6th Grade Week 3 Packet

April 13th – April 17th 2020

Parent/Student Work Directions: ELA and Math

- Paquete de la Semana 3 de Sexto Grado

13 de Abril - 17 de Abril

Instrucciones de Trabajo para Padres/Estudiantes: Matemáticas y ELA

Reading/Writing: April 13th-April 17th, 2020 (Unit 5 Lesson 25)

Monday/Lunes:

- Read Vocabulary in Context p. 728-729.
- On separate sheet of paper, write a paragraph answering the Essential Question on p. 733. Read Robotics p. 733-744.
- On p. 749, read and write a reading response.

- Leer vocabulario en contexto p. 728-729.
- En una hoja de papel separada, escriba un párrafo respondiendo la Pregunta esencial en la pág. 733. Leer Robótica, pág. 733-744.
- En P. 749, lee y escribe una respuesta de lectura.

Tuesday/Martes:

- Reread Robotics p. 733-744.
- Read p. 746 Sequence of Events and create a Flow Map to identify sequence of events.
- Write a summary using your Flow Map.

- Volver a leer Robótica p. 733-744.
- Leer p. 746 Secuencia de eventos y cree un mapa de flujo para identificar la secuencia de eventos.
- Escriba un resumen utilizando su Mapa de flujo.

Wednesday/Miercoles:

- Reader's Notebook p. 337, 338, & 438.
- Choose a topic to write a persuasive essay.
- Create a thinking map to organize thinking, then write the persuasive essay.

- Cuaderno del lector p. 337, 338 y 438.
- Elija un tema para escribir un ensayo persuasivo.
- Cree un mapa de pensamiento para organizar el pensamiento, luego escriba el ensayo persuasivo.

Thursday/Jueves:

- This is a catch-up day.
- Students can use the day complete any unfinished assignments and get any questions answered they may have by their teacher.
- You can ask me questions through phone, email or Dojo. Use the rest of your day to “sharpen the saw!”

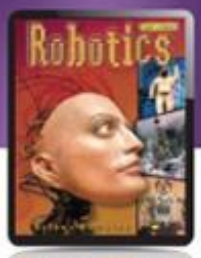
- Este es un día de recuperación.
- Los estudiantes pueden usar el día para completar cualquier tarea no terminada y obtener cualquier pregunta que su maestro pueda responder.
- Puede hacerme preguntas por teléfono, correo electrónico o Dojo. Use el resto de su día para "afilar la sierra".

Friday/Viernes:

- Today's lesson will focus on organizational structure. Using the ATI Galileo pages, read through the Organizational Structure Slides and answer the questions after each slide.
- The beginning of each slide will help you with the questions.
- Complete the Organizational Structure Test questions after going through the slides.

- La lección de hoy se centrará en la estructura organizativa. Usando las páginas de ATI Galileo, lea las Diapositivas de la Estructura Organizacional y responda las preguntas después de cada diapositiva.
- El comienzo de cada diapositiva lo ayudará con las preguntas.
- Complete las preguntas de la Prueba de Estructura Organizacional después de pasar por las diapositivas.

Lesson 25



TARGET VOCABULARY

artificial
interaction
sensors
data
ultimate
domestic
uncanny
stimulus
literally
inaccessible

Vocabulary Reader

Context Cards

COMMON CORE L6.6 acquire and use general academic and domain-specific words and phrases/gather vocabulary knowledge for comprehension or expression

Vocabulary in Context

1 artificial

A robot does not have a real brain. Its intelligence is artificial, created by humans.

2 interaction

A controller allows the interaction between a player and video game. The game and the player act on each other.

3 sensors

Sensors in devices detect information. If a camera's sensor doesn't detect enough light, it activates a flash.

4 data

A computer can sort through long lists of data, or information, often by converting it into ones and zeros.

Go Digital

- Study each Context Card.
- Tell a story about two or more pictures, using Vocabulary words of your choice.

5 ultimate

The "last word" in technology is always replaced by a model that is the *new* ultimate version.

6 domestic

A robot might be programmed to wash dishes or do other domestic chores around the house.

7 uncanny

In science fiction books and movies, robots often have uncanny, or strange, powers.

8 stimulus

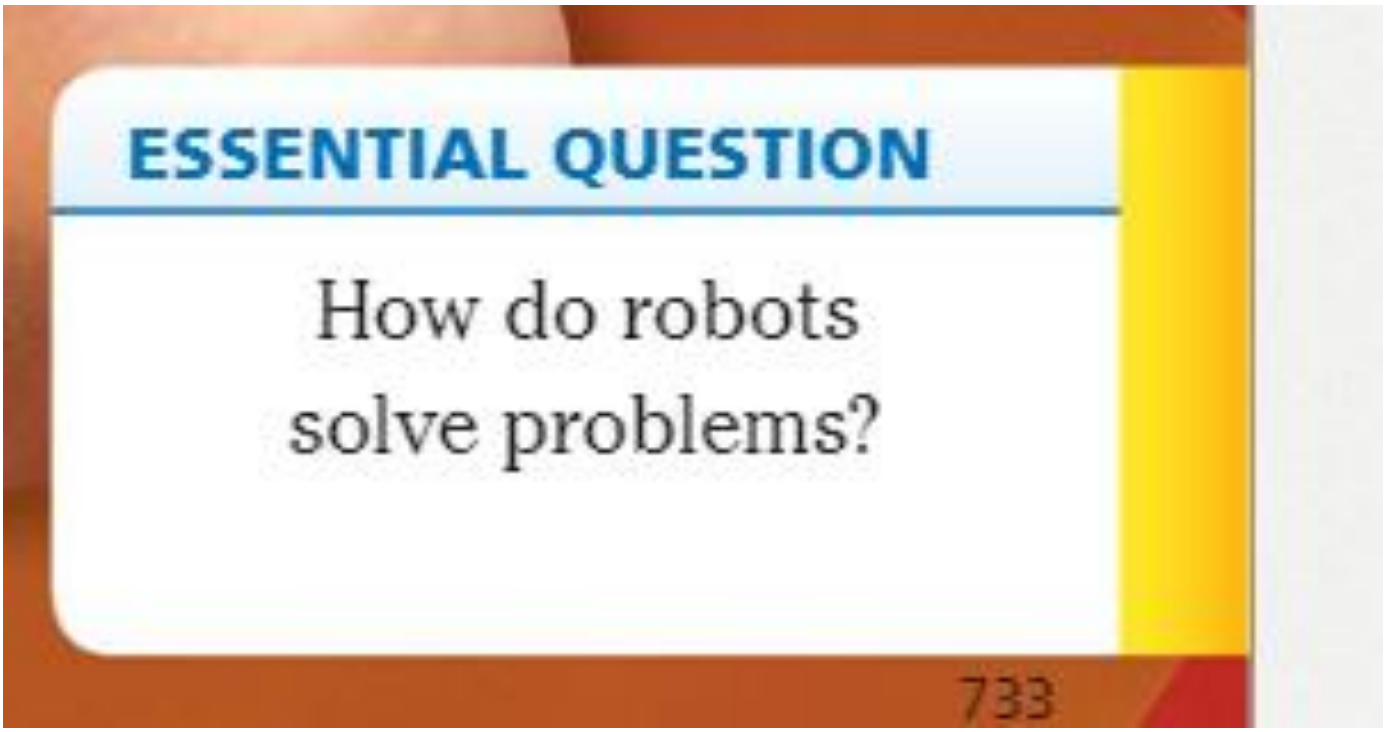
In this robot's motion detector, movement is the stimulus that causes its lights to turn on.

