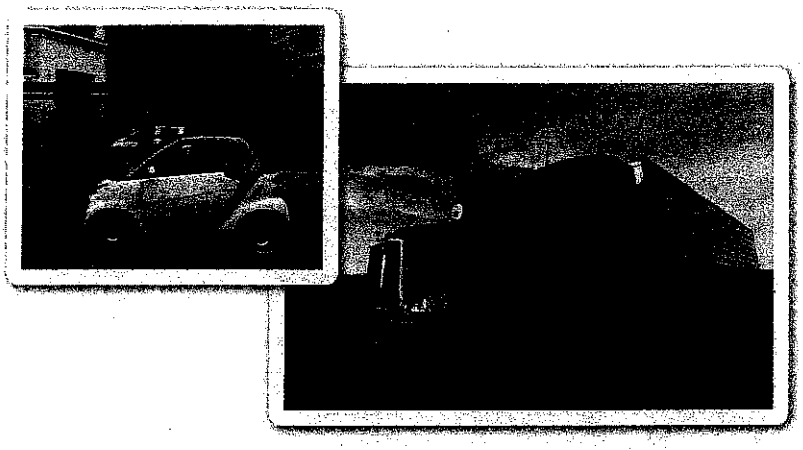
6. Use the slow and fast bowling ball example to explain the relationship between speed and energy.

A faster ball has more energy and strikes pins with greater force than a slower ball.

© Houghton Mifflin Harcourt

Motion Energy and Size: It's a Big Deal!

You already know that the speed of an object affects its energy. But what about size? If you wanted to knock down bowling pins, would you use a bowling ball or a tennis ball? That's right! You'd use a bowling ball because it's heavier. The heavier ball will have more energy than a lighter ball and will knock down more pins.



Look at the two vehicles. Imagine that they are both moving at 80 km/h (about 50 mph). Which do you think has more energy? If the speed is the same, how does one have more energy than the other?

HANDS-ON Apply What You Know

Flour Power

7. Try the activity you see in the pictures on the next page. Change one thing you saw. Repeat what was done in the picture, and record your results. How were the results the same, and how were they different? What does this show you about the relationship between speed and energy?

EVIDENCE NOTEBOOK Explain what would happen to the flour if the balls you used were heavier. Explain what would happen if the balls were lighter.

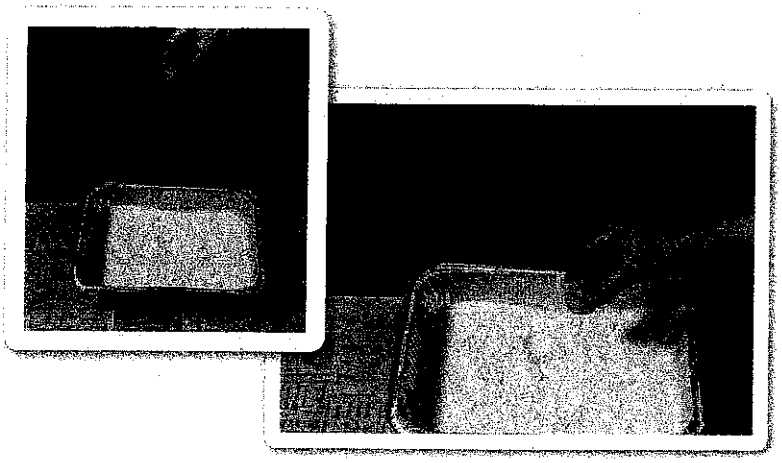
Language SmArts

Cause and Effect

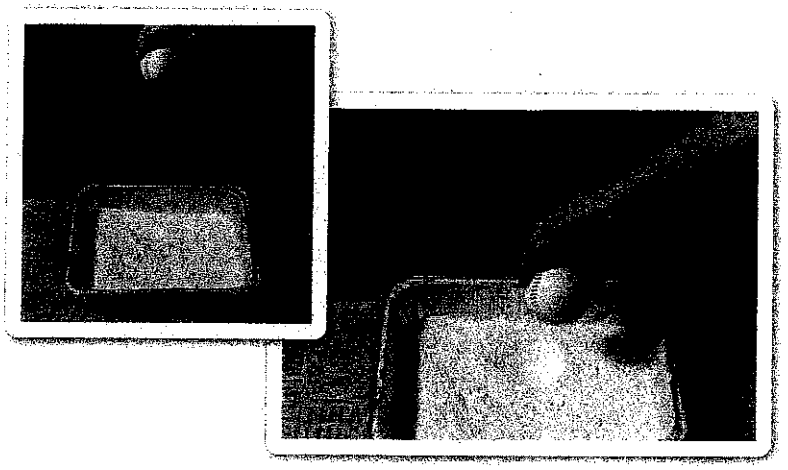
8. Explain how weight can affect collisions.

A heavier object has more energy than a lighter object if the objects are traveling at the same speed.

© Houghton Mifflin Harcourt • Image Credits: (t) ©AFP Footage/Getty Images; (b) ©Driendl Group/Getty Images



Notice the table tennis ball above the pan of flour. What happens when the ball hits the flour? Only a little of the flour moves. The ball didn't have much energy to transfer to the flour.



This baseball is dropped from the same height but is heavier than the table tennis ball. It also falls at the same speed. The crater left by the baseball is larger than the crater left by the table tennis ball. That's because the heavier ball had more energy to transfer.

Putting It Together

9. Explain why there is more damage when objects moving quickly collide than when they are moving slowly.

Variety of answers

© Houghton Mifflin Harcourt

Wonderful Springs

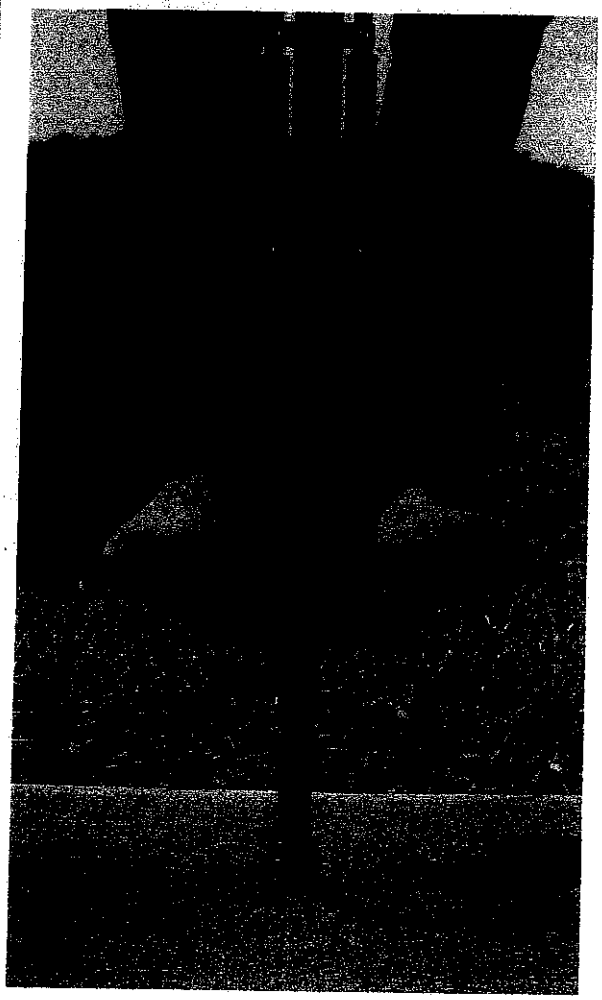
Ready to GO!

Earlier, you found out that anything that is moving has energy. A ball on top of a hill has the potential to move. When it does, it has energy of motion. You know that if you pull a rubber band back farther and farther, you can let it go—and it will go far! Energy is stored in the rubber band.

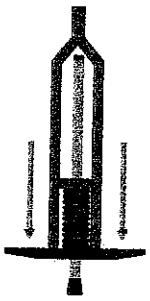
Many objects with bands and springs have stored energy that can be released to make them move!

Springtime!

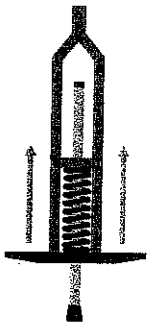
10. Circle the picture that has no stored energy.



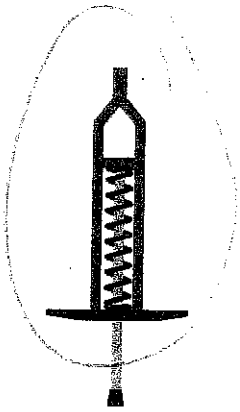
As the pogo stick compresses, energy is being stored in the spring. The spring has the potential to push up and become motion.



At the bottom of the jump, the spring is fully compressed. All the energy is stored in the spring.



As the pogo stick goes up, the energy in the spring is released and becomes motion energy.



At the top of the jump, the spring has transferred all the energy that was stored in it to motion energy.

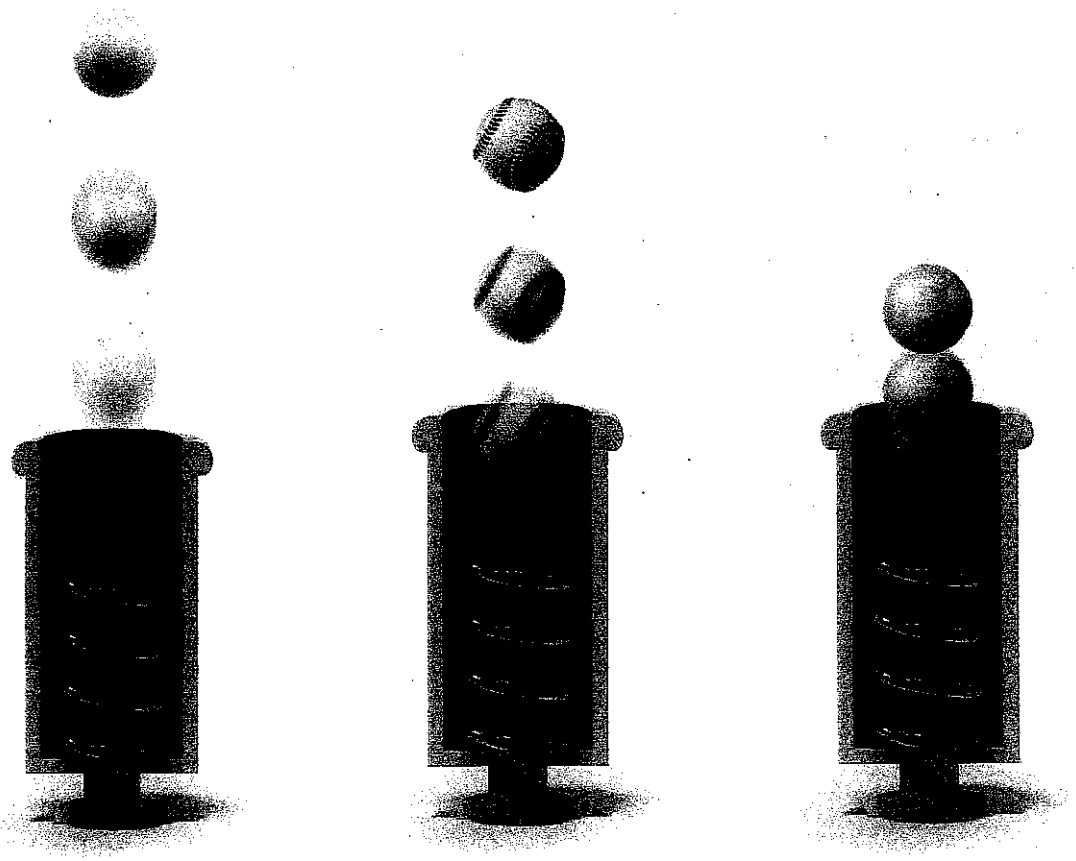
© Houghton Mifflin Harcourt

The Bigger, the Better

In the hands-on investigation, you saw that the farther you pulled back the rubber band, the more energy you released to move the car. But what if you replaced the small car with a larger car or one made of heavier steel? How far would the car travel then?