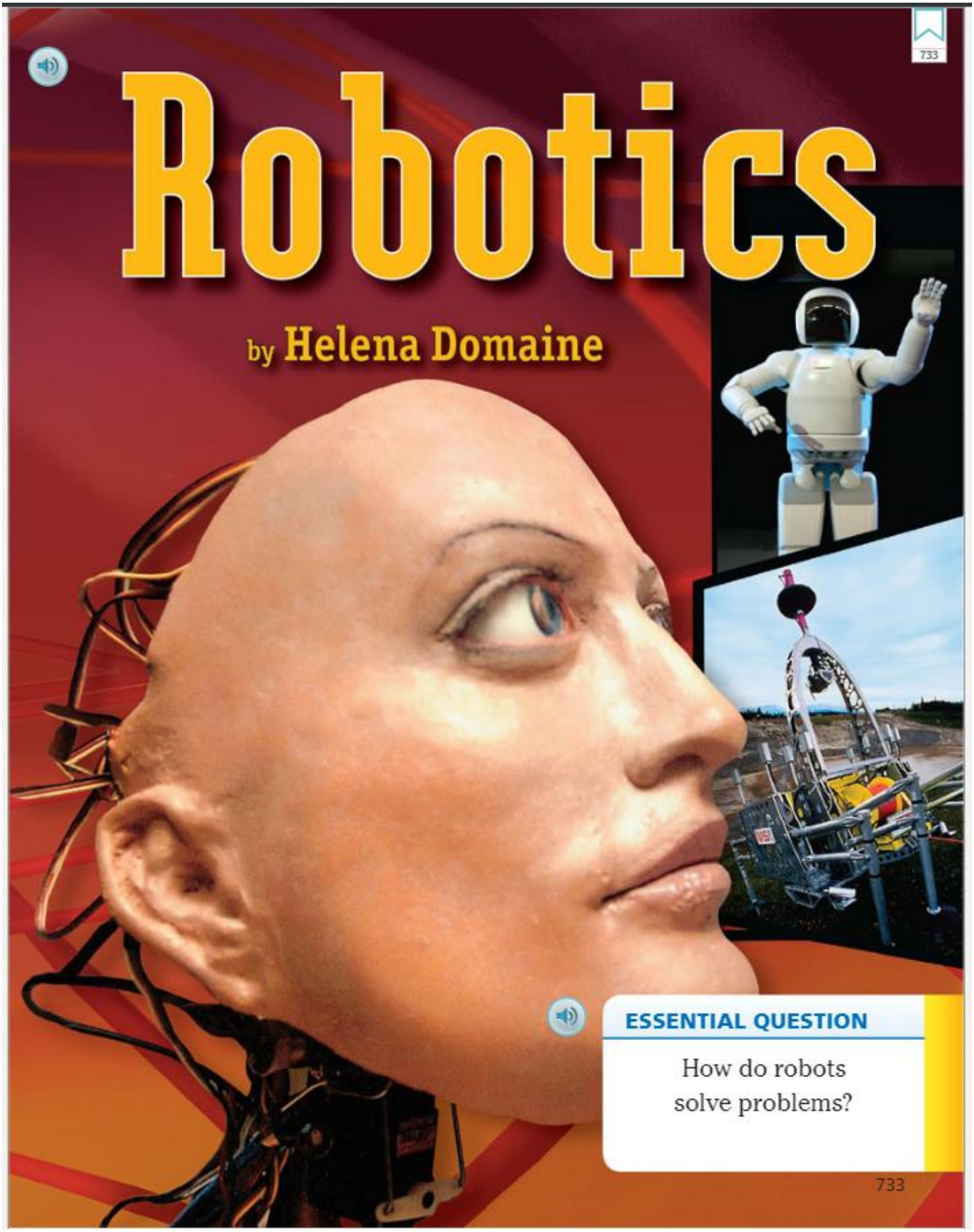
9 literally

If a robot took the command "Make the bed" literally, or word for word, it might begin by sawing wood for a frame.

10 inaccessible

A robot can dive to an ocean depth that is inaccessible to people. Scuba divers could not go there.


ESSENTIAL QUESTION
How do robots solve problems?
733


733
Robotics
by Helena Domaine
ESSENTIAL QUESTION
How do robots solve problems?
733

Working Robots

There are a lot of places we'd like to go but can't. Dangerous places. Distant places. Inaccessible places. We can explore these places by sending in robots. These mechanical adventurers have computer brains that don't feel fear or panic. Killer levels of radioactivity? No problem. The black, airless vacuum of space? The crushing pressure of tons of ocean water? Tiny paths through ancient rock? Bring it on, say these brave new robots.

Andros 5, for example, handles live bombs for the Baltimore (Maryland) Police Department. Rosie was built by a team at Carnegie Mellon University in Pennsylvania. It can safely roll into highly contaminated nuclear facilities and wash them down or take them apart. Houdini might be considered Rosie's baby brother. This robot can enter hazardous waste storage tanks to clean them.

You Want Me to Go Where?