Mass and Energy

11. Take a look at these spring setups. Consider the relative weights of the balls and the relative amounts of stored energy in the springs. Then predict which balls will travel the least distance, the middle distance, and the greatest distance.



foam ball | **baseball** | **steel ball**

The correct prediction is that this set up will propel the ball the farthest | the medium distance | the least distance

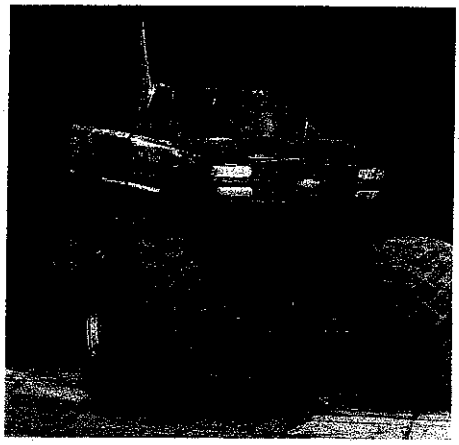
© Houghton Mifflin Harcourt

Engineer It!

Shocking

Buckle up! It's going to be a bumpy ride! When an uneven path causes a vehicle to bounce into the air, the vehicle experiences a collision every time it hits the ground. The motion energy from those collisions jolts the vehicle and the riders inside.

Cars and trucks have springs near the tires. When a spring is compressed, it absorbs and stores energy. The springs in an off-road truck are big and can store a lot of collision energy. That cuts down on the amount of energy that gets transferred to the riders every time the truck hits the ground after bouncing into the air.



12. Describe what it would feel like to ride on a bumpy path in a car that did not have springs to absorb energy.

Language SmArts

Recall from Experience

13. Considering the examples you have seen so far, identify another object that is able to absorb and store energy that is useful to you.

Putting It Together

14. Choose the best word or phrase to complete each sentence in the paragraph.

stored energy	**energy of motion**	**no energy at all**	
more compressed	**less compressed**	**lighter**	**heavier**

A compressed spring or a rubber band stretched out both have stored energy.

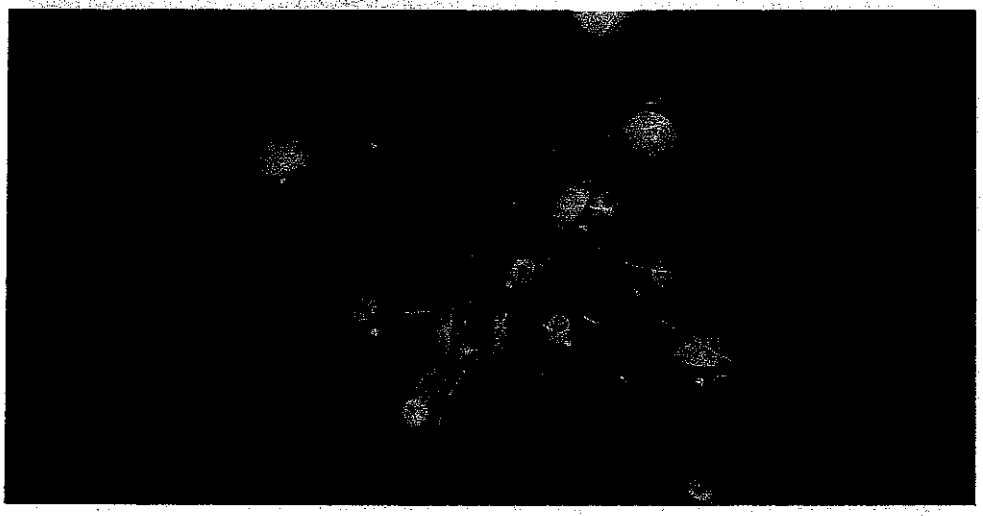
An object will travel farther when the compression energy launching it is more compressed. If two objects are launched by a rubber band with the same amount of compression, the object that is lighter will travel farther.

© Houghton Mifflin Harcourt • Image Credits: ©EvrenKalinbacak/Alamy

Collisions

Scatter!

What is a collision? A collision happens when two objects bump into each other. Think about a game of pool. When the cue ball hits the other balls, there are collisions. When these happen, energy is transferred. The total energy of all the balls is the same, but energy transfers to make the balls move in different directions. When a cue ball hits one of the balls, its motion slows. It transfers energy to the other balls and then moves in a different direction.



Language SmArts

Cause and Effect

15. Describe what happens to the other balls that are cued up when the cue ball hits them. Explain the transfer of energy.

The balls move outward. Energy is transferred from one ball to the next and to the next with each collision.

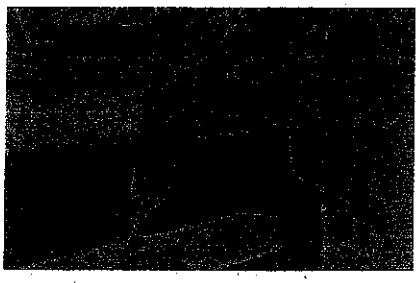
If you were going to collide with something, would you rather collide with something moving quickly or slowly? A slow-moving object has less energy, so the collision has less of an impact. A fast-moving object has more energy—so the object it collides with moves fast, too! You can see this in sports. If you want a soccer ball to go fast, you kick it hard!

EVIDENCE NOTEBOOK You see collisions every day. List some examples in your evidence notebook.

© Houghton Mifflin Harcourt • Image Credits: ©David Leah/The Image Bank/Getty Images

Too Hot to Handle!

Have you ever hit a nail with a hammer? That collision makes a lot of noise! What else did you notice about the nail—besides the fact that it went into the wood? If you had touched the nail, it would have been warm. The hammer would be warm, too! What causes the nail and hammer to heat up?



When a screw and wood collide, energy is transferred. Thermal imaging shows a difference in temperature. As the drill pushes the screw, it causes motion and heat energy!

What Happens to Energy in a Drop?

If you took a steel ball and dropped it, some of the energy would go right into the ground. A steel ball isn't springy—it won't bounce much. A tennis ball will. Look at what happens to the energy in a bouncing ball.

A tennis ball dropped toward the ground bounces back high, but not as high as the height from which it was dropped. Why? Some of the energy is transferred to the ground, and the rest to heat and sound energy.

HANDS-ON Apply What You Know

Rebounce

Hold a meterstick perpendicular to the ground. Have a partner hold a tennis ball parallel to the meterstick and drop it. Observe the ball as it bounces. Take turns doing this several times. Where does the energy go when the ball collides with the ground?

Putting It Together

17. What conclusion can you draw about energy transfer based on what you observed with the tennis ball?

Each time the ball hit the ground, the ground absorbed some of its energy causing it to slow down

© Houghton Mifflin Harcourt • Image Credits: (t) ©Joseph Giacomin/Cultura/Getty Images; (b) ©MarcelC/Getty Images

Discover More

Check out this path . . . or go online to choose one of these other paths.

People in Science & Engineering

- Bump!
- Collision Game!

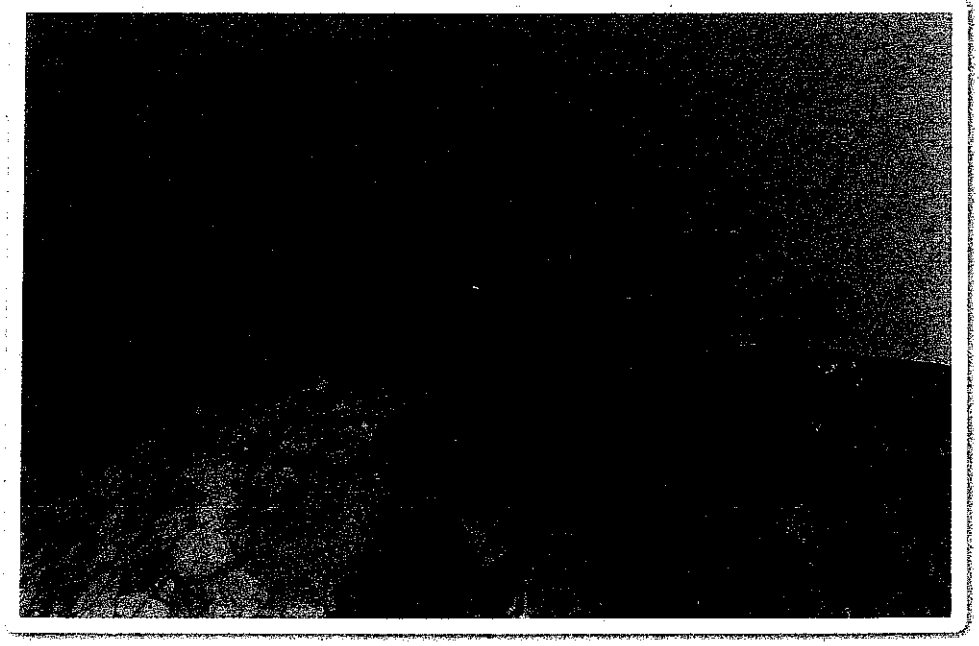
People in Science & Engineering

Amanda Steffy

When we drive on roads, we think about the interaction of the tires with the ground. How do we design tires that don't heat up too much? How do we handle roads that aren't perfectly flat?

Now imagine that you design tires for a vehicle on Mars. That's what Amanda Steffy does! She is an engineer for NASA's Jet Propulsion Laboratory (JPL). Her team tests the wheels and tires of the Mars rovers in different conditions. To do this, Steffy and team had to recreate the surface of Mars in California!

Amanda Steffy works for NASA's Jet Propulsion Laboratory.



The tires of the Mars Rover were designed for rough terrain.

© Houghton Mifflin Harcourt • Image Credits: ©NASA

The surface of Mars is different than what scientists believed it to be. Some of the rocks are sharp and can cut the tires. Some rocks are held tight to the ground while other rocks are very loose.

When a rover tire hits a loose rock, the tire spins faster, but if it hits a sharp rock held tight to the ground, the sharp rock can damage the tire. Amanda tests tires until they fail to find those designs that will hold up on the rough surface of Mars. Understanding these collisions on Earth helps scientists guide the rover on Mars.

Rovers are tested on rough terrain similar to that on Mars.

18. What factors do Amanda Steffy and other scientists who work on vehicles like the Mars rovers need to consider about the energy of motion as they work?

The surface of Mars and its gravity determine what the ride of the rover will be like and how much energy the tires need to be able to absorb

19. How is Amanda Steffy's work related to collisions? Write a few ideas below.

© Houghton Mifflin Harcourt • Image Credits: ©Stocktrek Images/Getty Images

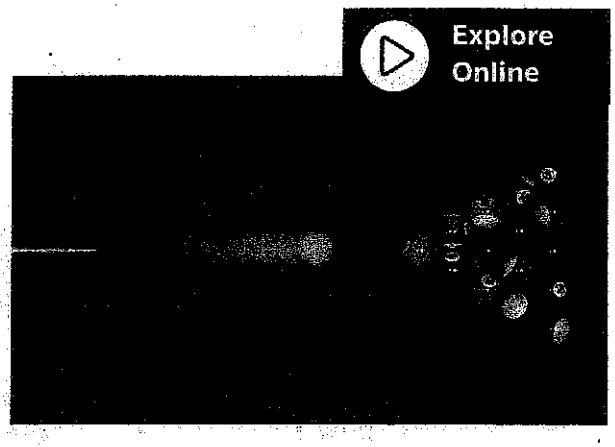
LESSON 3

Lesson Check

Name _____

Can You Explain It?

1. What will happen when the ball hits the group of balls? Write a few sentences below to explain what happens to all the balls on the pool table. Be sure to do the following:
   - Describe the motion and collisions.
   - Identify energy transfers.
   - Mention heat or sound.



EVIDENCE NOTEBOOK Use the information you've collected in your Evidence Notebook to help you cover each point above.

Checkpoints

2. A soccer ball sits in the grass. A girl pulls her leg back to kick the soccer ball. She kicks! What happens next? Circle all the correct answers.
   - **a.** The ball travels in one direction while the leg continues to travel.
   - **b.** The ball travels in one direction while the leg stops.
   - **c.** The collision of the leg and ball makes the ball travel quickly.
   - **d.** The collision of the leg and ball produces a noise.
   - **e.** The ball travels in one direction while the leg moves backwards.

© Houghton Mifflin Harcourt • Image Credits: (t) ©mevans/E+/Getty Images

3. A child plays hopscotch. When she jumps on the ground, which of the following things happen? Circle all the correct answers.

   a. The ground absorbs some of the energy.

   b. The collision produces light energy.

   c. The collision produces heat energy.

   d. The collision produces sound energy.

   e. The girl continues to bounce, going higher each time.

4. Which of the following have energy of motion? Circle all the correct answers.

   a. an electric lamp that has just been plugged in

   b. a child jumping on a trampoline

   c. a fish swimming in an aquarium

   d. the warmth of the sun

   e. a baseball player hitting a ball with a bat

5. A roller coaster moves to the top of a hill where it stops. What happens to the energy when the coaster stops?

   a. The energy becomes motion energy.

   b. The energy is stored energy.

   c. The energy converts to heat energy.

   d. The weight of the roller coaster causes it to collide with another car.

6. An archer is shooting an arrow with a bow. He pulls the string far back, lets the arrow go, and watches it fly far. On his second try, he uses a lighter arrow while pulling the string on the bow back a distance equal to his first try. Tell what happens next. How do you know?

© Houghton Mifflin Harcourt • Image Credits: (t) ©Ed Zurga/stringer/Getty Images

LESSON 3

Lesson Roundup

A. You and a friend are sitting on the ground a few meters apart. You each have a basketball and roll them toward each other. The ball that your friend rolls is moving faster. Write a few sentences to tell what happens next.

B. Which of these types of energy changes in a collision? Circle all that are correct.

a. heat
b. sound
c. motion
d. stored
e. electrical

C. Which of these is a collision? Circle all the answers you think are correct.

a. a baseball player bunting the ball
b. a rubber band snapping
c. a ball player missing a catch as the ball sails overhead
d. a hockey player hitting a hockey puck with a stick
e. two cars driving down a highway
f. a mallet hitting a croquet ball

D. Choose the phrase that makes the sentence correct.

tennis ball **bowling ball** **table tennis ball**

If a spring is compressed at the same compression and is used to launch a table tennis ball, a tennis ball, and a bowling ball on the same flat surface, the table tennis ball will go the farthest distance.

© Houghton Mifflin Harcourt

Name 4th

4.G.1

Draw Points, Lines, and Rays

Lesson 1

ESSENTIAL QUESTION
How are different ideas about geometry connected?

A **point** is an exact location that is represented by a dot. A **line** is a straight set of points that extends in opposite directions without ending.

Math in My World

Tools Tutor

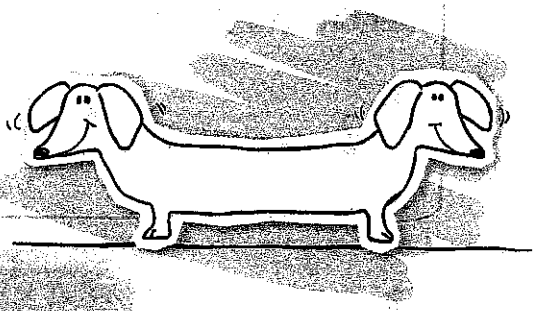
Example 1

Molly drew the figure shown. Identify the figure she drew.

The figure extends in opposite directions. The arrows indicate that it extends without ending. It is a line.

This line is labeled with point *X* and point *Y*. There are different ways to represent this line, such as line *XY* or $\overleftrightarrow{XY}$.

So, Molly drew line XY or $\overleftrightarrow{XY}$.



Key Concept Lines, Rays, Line Segments

Words	Models
A line is a straight set of points that extends in opposite directions without ending.	A B line *AB* or $\overleftrightarrow{AB}$
A **ray** is a part of a line that has one **endpoint** and extends in one direction without ending.	endpoint A B ray *AB* or $\overrightarrow{AB}$
A **line segment** is a part of a line between two endpoints.	endpoint A B line segment *AB* or $\overline{AB}$

Copyright © The McGraw-Hill Companies, Inc.

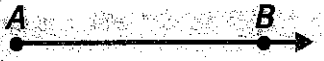
Example 2

Draw a figure that could be represented by $\overline{CD}$.

$\overline{CD}$ represents a line segment with endpoints *C* and *D*.

My Drawing!

Example 3

Identify the figure at the right. 

The figure has one endpoint and extends in one direction without ending. It is a ray.

The endpoint is *A*. The ray extends in the direction of point *B*.

So, the figure is ray AB or $\overrightarrow{AB}$.

Guided Practice

Identify each figure.

1.

line segment QR or $\overline{QR}$

2.

line FB or $\overleftrightarrow{FB}$

3.

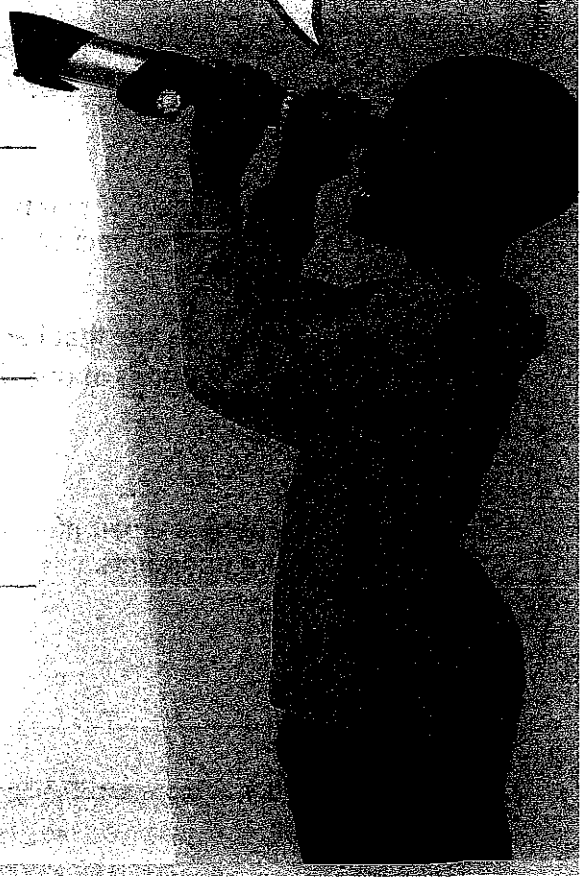
ray AC or $\overrightarrow{AC}$

4.

line DF or $\overleftrightarrow{DF}$

Talk MATH

How are lines and line segments alike? How are they different?



Copyright © The McGraw-Hill Companies, Inc. The McGraw-Hill Companies

Name _____

Independent Practice

Identify each figure.

5.

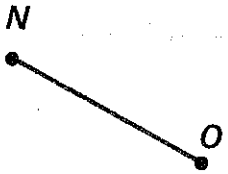
ray FG or $\overrightarrow{FG}$

6.

line segment HK or $\overline{HK}$

7.

line LM or $\overleftrightarrow{LM}$

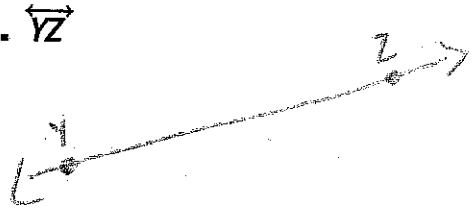
8. 

line segment NO or $\overline{NO}$

Draw each figure.

9. point *T*

10. $\overleftrightarrow{YZ}$

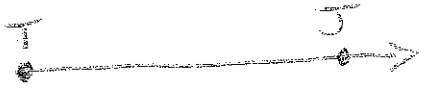


11. $\overrightarrow{CR}$

12. $\overline{AW}$

13. $\overleftrightarrow{SN}$

14. $\overrightarrow{TJ}$



Copyright © The McGraw-Hill Companies, Inc.

Real World Problem Solving

15. Identify the figure that is shown on the stop sign.

Line Segment

16. Mathematical PRACTICE 5 **Use Math Tools** Use a pencil to draw a different type of traffic sign than a stop sign. Then use a crayon or marker to show a line segment on the sign. Individual

My Drawing!

17. Mathematical PRACTICE 4 **Model Math** Name three real-world examples of line segments.

Individual

HOT Problems

18. Mathematical PRACTICE 5 **Use Math Tools** Draw a line segment that is greater than 2 inches and less than 5 inches.

19. **Building on the Essential Question** Explain the similarities and differences of lines and line segments.

Sample: They are both made up of straight sets of points. However, lines do not end. Line segments do not end.

Copyright © The McGraw-Hill Companies, Inc. Comstock Images/Alamy

Name _____

4.G.1

Draw Parallel and Perpendicular Lines

Lesson 2

ESSENTIAL QUESTION
How are different ideas about geometry connected?

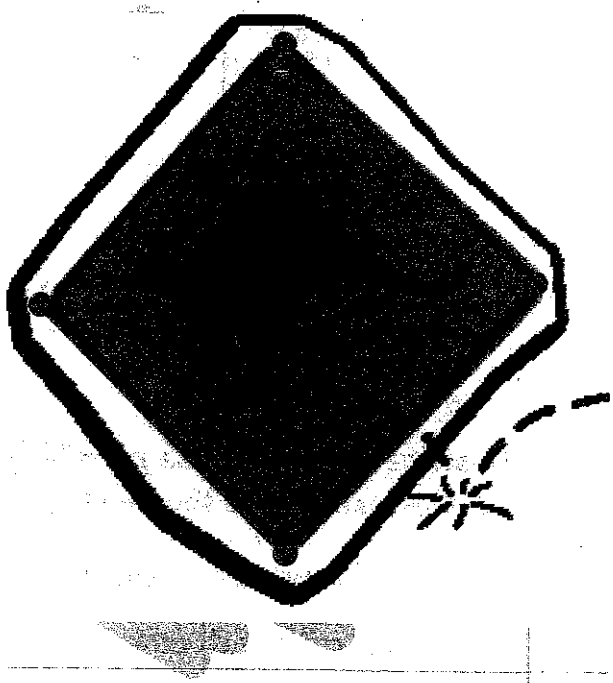
You can describe lines, rays, and line segments by the way they cross each other or do not cross each other.