In 1994, the National Aeronautics and Space Administration (NASA) teamed up with scientists at Carnegie Mellon University and the Alaska Volcano Observatory. They sent a robot to explore an active volcano. Scientists explore volcanoes to learn how they work and how to read the warning signs of a volcanic eruption. An eight-legged robot named Dante II climbed down into Alaska's Mount Spurr, 90 miles (145 km) west of Anchorage. Dante's job was to explore the crater floor and take gas and soil samples. It was something that no human could have done.

Dante's designers knew the descent would be very tricky. The north wall of the volcano has a 1,000-foot (305-meter) drop. The south wall is steep and covered with rocks. Designers gave Dante servomotors, mechanisms that help Dante's main computer. The servomotors allow Dante to raise and lower each leg as the robot climbs over rocky surfaces. Dante's footpads and legs also have sensors. The sensors keep it from crashing into rocks or falling into holes.

Dante II makes its way beside a river in Alaska.

But even with all this technology, nobody trusted Dante to make its own decisions. Dante was connected to its human team by satellite and the Internet. Its main computer analyzed every step before it allowed the robot to go forward. Eventually Dante reached the floor of the crater, safe and sound.

As Dante gathered samples, the robot's cameras sent a three-dimensional view to the computer screens in front of the scientists at the volcano's rim. And thanks to something called Virtual Environment Vehicle Interface software, the scientists felt as if they were right there in the volcano with Dante.

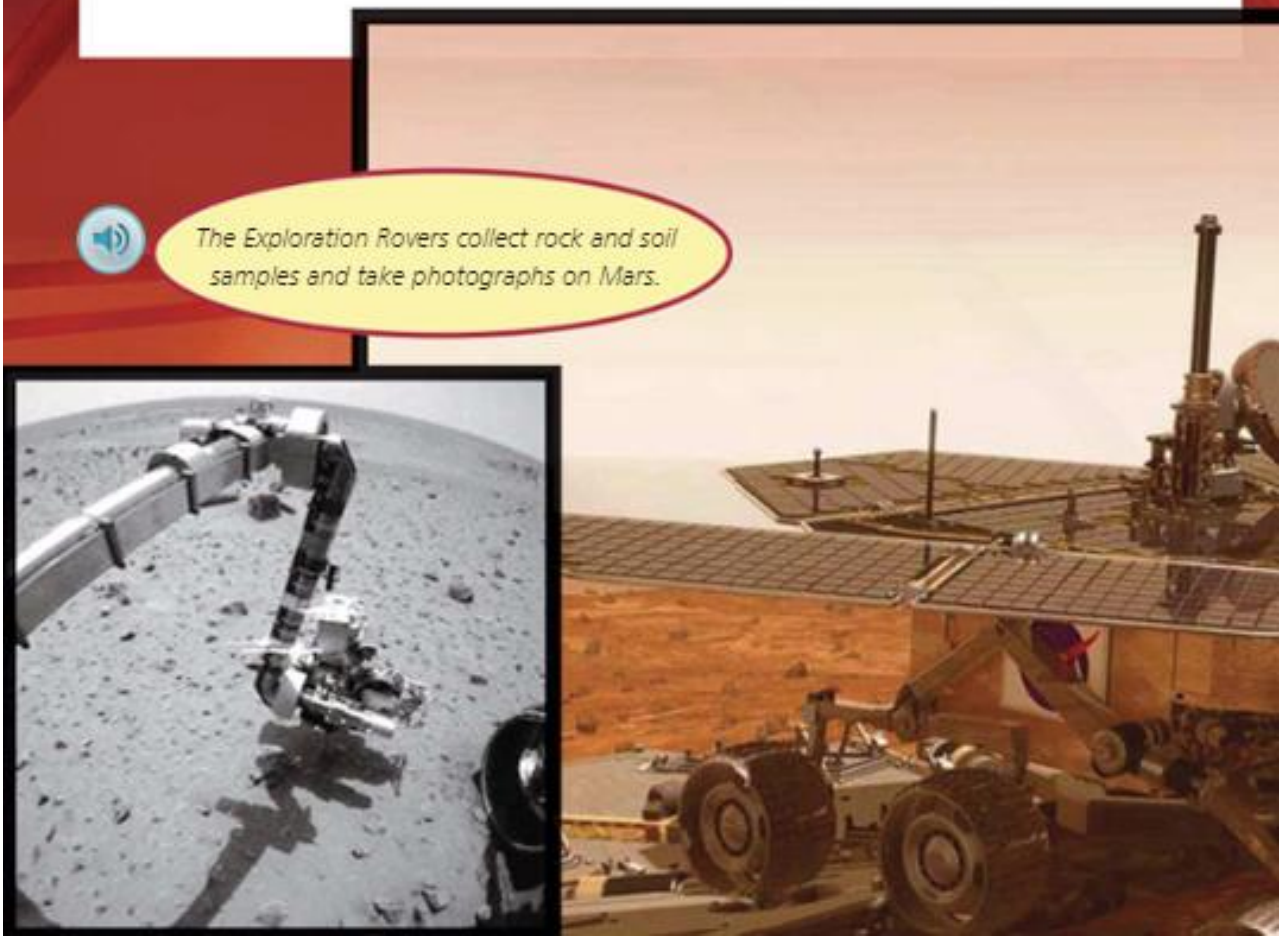
But a near-perfect robotic adventure ended in a way familiar to anyone who's ever climbed a steep hill. Dante slipped in some loose dirt on the way out of the volcano and could not climb out. The science team had to call in a helicopter to rescue the robot.

ANALYZE THE TEXT

Sequence of Events What steps does the author describe in Dante's adventure? How does this section provide clues about what you will learn in the overall selection?

Unfortunately, no one can fly to Mars to save robots that get into trouble. NASA landed twin Rover robots, Spirit and Opportunity, on Mars in 2004. The robots were sent to explore the planet, collect soil and rock samples, and take pictures. Spirit and Opportunity are all alone on the red planet. They are millions of miles from Earth. And Mars is a far more hostile place than the inside of a volcano. Mars is very cold, averaging −67°F (−55°C). Its strong winds whip red dust across the rocky surface of the planet.

The Rovers' connection to NASA is tricky, too. Communications between the robots and NASA scientists are sent through millions of miles of space. The information travels via computer connections to orbiting spacecraft and antennas on Earth. As the Rovers roll across Mars, any helpful messages from their human teammates on Earth are delayed by several minutes. So the Rovers are designed to make many of their own choices. They are given jobs, but it is up to them to figure out how to get them done. The Rovers also have a "survival instinct" programmed into them. It helps them adapt to unexpected situations.