Math in My World

Tools Tutor

Example 1

Oliver was riding in the car and saw this sign. Describe how the outlined line segments cross each other or do not cross each other.



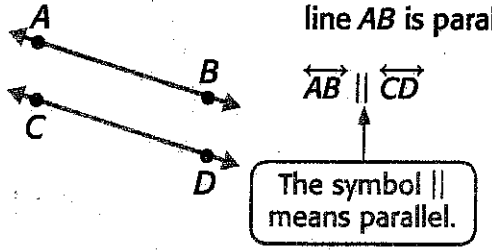
Parallel lines are always the same distance apart. They do not meet or cross each other.

So, Oliver saw a figure with parallel line segments.

Key Concept Types of Lines

Words Parallel lines are always the same distance apart. They do not meet.

Model



line *AB* is parallel to line *CD*

$\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$

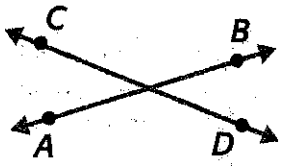
The symbol || means parallel.

Copyright © The McGraw-Hill Companies, Inc. Brand X Pictures/PunchStock

Key Concept Types of Lines

Words Lines that meet or cross each other are called **intersecting** lines.

Model

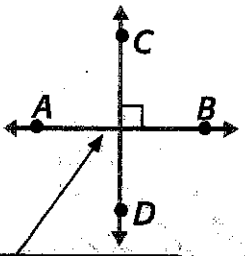


line *AB* intersects line *CD*

$\overleftrightarrow{AB}$ intersects $\overleftrightarrow{CD}$

Words Lines that meet or cross each other to form square corners are called **perpendicular** lines.

Model



line *AB* is perpendicular to line *CD*

$\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$

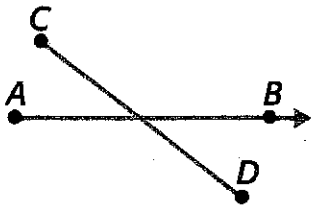
The symbol $\perp$ means perpendicular.

The symbol ⌝ means square corner.

Tutor

Example 2

Describe the figure. Use *parallel, perpendicular,* or *intersecting*. Use the most specific term.



The figure shows ray *AB* and line segment *CD*.

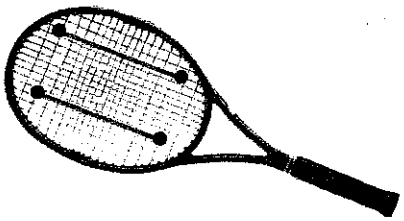
The figures cross each other but do not form square corners.

$\overrightarrow{AB}$ and $\overline{CD}$ are intersecting.

Guided Practice

Check

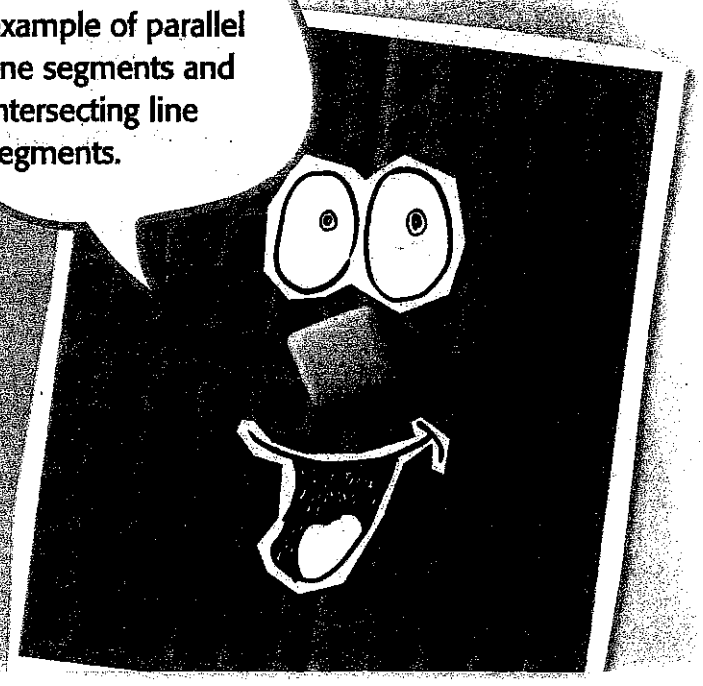
1. Describe the line segments outlined on the tennis racquet.



parallel

Talk MATH

Name a real-world example of parallel line segments and intersecting line segments.



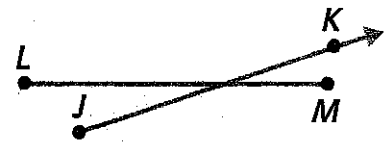
Copyright © The McGraw-Hill Companies, Inc. (l)Brand X/ImageState, Burke Triolo Productions/Brand X Pictures/PunchStock

Name _____

Independent Practice

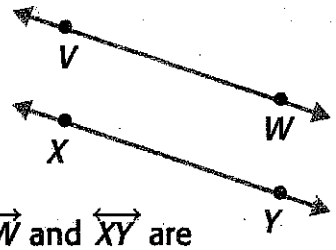
Describe each figure. Use *parallel, perpendicular,* or *intersecting*. Use the most specific term.

2.



$\overline{LM}$ and $\overleftrightarrow{JK}$ are intersecting.

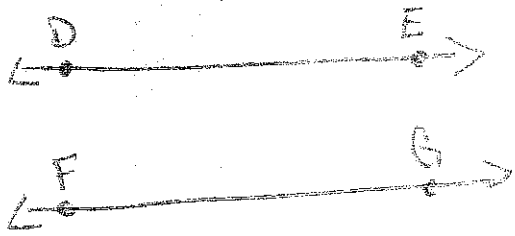
3.



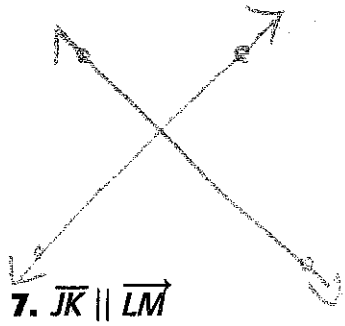
$\overleftrightarrow{VW}$ and $\overleftrightarrow{XY}$ are parallel.

Draw an example of each figure.

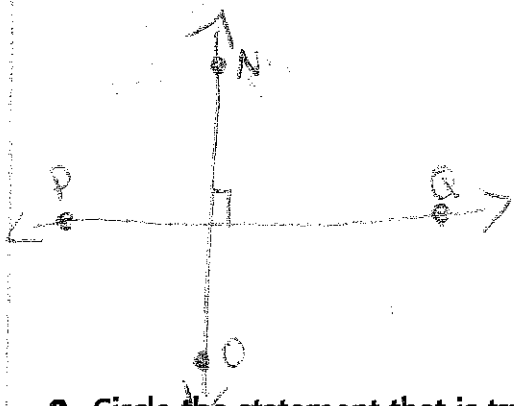
4. $\overleftrightarrow{DE} \parallel \overleftrightarrow{FG}$



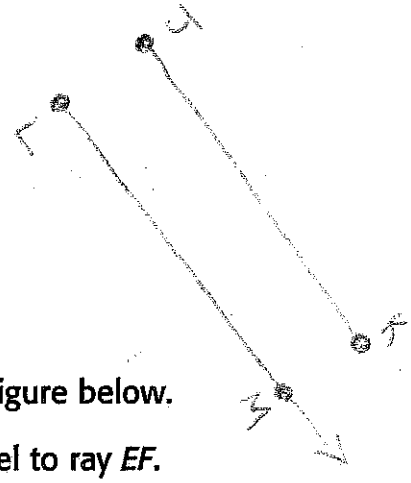
5. $\overleftrightarrow{RS}$ intersects $\overleftrightarrow{TU}$



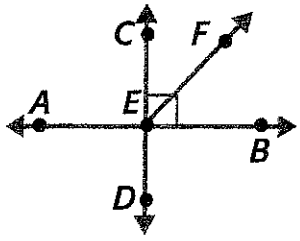
6. $\overleftrightarrow{NO} \perp \overleftrightarrow{PQ}$



7. $\overleftrightarrow{JK} \parallel \overleftrightarrow{LM}$



8. Circle the statement that is true about the figure below.



Line *AB* is parallel to ray *EF*.

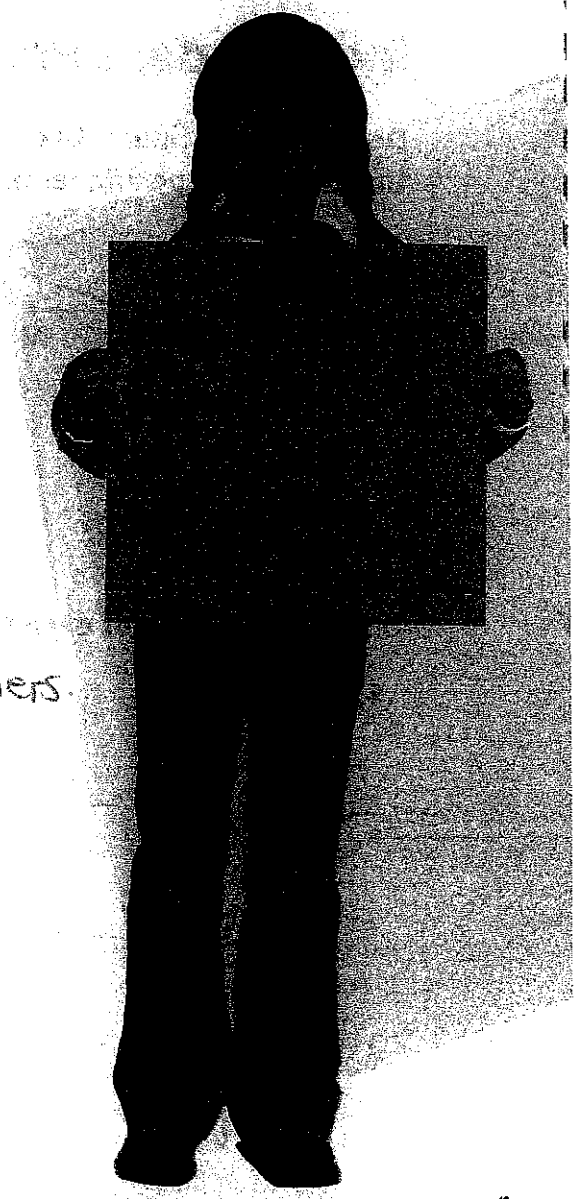
Line *AB* is perpendicular to line *CD*.

Line *CD* is parallel to ray *EF*.

Line *CD* is parallel to line *AB*.

Copyright © The McGraw-Hill Companies, Inc.

Problem Solving



Mathematical PRACTICE 4 Model Math On a map, streets can be represented by line segments. Use the map to answer Exercises 9–11.

9. Identify two streets that appear to be parallel to Washington Avenue.

Hayes Ave. and Jefferson St.

10. Tell whether Hayes Avenue and Capital Lane appear to be parallel, intersecting, or perpendicular lines. Explain.

perpendicular; These two streets cross each other to form square corners.

11. Are there any streets that are intersecting but not perpendicular? Explain.

yes;

HOT Problems

12. Mathematical PRACTICE 2 Stop and Reflect Tell whether each statement is *true* or *false*.

- If two lines are parallel, they are always the same distance apart. true
- If two lines are parallel, they are also perpendicular. false

13. Building on the Essential Question Describe a real-world example of when it is necessary that line segments are parallel.

Copyright © The McGraw-Hill Companies, Inc. Thomas Northcut/Photodisc/Getty Images

Name

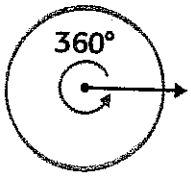
4.G.1, 4.MD.5, 4.MD.5a, 4.MD.5b

Classify Angles

Lesson 4

ESSENTIAL QUESTION
How are different ideas about geometry connected?

Angles can be measured in a more precise way than turns. The unit used to measure an angle is called a **degree (°)**. A circle is made up of 360°.



An angle that turns through $\frac{1}{360}$ of a circle is called a **one-degree angle**. That means that 360 one-degree angles sharing the same endpoint make a circle. The angle below turns through 3 one-degree angles. So, it measures 3°.

Math in My World

Watch Tutor

Example 1

David waits by the crosswalk sign on his way to school. The angle outlined on the sign turns through 50 one-degree angles. Find the measure of the angle.

The angle turns through 50 one-degree angles.

That means that 50 one-degree angles sharing the same endpoint make the angle.

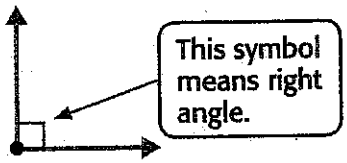
So, the angle has a measure of 50 °.

Copyright © The McGraw-Hill Companies, Inc. Emma Lee/Life File/Getty Images

Angles can be classified as *right*, *acute*, or *obtuse*.

Key Concept Types of Angles

A **right angle** measures 90°.



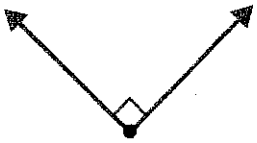
An **acute angle** measures greater than 0° and less than 90°.

An **obtuse angle** measures greater than 90° but less than 180°.

Example 2

Tutor

Classify the angle as *right*, *acute*, or *obtuse*.



The angle is 90°.

So, it is a right angle.

Example 3

Tutor

Classify the angle as *right*, *acute*, or *obtuse*.

The angle is greater than 90° and less than 180°.

So, it is a(n) obtuse angle.

Guided Practice

Check

1. The angle shown turns through 94 one-degree angles. Find the measure of the angle.

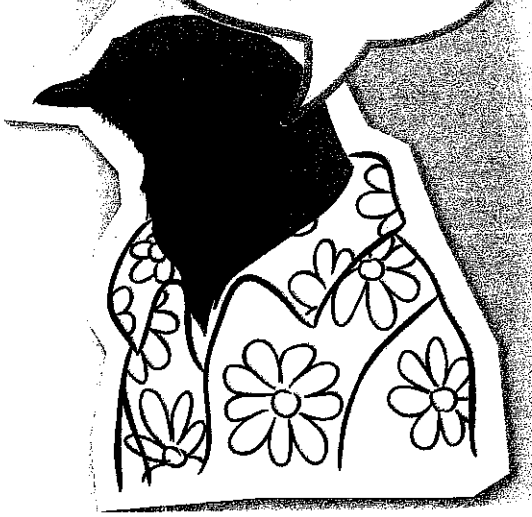
94°

2. Classify the angle shown as *right*, *acute*, or *obtuse*.

acute

Talk MATH

How many one-degree angles does a right angle turn through?



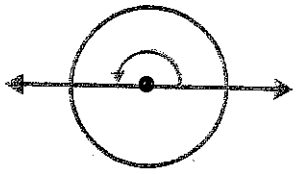
Copyright © The McGraw-Hill Companies, Inc. (t)The McGraw-Hill Companies, (r)Purestock/Getty Images

Name .....

Independent Practice

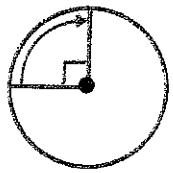
Write the measure of the angle in degrees and as a fraction of a full turn.

3.



180°; 1/2 turn

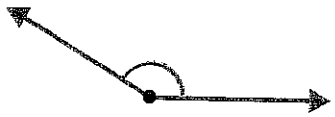
4.



90°; 1/4 turn

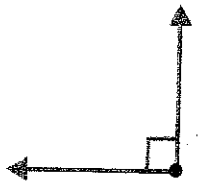
Classify each angle as *right*, *acute*, or *obtuse*.

5.



obtuse

6.



right

7.

obtuse

8.

acute

Draw an example of each figure.

9. an acute angle

10. an obtuse angle

11. An angle that measures 30° turns through how many one-degree angles? 30

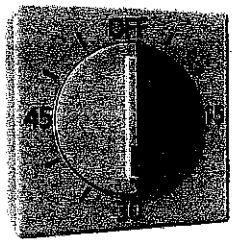
12. Classify the angle in Excercise 11 as *acute*, *right*, or *obtuse*. acute

13. An angle that measures 100° turns through how many one-degree angles? 100

14. Classify the angle in Excercise 13 as *acute*, *right*, or *obtuse*. obtuse

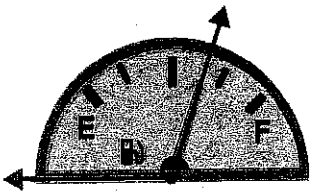
Copyright © The McGraw-Hill Companies, Inc.

Real World Problem Solving



15. The timer is set to 30 minutes. Through how many degrees will the dial have turned when the timer goes off? What fraction of a full turn is shown by the angle?

150; 1/2 turn



16. Classify the angle shown on the gas gauge.

obtuse

HOT Problems

17. Mathematical PRACTICE 6 **Be Precise** Draw three angles that satisfy the clues below.

- The first angle is a right angle.
- The second angle turns through more one-degree angles than the first angle.
- The third angle turns through less one-degree angles than the first angle.

Classify the second and third angles as *acute*, *right*, or *obtuse*.

The second angle is obtuse. The third angle is acute

My Drawing!

18. **Building on the Essential Question** How is a one-degree angle helpful in classifying angles?

Copyright © The McGraw-Hill Companies, Inc.

Name .....

4.G.1, 4.MD.7

Solve Problems with Angles

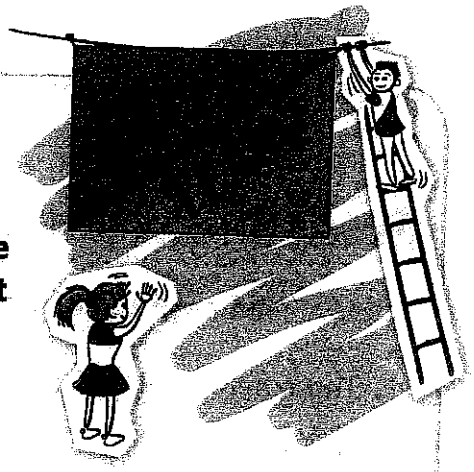
Lesson 7

ESSENTIAL QUESTION
How are different ideas about geometry connected?

An angle can be decomposed, or broken, into non-overlapping parts. The angle measure of the whole is the sum of the angle measures of the parts.

Math in My World

Tools Tutor

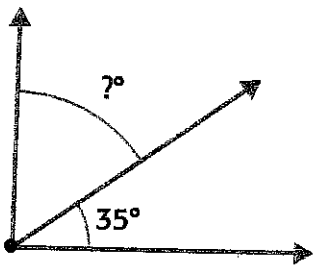


Example 1

Rachel and Dean made a sign out of fabric like the one shown to hang in the school gymnasium. The blue piece has a 35° angle. The red piece is attached to the longest side of the blue piece. Together, the pieces form a right angle. What is the angle shown on the red piece?

One Way Make a model.

Draw a 90° angle. Mark off a 35° angle. Measure the other angle.



The other angle has a measure of 55°.

Another Way Use an equation.

The 90° angle measure is the sum of two parts. One angle is 35°. Find the unknown angle measure.
Let r represent the unknown angle measure.

$35 + r = 90$

Since $35 + r = 90$, you know that $90 - 35 = r$.

Addition and subtraction are inverse, or opposite, operations.

$r = 90 - 35$

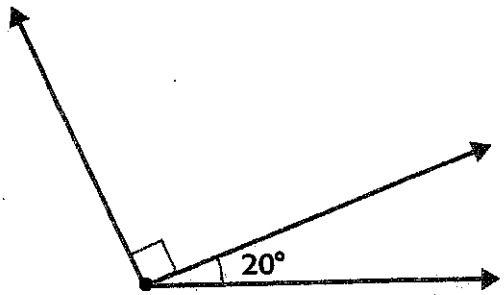
$r =$ 55

So, the angle shown on the red piece measures 55°.

Copyright © The McGraw-Hill Companies, Inc.

Example 2

Find the combined measure of the angle shown.



One of the angles is 20°. The symbol on the other angle shows that it is a right angle. Therefore, it is 90°.

To find the combined measure of the angle, add the angle measures of the parts.

Let a represent the combined angle measure.

$a = 20° + 90°$

$a =$ 110°

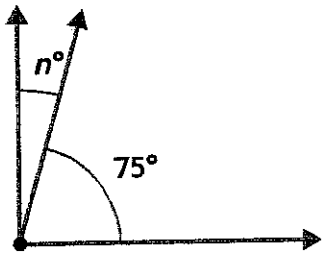
So, the combined measure of the angle is 110°.

Guided Practice

Check

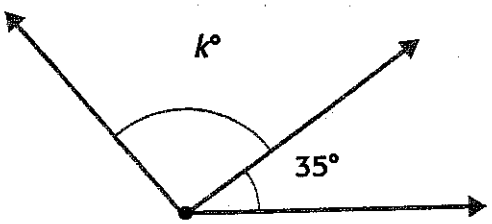
Algebra Find each unknown.

1. The combined angle measure is 90°.



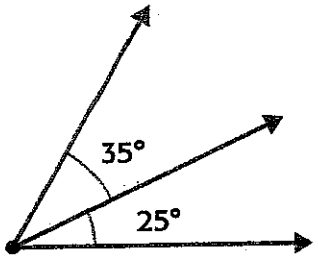
$n =$ 15

2. The combined angle measure is 130°.



$k =$ 95

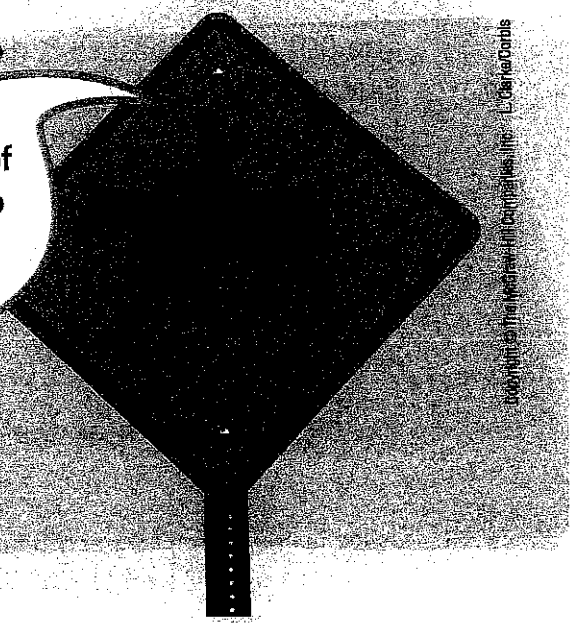
3. Find the combined angle measure.



combined measure = 60°

Talk MATH

How can the measures of parts of an angle be used to find the combined measure?