The Exploration Rovers collect rock and soil samples and take photographs on Mars.

The Incredible Shrinking Bot

Scientists at the California Institute of Technology are working on the designs for a tiny snake-bot to travel through the human gastrointestinal system (the stomach and intestines). As a doctor looks down a patient's throat for swelling or other signs of illness, the snake-bot would look at a patient's insides. A camera and sensors would help the snake-bot gather medical information for doctors. The snake-bot's information would help doctors diagnose disease. It may even help in therapy.

Miniature robots from New Mexico's Sandia Laboratory also explore tight spots.

But without question, the tiniest and most daring medical robots are being designed in Sweden. The Swedish micro-bots are smaller than the hyphen between *micro* and *bots* in this sentence. The micro-bots are made of silicon. The silicon is coated in gold and then covered in polymer (a plastic compound) that can shrink or swell. This allows the pieces of the robot to bend so it can pick things up and move them around.

The Swedish micro-bots are designed to operate in all kinds of fluids. The research team imagines a time in the near future when the micro-bots can be injected into the human bloodstream. Doctors hope the micro-bots will be able to clean up the plaque that causes heart attacks and break through the blood clots that cause strokes. The micro-bots could also remove bacteria. One day they may even fix disease-causing cells.

In the old sci-fi movie *Fantastic Voyage,* five scientists and their submarine, the *Proteus,* were shrunk to microscopic size. They were injected into the bloodstream of a fellow scientist. Their mission was to reach a blood clot in their friend's brain and save his life. What Hollywood imagined as movie fantasy in 1966 is becoming science fact.

Sandia researcher Doug Adkins designed the miniature robots to work in swarms, like insects. They communicate with each other and with a central station.

Artsy Robots

The Sony Corporation's QRIO robot took center stage—literally—in March 2004, when it conducted the Tokyo (Japan) Philharmonic Orchestra. QRIO can perform many tasks. But Sony, a Japanese electronics company, wanted to show off the robot's ability to control its motions. QRIO held a conductor's baton and led the human musicians through Beethoven's Symphony No. 5. Japanese automaker Toyota has also proudly produced a musical robot. The Toyota robot can play "When You Wish Upon a Star" on a trumpet. Toyota says it hopes to soon have an entire robot band ready to belt out tunes.

QRIO was designed to test controlled robotic movement.

Who's Got the Ball?

Robots aren't all work and no play. On May 4, 2003, robots from around the world played soccer in the International RoboCup Federation's American Open. The event was held at Carnegie Mellon University. Hiroaki Kitano established RoboCup in 1997. He hoped that it would lead to the development of robotic soccer players good enough to play against human athletes.

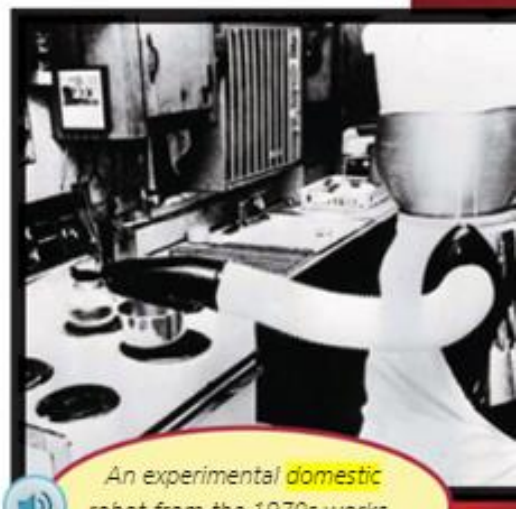
That first 1997 tournament was a little chaotic. The robots had a tough time finding the ball. They struggled to recognize their teammates and figure out which goal they were supposed to aim for. As engineers improved the robots' vision systems, play improved. By the 2001 games, the 8-inch (20-cm)-tall, wheeled robots in the Small League were doing better. They played two ten-minute halves on a field the size of a Ping-Pong table. Their soccer ball was an orange golf ball.

The Sony Corporation sends its Aibo team to the Open. Most RoboCup players are two-legged, but the Aibos are little robotic dogs. The Aibos kick the ball by getting down on their elbows. This position allows them to use both front paws. Play is slow and a bit goofy. The Aibos are, after all, still amateurs.

Aibos, robotic dogs, compete in a RoboCup soccer game.

Thinking Robots

Bertram, your robot butler, rolls into the living room and says in a flat voice, "Dinner is served." You're slouched down in a corner of the couch. "I'm not hungry, thanks," you answer. Your parents or friends might ask if you feel all right, or if there's anything they can get you. But Bertram has no reaction. He simply rolls back into the kitchen without a word and puts away the uneaten dinner. Bertram has understood your reply, but he can't respond to your tone of voice or your body language. And most people, Allison Bruce discovered, really don't like that about robots.

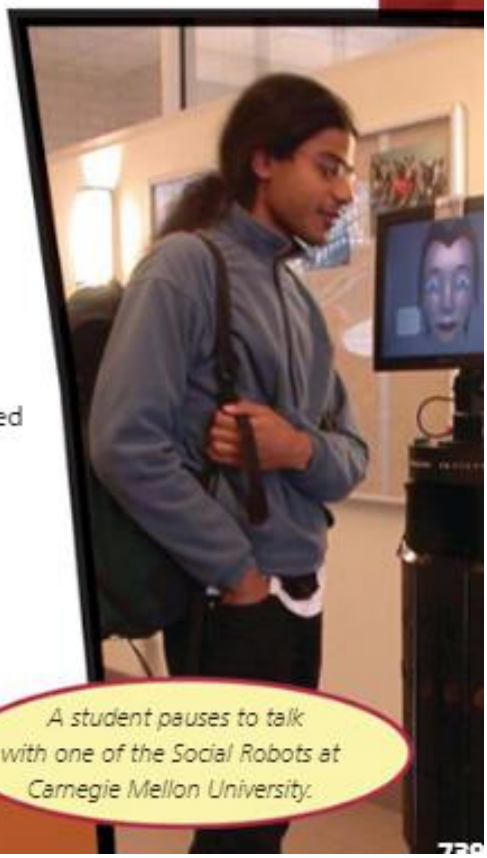


An experimental domestic robot from the 1970s works in the kitchen.

Bruce is a researcher at the Robotics Institute at Carnegie Mellon University. Bruce is part of the institute's Social Robot program. The program studies ways to improve interaction between humans and robots. In Bruce's experiment, a laptop computer was attached to a robot. The robot stood in the hall of a college classroom building and asked passing students a question. Sometimes the laptop screen would be blank, but sometimes it showed a face with a range of expressions.

Bruce was not really interested in the students' answers to the questions. What she was interested in was the students' willingness to stop and talk to the robot. She found that more students responded to the robot when it had a face.

Like Bruce, others who work with robots have realized that humans prefer robots they can relate to. They have developed robots that can show human emotions, such as anger, happiness, embarrassment, and sadness.



A student pauses to talk with one of the Social Robots at Carnegie Mellon University.

I Feel, Therefore I Am

Kismet the robot was designed and built by Cynthia Breazeal, a researcher at the Massachusetts Institute of Technology's (MIT's) Artificial Intelligence Laboratory. The lab is home to many kinds of interesting robots. But Kismet is not like the others. This robot can display emotion. Kismet's lips can pout or smile. His eyebrows can arch, and his ears can wiggle. A combination of clever computer programming and sophisticated engineering has given Kismet the ability to actually respond to a stimulus in an emotionally recognizable way.

If you say words of praise to Kismet, he will smile. Bright colors also earn a smile. So does his own reflection in a mirror. But raise your voice and scold Kismet, and his lips will sink into a frown. And when Kismet becomes overstimulated by too much noise or movement, he will withdraw, lowering his eyes and taking a kind of robotic time-out.

Kismet is lovable not just because of his blue golf-ball-sized eyes. Kismet interacts with people and shows he has "understood" them through his facial expressions. His success in relating to people may be reflected in the fact that everyone refers to Kismet as "he" instead of "it."

Heads Will Roll!

His name is David Hanson. In 2003 he showed up at a science conference in Denver, Colorado, carrying a head. The head was backless and bald and bolted to a piece of wood. But it was still pretty. It had high cheekbones, blue eyes, and smooth rubber polymer skin. Hanson set the head down on a table. He plugged it into his laptop computer and tapped a few keys. Everyone stopped to watch what would happen.

Moments later, the head began to move, turning right and left. It smiled, sneered, and frowned. Hanson, a robot scientist at the University of Texas at Dallas, called the head K-bot. K-bot can mimic the major muscles in a human face. It has 24 servomotors under its specially developed skin. Digital cameras in its eyes watch the people who are curiously studying it, and software helps it to imitate what it sees.

Hanson has built several robotic heads, but he isn't the only one. In Tokyo, Hiroshi Kobayashi's face robots, as he calls them, are also eerily lifelike. So is the head sitting in Fumio Hara's robotics lab at the Science University of Tokyo. Hara's robotic head can scan the face of the person standing in front of it. Then it can compare the face to those in its memory bank. Once the robot identifies which of six emotions the person is expressing, tiny machines under the robot's skin remold its face to mimic what it sees.

Fumio Hara poses with a skeleton of one of his face robots. The face robot's network of wires and pulleys is covered with a flexible skin.

For Hara, heads are just the beginning. His goal is to design a robot that is interactive, friendly, and most of all, familiar. But do we really want a robot that looks just like us? Maybe not.

In the late 1970s, Japanese robot engineer Masahiro Mori did some fascinating research on how human beings interact with robots. Mori discovered that people like friendly-looking mechanical robots. But Mori found that when robots look too much like humans, people stop liking them. Mori called this sudden shift the Uncanny Valley, the place where people begin to feel uncomfortable with humanlike robots.

Experience Is the Best Teacher

Engineers have begun building robots that can adapt to their environment. They operate on what are called patterns of behavior.

Most of these robots are quite small and behave a lot like insects. Insects don't really think. They rely on their senses and instincts to find food and survive. Like insects, the little insect-bots have been equipped for sensing their physical environment. But they have not been preprogrammed with any data about their environment. So when they are first turned on, they're brainless.

But the insect-bots' computers are programmed with separate "layers of behavior." The behavior layers help an insect-bot learn about its environment. The more it learns, the more it can do. Once the insect-bot has mastered one layer of behavior, the next higher layer of behavior kicks in. With each layer, the insect-bot gets better at dealing with the world around it.

At MIT, James McLurkin has built robot ants using these layers of behavior. But McLurkin's ant-bots are even more amazing because they are able to signal each other when they find ant-bot "food." In other words, the ant-bots learn how to work together to achieve a shared goal. The ultimate ant-bot, however, is yet to come—one that can communicate with real ants.

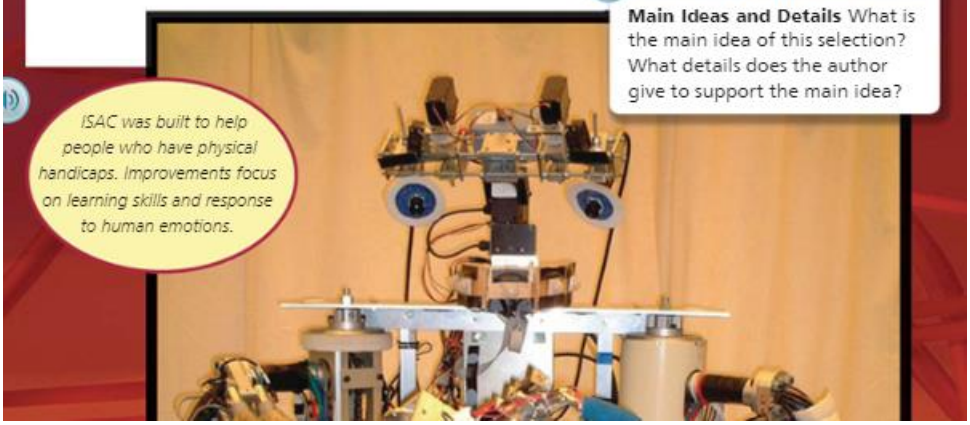
A robotic ladybug, developed by Sanyo Electric Company, sits on a leaf.

"I believe," says Hans Moravec, a research professor at Carnegie Mellon, "that robots with human intelligence will be common during the next 50 years." Certainly, the Center for Intelligent Systems (CIS) at Vanderbilt University in Tennessee shows how close we are getting. The CIS has developed a robot called ISAC (for Intelligent Soft Arm Control). ISAC can express emotion and has both short-term and long-term memory. And because this robot's brain has been designed to "think" much like ours, ISAC may soon actually be able to dream.