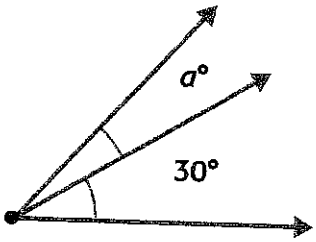
Copyright © The McGraw-Hill Companies, Inc. L. Clarke/Corbis

Name _____

Independent Practice

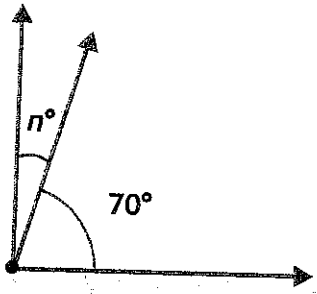
Algebra **Find each unknown.**

4. The combined angle measure is 50°.



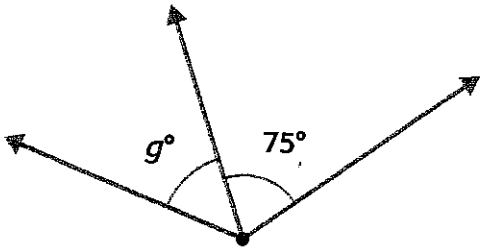
$a =$ 20

5. The combined angle measure is 90°.



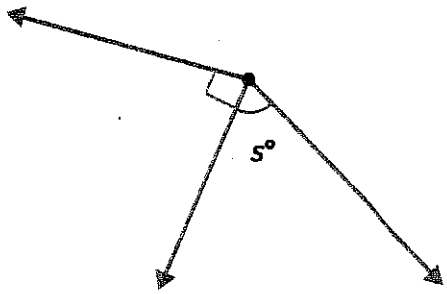
$n =$ 20

6. The combined angle measure is 125°.



$g =$ 30

7. The combined angle measure is 150°.



$s =$ 60

8. Draw a triangle with one right angle.

9. Draw a triangle with one obtuse angle.

Find the combined measure of the three angles.

180°

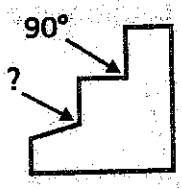
Find the combined measure of the three angles.

180°

Copyright © The McGraw-Hill Companies, Inc.

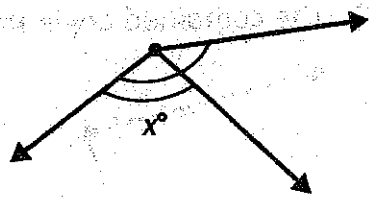
Problem Solving

10. The steps on a staircase should be 90°. One of the steps is crooked. The angle formed is 15° too large. What is the angle of that step?



105°

11. Mathematical PRACTICE 4 **Model Math** The combined measure of the angles is 150°. One angle measures 50°. Find the value of x.



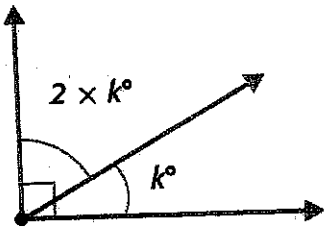
100°

My Work!

HOT Problems

12. Mathematical PRACTICE 2 **Understand Symbols** Find the value of k.

$k =$ 30



13. **Building on the Essential Question** How is addition related to angle measurement?

Copyright © The McGraw-Hill Companies, Inc. Ingram Publishing/SuperStock

Name _____

4.G.1, 4.G.2

Triangles

Lesson 8

ESSENTIAL QUESTION
How are different ideas about geometry connected?

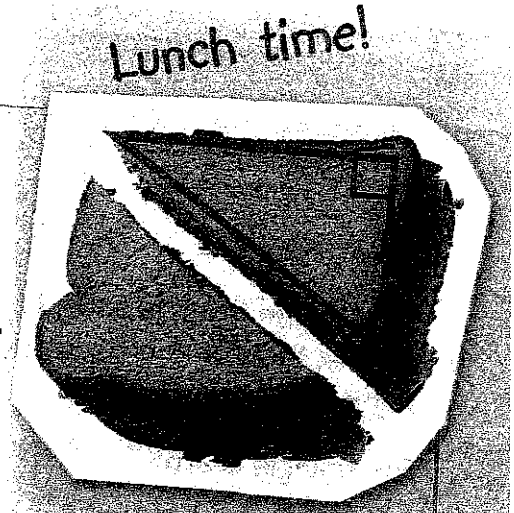
There are many different kinds of triangles. You can classify triangles by the measure of their angles.

Math in My World

Tutor

Example 1

This sandwich is cut in half. Classify the triangle represented by the half sandwich as *right*, *acute*, or *obtuse*. Determine if any of the sides are perpendicular.



A **right triangle** has one right angle.

How many right angles are there? 1

The two sides that form the right angle are perpendicular.

An **acute triangle** has three acute angles.

How many acute angles are there? 2

An **obtuse triangle** has one obtuse angle.

How many obtuse angles are there? 0

So, the triangle is a(n) right triangle.

Key Concept Classify Triangles by Angles

An obtuse triangle has one obtuse angle.

An acute triangle has three acute angles.

A right triangle has one right angle. The two sides that form the right angle are perpendicular.

Copyright © The McGraw-Hill Companies, Inc. The McGraw-Hill Companies

You can also identify vertices and line segments in triangles.

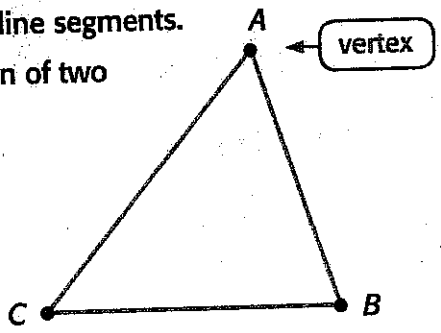
Key Concept Vertices and Line Segments in Triangles

A triangle has three vertices and three line segments.

Each point is formed by the intersection of two line segments.

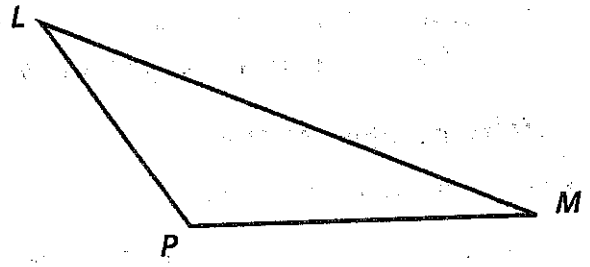
Vertices: A, B, C

Line Segments: $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$



Example 2

Classify the triangle as *right*, *acute*, or *obtuse*. Identify the vertices and line segments of the triangle.



The triangle is a(n) obtuse triangle

because it has one obtuse angle.

There are 3 vertices. List them below.

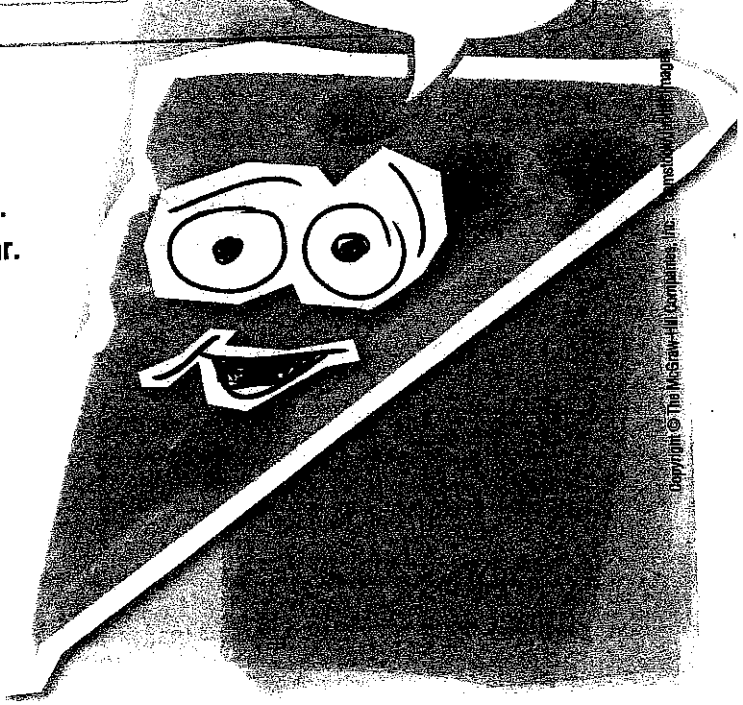
Vertices: L, M, P

There are 3 line segments. List them below.

Line Segments: $\overline{LM}$, $\overline{MP}$, $\overline{PL}$

Talk MATH

Is it possible for a triangle to have a pair of parallel sides? Explain.



Guided Practice

1. Classify the triangle as *acute*, *right*, or *obtuse*. Determine how many sides are perpendicular.

The triangle is obtuse

0 sides are perpendicular.

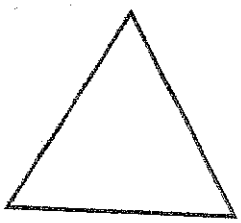
Copyright © The McGraw-Hill Companies, Inc. Permission is granted to reproduce for classroom use.

Name _____

Independent Practice

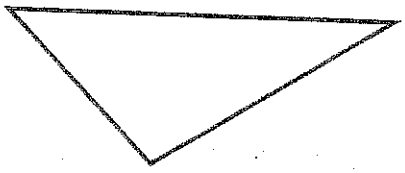
Classify each triangle as *acute*, *right*, or *obtuse*.
Circle the triangles that have any perpendicular sides.

2.



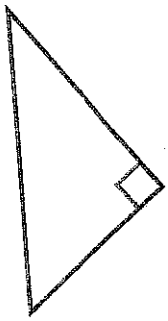
acute

3.



obtuse

4.

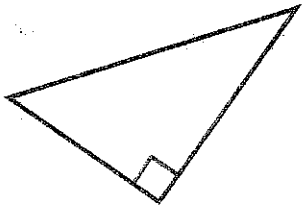


right

5.

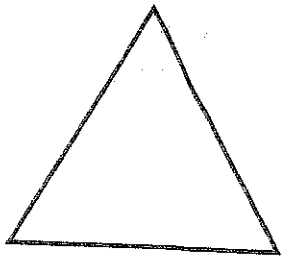
obtuse

6.



right

7.



acute

8. Draw three line segments that form a right triangle.

9. Draw three line segments that form an obtuse triangle.

10. Which exercises on this page show right triangles?

4, 6, 8

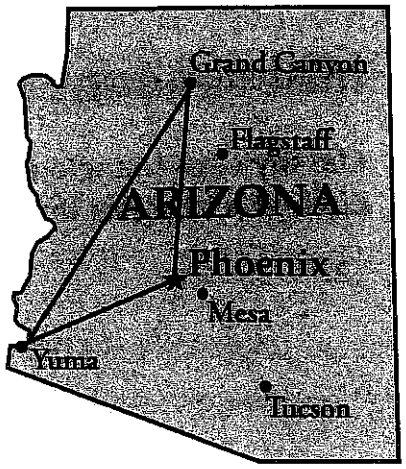
11. Which exercises on this page show figures with perpendicular line segments?

4, 6, 8

Copyright © The McGraw-Hill Companies, Inc.

Real World Problem Solving

For Exercises 12 and 13, refer to the map of Arizona at the right.