It seems almost certain that in the future we will share our planet with robots. What we build in the lab will have the potential to become as smart as we are. It may even improve upon its own technology. Will we love these robots or fear them? Time will tell.

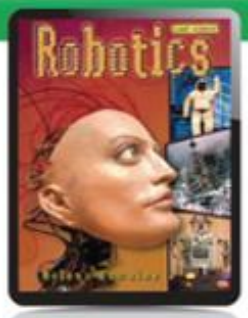
ANALYZE THE TEXT

Main Ideas and Details What is the main idea of this selection? What details does the author give to support the main idea?

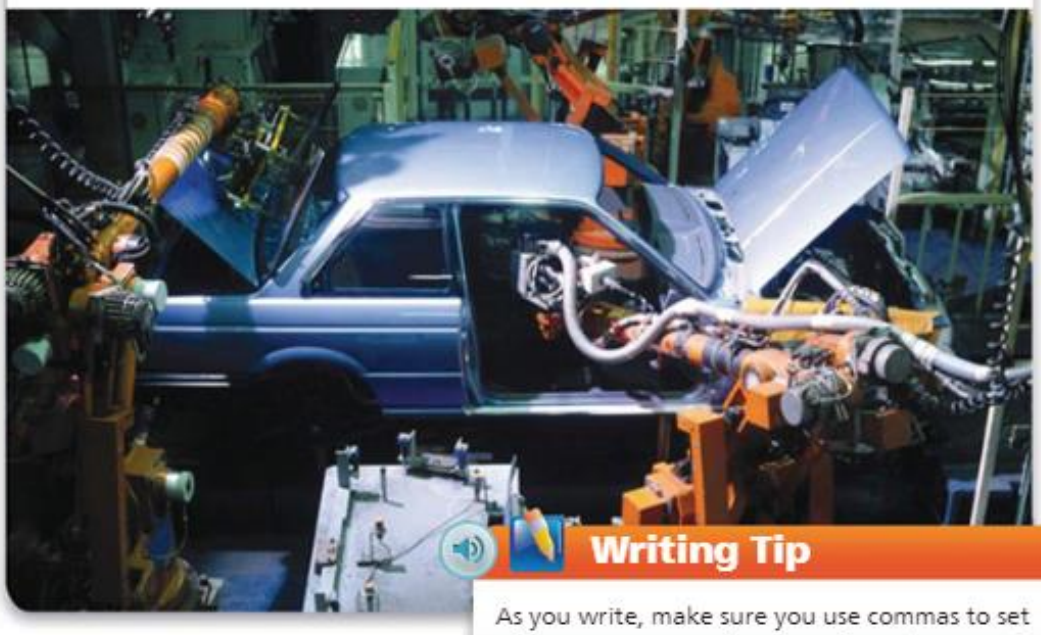


ISAC was built to help people who have physical handicaps. Improvements focus on learning skills and response to human emotions.

WRITE ABOUT READING



Response Do you think the current widespread use of robots to do work for people is a change for the better? Why or why not? Write a paragraph that presents and explains your argument. Introduce the paragraph with your claim, and use your own knowledge as well as text evidence to support it. End with a conclusion that summarizes your opinion.



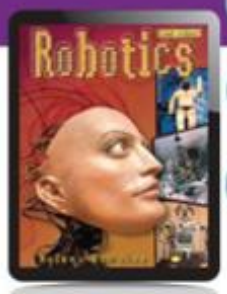
Writing Tip

As you write, make sure you use commas to set off nonrestrictive information from the rest of a sentence. Use dashes or parentheses to set off parenthetical information.

Go Digital

COMMON CORE

RI.6.1 cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn; **W.6.1a** introduce claim(s) and organize reasons and evidence clearly; **W.6.9b** apply grade 6 Reading standards to literary nonfiction; **SL.6.1c** pose and respond to questions and make comments that contribute to the discussion; **L.6.2a** use punctuation to set off nonrestrictive/parenthetical elements; **L.6.4c** consult reference materials, both print and digital, to find pronunciation and determine or clarify meaning or part of speech



Dig Deeper

How to Analyze the Text

Use these pages to learn about Sequence of Events, Domain-Specific Vocabulary, and Main Ideas and Details. Then read "Robotics" again to apply what you learned.

Sequence of Events

Authors of informational texts such as "Robotics" often use **sequence,** or time order, to organize information about a topic. Dates and signal words such as *first, after, next,* and *finally* help readers figure out the order in which events occur. Paying attention to the overall sequence of events allows you to figure out where a single event or a group of events fits within the sequence.

Look back at page 738 in "Robotics." The author explains the sequence of events in the RoboCup Open, which began in 1997. What happened from 1997 to 2003 that shows how the robots' soccer competition changed and improved through the years?

COMMON CORE RI.6.2 determine a central idea of a text/provide a summary; RI.6.4 determine the meaning of words and phrases, including figurative, connotative, and technical meanings; RI.6.5 analyze how a sentence, paragraph, chapter, or section fits in the overall structure; L.6.6 acquire and use general academic and domain-specific words and phrases/gather vocabulary knowledge for comprehension or expression

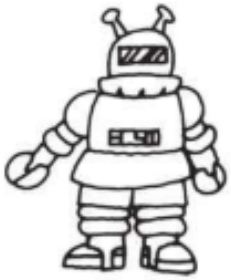
Go Digital

Name _____ Date _____

Robotics
Independent Reading

Reader's Guide

Robotics



Think Like an Engineer

Find evidence to show what engineering challenges each robot has overcome and what it has contributed to the field of engineering.

Reread the third paragraph on page 734 and all of page 735.

Robot:	
What challenges did the robot face? How did it overcome them?	What has it contributed to the field of robotics?

Reread page 736.

Robots:	
What challenges did the robots face? How did they overcome these challenges?	What have they contributed to the field of robotics?

Name _____ Date _____

Reread the second and third paragraphs on page 737.

Robots:	
What challenges did the robots face? How did they overcome these challenges?	What have they contributed to the field of robotics?

Read the second and third paragraphs on page 743.

Robot:	
What challenges did the robot face? How did it overcome them?	What has it contributed to the field of robotics?

Think about the advances made by each of these robots. What do you think they tell us about the future of robotics?