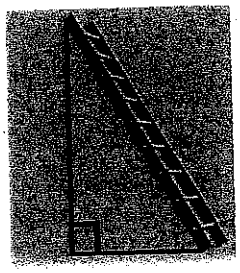


12. Classify the triangle formed by Phoenix, Yuma, and the Grand Canyon as *acute*, *right*, or *obtuse*.

Obtuse

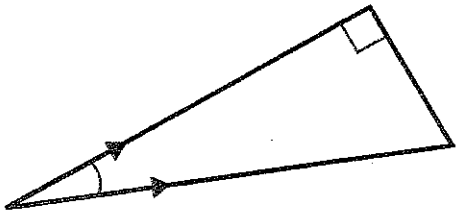
13. Mathematical PRACTICE 6 **Explain to a Friend** Explain how you classified the triangle.

14. Ved noticed that a triangle was formed by the ladder and the wall. Classify the triangle as *acute*, *right*, or *obtuse*.



right

HOT Problems



15. Mathematical PRACTICE 3 **Find the Error** Ben said that the triangle shown is an acute triangle because the angle shown is acute. Find and correct his mistake.

Ben only looked at one angle, One of the angles is 90° So, it is a right triangle.

16. **Building on the Essential Question** Is it possible for a triangle to have two obtuse angles? Explain.

No;

Copyright © The McGraw-Hill Companies, Inc.

Name _____

4.G.1, 4.G.2

Quadrilaterals

Lesson 9

ESSENTIAL QUESTION
How are different ideas about geometry connected?

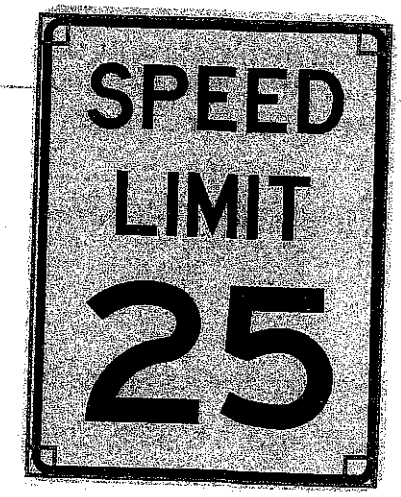
All quadrilaterals have 4 sides and 4 angles.
There are many different kinds of quadrilaterals.

Math in My World

Watch Tutor

Example 1

The speed limit sign represents a quadrilateral. Classify the angles formed by the quadrilateral. Determine if any of the sides are parallel or perpendicular.



1 Classify the angles.

There are 4 right angles,

0 acute angles, and 0 obtuse angles.

2 Determine if there are any parallel or perpendicular sides.

The top and bottom sides are parallel.

The left and right sides are parallel.

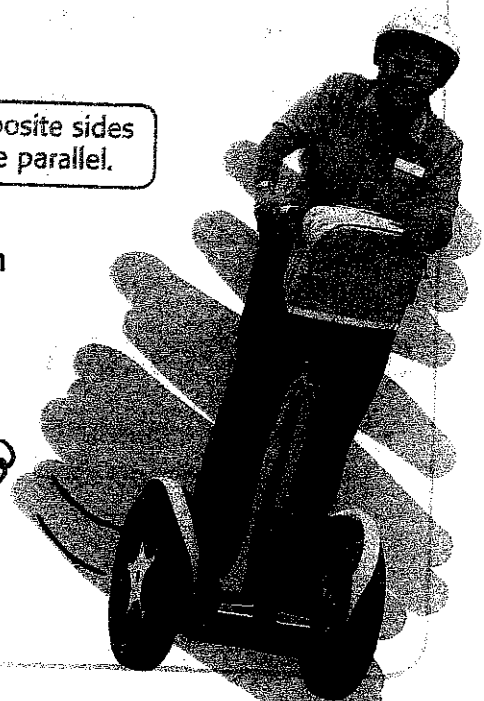
Opposite sides are parallel.

Since there are 4 right angles, the sides that form each right angle are perpendicular.

So, there are 4 pairs of perpendicular sides.

Notice that opposite sides are also equal in length.

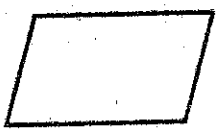
A quadrilateral with 4 right angles, opposite sides equal in length, and opposite sides parallel is a *rectangle*. A rectangle is a special kind of quadrilateral.



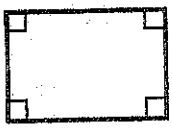
Copyright © The McGraw-Hill Companies, Inc. (t)PNC/Getty Images, (b)Ingram Publishing

Key Concept Quadrilaterals

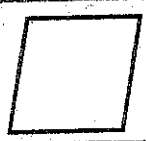
A **parallelogram** has opposite sides equal in length and parallel. In addition, opposite angles have the same size.



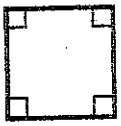
A **rectangle** has opposite sides equal in length and parallel. It has 4 right angles.



A **rhombus** has opposite sides equal in length and parallel. It has 4 equal sides.



A **square** has opposite sides equal in length and parallel. It has 4 right angles and 4 equal sides.



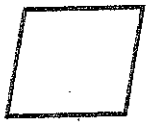
A **trapezoid** has exactly one pair of parallel sides.

A rectangle, a square, and a rhombus each have all of the attributes, or characteristics, of a parallelogram. So, they are also parallelograms.

Example 2

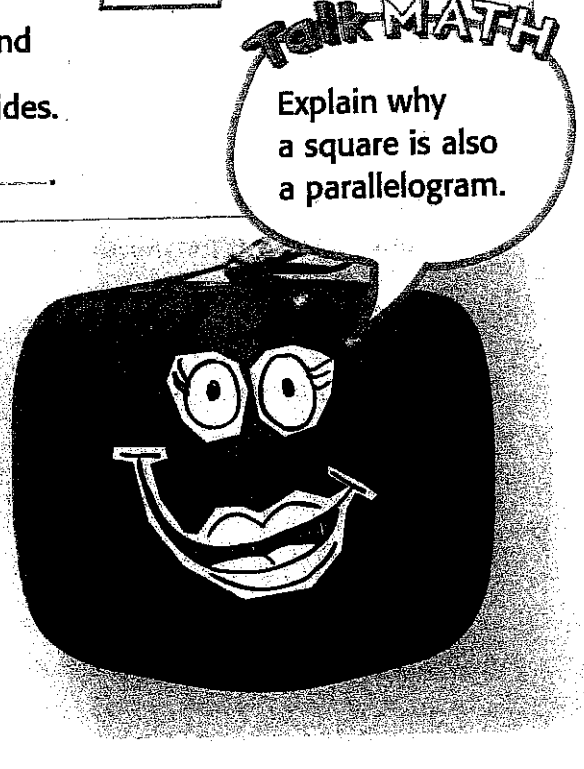
Tutor

Classify the quadrilateral in as many ways as possible.



The quadrilateral has opposite sides equal in length and opposite sides parallel. It also has 4 equal sides.

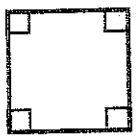
So, it is a parallelogram and a rhombus.



Guided Practice

Check

1. Classify the quadrilateral in as many ways as possible.



It is a parallelogram, a rectangle, a rhombus, and a square.

Copyright © The McGraw-Hill Companies, Inc. Koichi Kamoshida/Stringer/Getty Images News

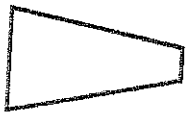
Name _____

Independent Practice

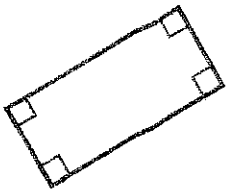
Classify each quadrilateral in as many ways as possible.

2.

parallelogram

3. 

trapezoid

4. 

rectangle and parallelogram

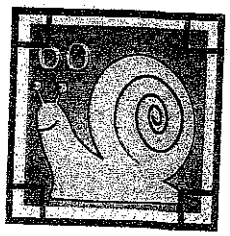
Write the type of quadrilateral that best describes each shape. Choose the most specific term.

5.

rectangle

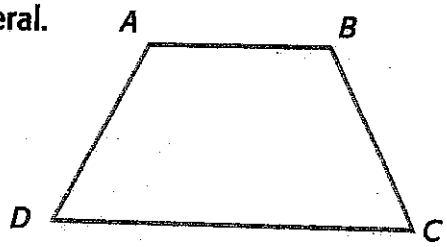
6.

trapezoid

7. 

square

8. Follow the steps to describe the quadrilateral.



The quadrilateral is a trapezoid because it has exactly one pair of parallel sides.

There are 4 vertices. List them below.

Vertices: A, B, C, D

There are 4 line segments. List them below.

Line Segments: $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, $\overline{DA}$

Explain why the figure is not a parallelogram.

Copyright © The McGraw-Hill Companies, Inc.

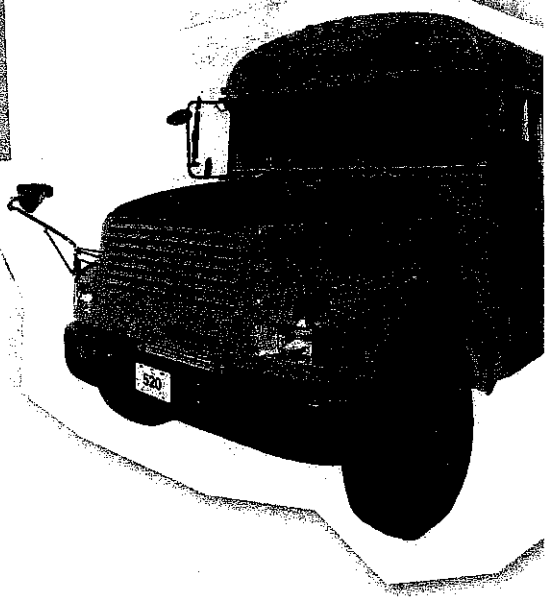
Problem Solving

9. A quadrilateral has opposite sides parallel and 4 right angles. Two sides are longer than the others. What is the quadrilateral?

rectangle

10. Draw four line segments that form a square.

My Work!



11. Mathematical PRACTICE 2 **Reason** How are a square and a rhombus alike? How are they different?

HOT Problems

Mathematical PRACTICE 7 **Identify Structure Tell whether each statement is true or false. If the statement is false, draw an example to show why it is false.**

12. A rhombus is a square. false

13. A rectangle is a parallelogram. true

14. **Building on the Essential Question** How can I classify quadrilaterals?

Copyright © The McGraw-Hill Companies, Inc.
Author's image/PunchStock

Name _____

4.G.3

Draw Lines of Symmetry

Lesson 10

ESSENTIAL QUESTION
How are different ideas about geometry connected?

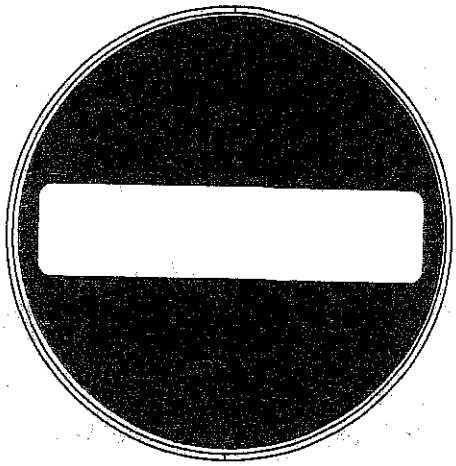
A figure has **line symmetry** if it can be folded over a line so that one half of the figure matches the other half. This fold line is called the **line of symmetry**.

Math in My World

Watch Tutor

Example 1

Determine whether the sign at the right has line symmetry. If it does, draw the line(s) of symmetry on the figure.



1 **Determine if the figure has line symmetry.**
The figure can be folded in half vertically so that the left side matches the right side.

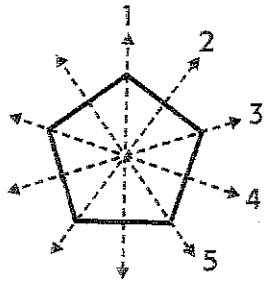
So, the figure has line symmetry.

2 **Draw the line of symmetry.**
Draw a vertical line through the center of the figure.

Some figures have more than one line of symmetry.

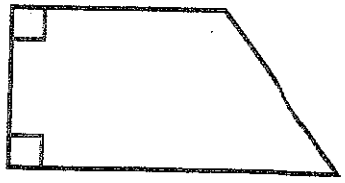
The pentagon at the right has five lines of symmetry.

Notice that the arrow ends that are not labeled are the other ends of the arrows that are labeled.



Some figures do not have any lines of symmetry.

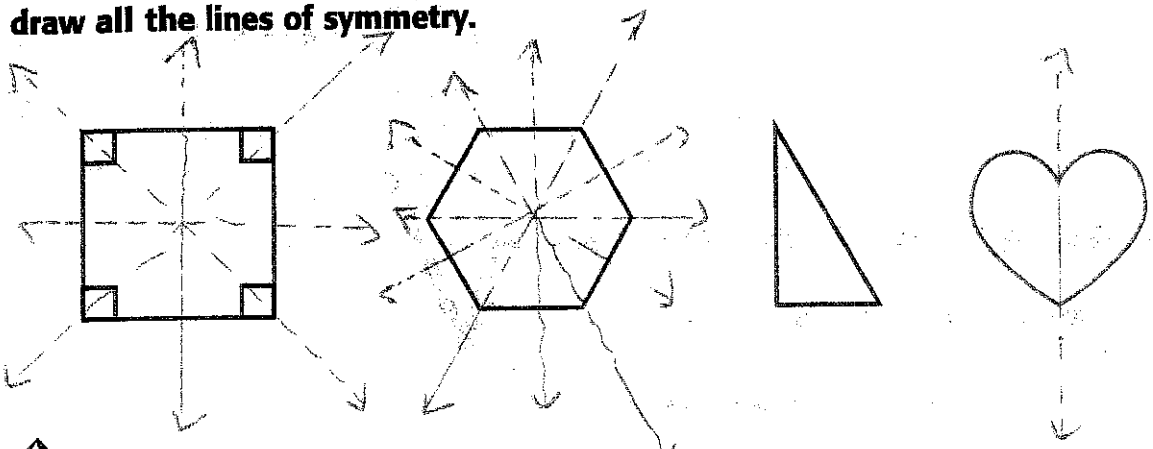
The trapezoid at the right does not have any lines of symmetry.



Copyright © The McGraw-Hill Companies, Inc. Nova Development/Art Explosion

Example 2

Circle the figures that have line symmetry. On those figures, draw all the lines of symmetry.



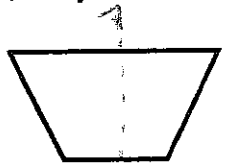
1 Determine which figures have line symmetry. List them.

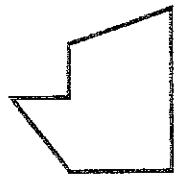
_____

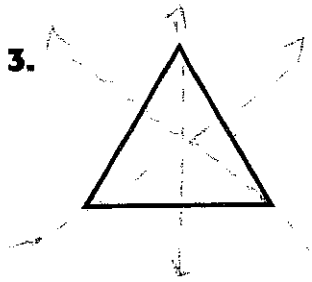
2 Draw the lines of symmetry on those figures.

Guided Practice

Determine whether each figure has line symmetry. If it does, draw the line(s) of symmetry.

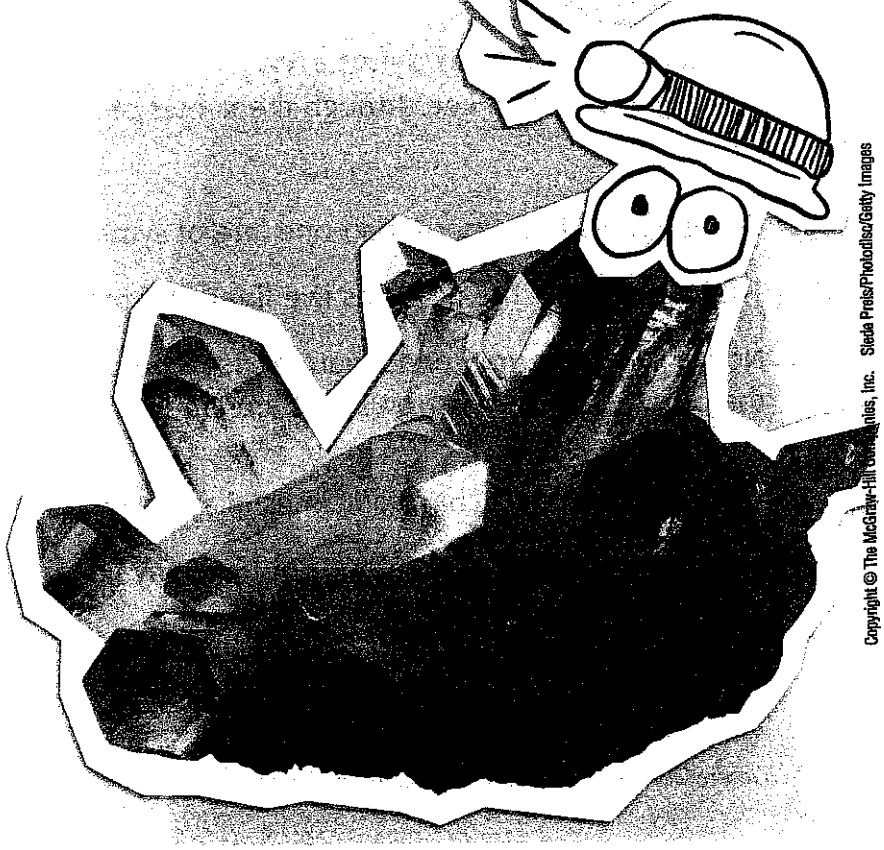
1.  yes

2.  no

3.  yes

Talk MATH

Name one of the capital letters of the alphabet that does not have any line symmetry.

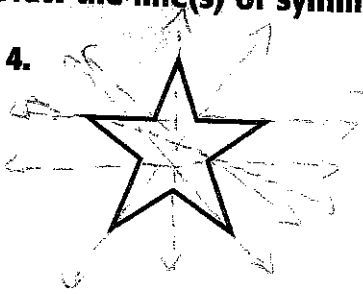


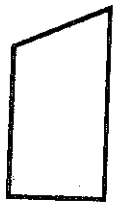
Copyright © The McGraw-Hill Companies, Inc. Sheila Preis/Photodisc/Getty Images

Name _____

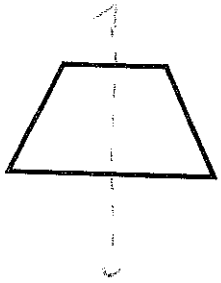
Independent Practice

Determine whether each figure has line symmetry. Write *yes* or *no*. Draw the line(s) of symmetry on the figures that have line symmetry.

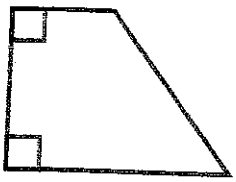
4.  yes

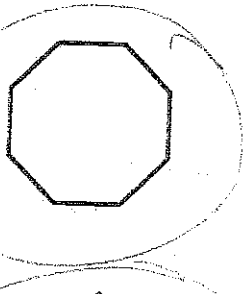
5.  no

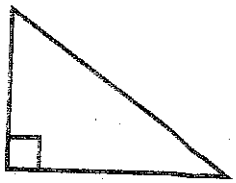
6. no

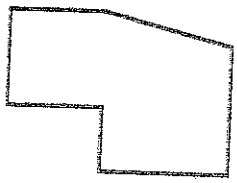
7.  yes

Circle the figures that have line symmetry. Cross out the figures that *do* not have line symmetry.

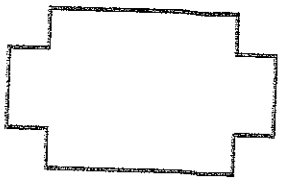
8. 

9. 

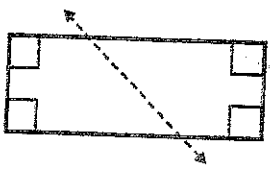
10. 

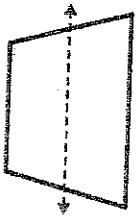
11. 

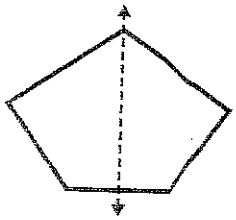
12.

13. 

Determine whether the dotted line is a line of symmetry for each figure. Write *yes* or *no*.

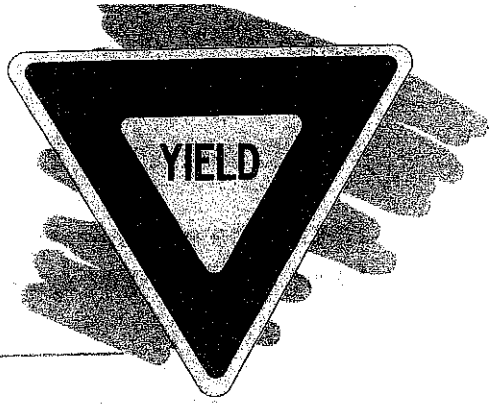
14.  no

15.  no

16.  yes

Copyright © The McGraw-Hill Companies, Inc.

Problem Solving

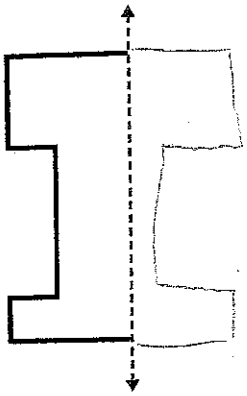


17. Mathematical PRACTICE 2 **Stop and Reflect** Layla saw this sign on her way home from school. Does this sign have line symmetry? Explain.

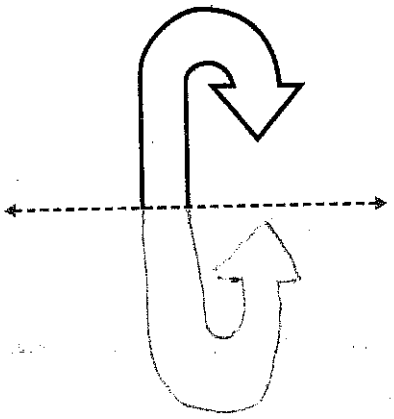
No

Draw the other half of each symmetrical shape.

18.



19.



HOT Problems

20. Mathematical PRACTICE 4 **Model Math** Draw an object that shows line symmetry and an object that does not show line symmetry. Circle the object that shows line symmetry.

My Drawing!

21. **Building on the Essential Question** Name a subject other than math in which symmetry is important. Explain.

Copyright © The McGraw-Hill Companies, Inc. PNC/Getty Images