Name _____ Date _____

Robotics
Writing: Argument

Focus Trait: Word Choice

Using Persuasive Language

Statement	More Persuasive Statement
People are afraid that robots may be too smart and a threat to humanity.	People have imagined the possibility of highly intelligent robots taking over the human race. This fear has been expressed in countless books and films, from science fiction novels to action movies.

Fill in the blanks with words that are more persuasive than the examples on the left. Choose words that are confident, positive, and convincing.

Instead of this...	you can write this.
1. Modern technology can do things that help some people.	Modern technology can _____ that help_____ people.
2. Fooling around with robots has probably had many big results.	_____ robots has _____ _____ results.

Rewrite each sentence to make it more persuasive. Change or add persuasive language, and eliminate words that are vague or sound uncertain.

3. Robots might help doctors take care of people.

_____

_____

4. People will usually like a robot more if it looks like it has expressions.

_____

_____

5. A few people are putting together robots that are actually really small.

_____

_____

Organizational Structure

Slide 1

What you will learn...

This dialog discusses the different ways authors organize their texts, and how you can use this information to better locate the information you need.

Slide 2

Key Words

organization:
how a text is arranged
the order in which points are discussed in a text

structure:
the pattern of a text

comparison/contrast organizational structure:
a text discusses the similarities and/or differences between two or more things

chronological order organizational structure:
a text tells about events from the first thing to the last thing that happens

cause and effect organizational structure:
a text discusses how events are related through cause and effect

classification schemes organizational structure:
a text discusses something by dividing it into different parts

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Organizational Structure

Slide 3

Why does organization matter?

People usually think logically.

Our brains are designed to make sense of what we read.

Understanding the structure of a text can help you make sense of the information.

It can help you remember important points.

Authors organize texts in order to make the information as clear as possible.

Slide 4

Organizational Structure

Comparison-Contrast

A text with a comparison-contrast structure will focus on describing the similarities, differences, or both, of at least two things.

—An author may want to prove that one thing is better than another.
—An author may use one thing to help you understand another.
—An author may just want to show how things are the same or different.

CLUES:
vocabulary—*in comparison, in contrast, on the other hand*

For a comparison-contrast text, you will probably be able to make a chart similar to the one below. The things that are compared are listed at the top (Mom, Dad). The WAYS they are compared are listed below (where they work, what they look like, how they help).

Mom	Dad
-works at home	-works at the office
-tall, blonde	-tall, dark hair
-tells good stories	-shows me how to do things

Here's an example of a text with comparison-contrast structure. Can you find any vocabulary clues? Can you make a chart for this text?

"A Guide to Some Desserts"

Summer is a great time to eat some frozen desserts. Here is a guide to some of the most popular ones around.

"**Ice cream**" is a mixture of milk products (like cream or milk), sweetening agents (like sugar or artificial sweeteners), and the other good stuff thrown in (like chocolate chips, strawberries, etc.)

"**Ice milk**" is ice cream with less milk fats and solids. It is often made with non-fat milk. It is usually lower in calories, but has a less creamy texture.

"**Frozen yogurt**" is really just that—yogurt that is frozen and mixed up to a consistency like ice cream. While regular yogurt has some healthy bacteria in it, the freezing kills this off. In the end, frozen yogurt may or may not be healthier; you should check individual ingredient labels to find out.

"**Sherbets**" (SHER-bihts) are much like sorbets. So much, in fact, that many places do not distinguish between the two. Sherbets contain water and fruit juice or other sweetened liquids. They also usually contain milk, gelatin or egg whites.

In contrast, a "**sorbet**" (sor-BAY) never contains milk and typically has a softer consistency than a sherbet. And it is more fun to pronounce.

The last name you'll likely run into is an "**ice**," also known as a granite or granita. It has a more granular

texture and is made from a mixture of water, sugar and flavorings (such as fruit). While freezing, an ice is stirred frequently, which produces the different texture.

Finally, if you run into the word "**gelato**," think of it as a heavier Italian version of ice cream.

Slide 5

Chronological Order

A text with chronological order will tell you about something in the order that events happened.

—An author may tell you about someone's life.
—An author may tell you about the history of something.

CLUES:
vocabulary—*first, next, finally*, etc.

For a text written in chronological order, you will probably be able to make a timeline of important points.

"The Life of a Poet"

1925	born
1942	publishes first poem
1945	publishes first book of poetry
1950	wins prize for book of poetry
1961	begins teaching at university
1988	dies

Here's an example of a text with chronological order. Can you find the vocabulary clues? Can you make a timeline of important points?

"How Do Astronauts Eat?"

The United States has been sending astronauts into space for nearly 50 years. Life in space is made of the same basic events as life on earth—astronauts work, talk, sleep, wash, and have fun. However, astronauts in space live without gravity. Can you imagine trying to eat without gravity? How would you keep your food from floating away? Read on to discover how the National Aeronautics and Space Administration (NASA) has worked to solve the problem of eating in space over the years.

The first American to orbit the Earth was John Glenn. His 1962 mission lasted only five hours, not enough time to have to eat. However, Glenn did attempt eating in space to help NASA design future food systems for use in space. Many were worried that the lack of gravity would make food hard to swallow. Glenn discovered that this wasn't the case. However, he did notice that it was difficult to keep food crumbs from dirtying and possibly interfering with important spacecraft instruments. Thus, the astronauts in the years immediately following Glenn's mission were limited to bite-sized food chunks. Any liquids that they had were squeezed out of something resembling toothpaste tubes.

During the 1960s and 1970s, NASA worked to improve the space food system. For the first time, astronauts had heated and chilled water. Foods didn't all have to be room temperature anymore. Hot water made it easier to rehydrate food and improved its taste. NASA engineers also developed a sort of dining room table in spacecraft. The astronauts "sat" in air and were kept in place with foot and thigh

restraints; the food trays were mounted to a pedestal. During this time, NASA also developed collapsible "bottles" so that astronauts no longer had to squeeze liquids from tubes.

With the beginning of the Space Shuttle program in the 1980s, it became vital to improve the food and methods of eating and drinking in space since astronauts could spend 30 days aboard. The new food system included hot and cold water dispensers, a pantry, and an oven. Astronauts are able to choose meals in advance, though meals are repeated about every week. In addition, the space shuttle includes individual-sized packets of mustard, ketchup, mayonnaise, and hot sauce for seasoning. The space food system has improved drastically since its beginning days of tubes and bite-sized, dehydrated foods. As space missions become longer, the program will undoubtedly make new advances.

Slide 6

Organizational Structure

Cause-Effect

A text with cause-effect structure will focus on how one thing causes another, or on the effects of a certain event.

—An author may want to explain the positive or negative effects of something in order to convince the readers to do something.
—An author may want to explain the causes of something.
—An author may want to show a chain of events.

CLUES:
vocabulary—*this causes..., the effects are..., if...then*
For a cause-effect text, you will probably be able to use one of the diagrams at the bottom of the page.

Here is an example of a text with cause-effect structure. Can you find the vocabulary clues? Can you make a diagram?

"Lying: A Dangerous Choice"

You may have read Aesop's tale about the boy who cried wolf. In this fable, a lonely boy keeps shouting that a wolf is hurting his sheep when there is no wolf at all. At first, the villagers run out to protect the boy and his sheep, but over time they grow weary of his lies. Finally, a wolf does attack his flock of sheep, and the boy cries, "Wolf! Wolf!" but no one responds. Have you ever known anyone like the boy who cried wolf? Have you ever been like this boy? Lying is so common that it seems everyone does it, but not telling the truth can get you in serious trouble.

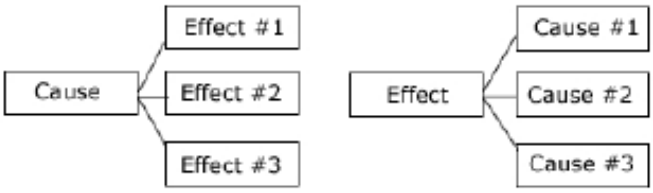
First of all, lies lead to more lies. Imagine that you told your classmates that your family was going to visit Australia over the summer. You did this even though you knew that you would actually just be staying at your grandparents' house a few hours away from home. You could not write your friends letters because the postmark wouldn't be from Australia! When you returned to school in the fall, you would have to make up stories. You would have to tell lies about the kangaroos you saw in Australia, instead of talking about all the neat things you did at your grandparents' house. One lie often causes many more.

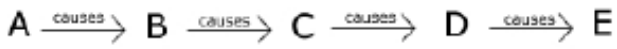
Besides lying creating the need to lie more, lying can hurt others. Suppose that while you are visiting your grandparents, they tell you that you can invite a friend up to stay for a week. If you choose not to lie to your grandparents, then you have to tell them that you lied to your friends because going to Australia sounded more interesting than visiting relatives. It could be easy to hurt someone's feelings with a lie like this. Your grandparents might think you'd rather be in Australia than with them. If you chose to come clean with your friend at this point, your friend's feelings might be hurt also. After all, wouldn't it hurt your feelings if you found out your friends were lying to you?

Perhaps the most important reason not to lie is so people will trust you. Imagine that two years after you lied to your friends about going to Australia, your family really got to take a trip there. The first time you told your friends you were going to Australia, they believed you readily, only to discover later that you were not telling the truth. The second time you tell the same story, your friends may not believe you even though you are now telling the truth! If you often lie, your friends will never know when they can trust what you are saying. They may stop trusting you completely.

7

Organizational Structure





Slide 7

Organizational Structure

Classification Schemes

A text with classification structure will divide its subject into parts.

—An author may want to explain something complicated by breaking it down into its parts.
—An author may want to show you the different types of something.

CLUES:
vocabulary—*divided into, types, parts, categories, kinds*

For a text with classification scheme structure, you will probably be able to make a diagram like the one at the bottom of the page.

Here is an example of a text with a classification scheme structure. Can you find any vocabulary clues? Can you make a diagram for this text?

"A Guide to Some Desserts"

Summer is a great time to eat some frozen desserts. Here is a guide to some of the most popular ones around.

"**Ice cream**" is a mixture of milk products (like cream or milk), sweetening agents (like sugar or artificial sweeteners), and the other good stuff thrown in (like chocolate chips, strawberries, etc.)

"**Ice milk**" is ice cream with less milk fats and solids. It is often made with non-fat milk. It is usually lower in calories, but has a less creamy texture.

"**Frozen yogurt**" is really just that—yogurt that is frozen and mixed up to a consistency like ice cream. While regular yogurt has some healthy bacteria in it, the freezing kills this off. In the end, frozen yogurt may or may not be healthier; you should check individual ingredient labels to find out.

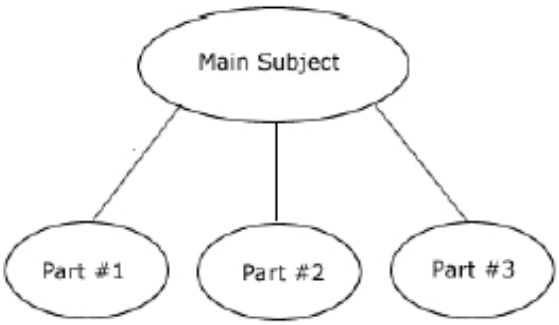
"**Sherbets**" (SHER-bihts) are much like sorbets. So much, in fact, that many places do not distinguish between the two. Sherbets contain water and fruit juice or other sweetened liquids. They also usually contain milk, gelatin, or egg whites.

In contrast, a "**sorbet**" (sor-BAY) never contains milk and typically has a softer consistency than a sherbet. And it is more fun to pronounce.

The last name you'll likely run into is an "**ice**," also known as a granite or granita. It has a more granular texture and is made from a mixture of water, sugar, and flavorings (such as fruit). While freezing, an ice is stirred frequently, which produces the different texture.

Finally, if you run into the word "**gelato**," think of it as a heavier Italian version of ice cream.

Organizational Structure



Slide 8

What you learned...

Texts are written with an organizational structure that is meant to help the reader understand the information.

Information from a text can be put into a diagram, chart, or timeline, depending on the organizational structure.

Common organizational structures include comparison-contrast, chronological order, cause-effect, and classification schemes.

Organizational Structure Test

"A Guide to Some Desserts"

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Finally, if you run into the word "**gelato**," think of it as a heavier Italian version of ice cream.

Organizational Structure Test

1) from "A Guide to Some Desserts"

Which of the following best describes how this text is organized?

A) chronological order

B) cause and effect

C) comparison and contrast

D) problem and solution

Organizational Structure Test

"Washington, D.C."
(excerpted from Ben's Guide to the U.S. Government for Kids)

New York City was the first capital of the United States once the Constitution was ratified. It is also where George Washington took the oath of office from the balcony of the old City Hall to become the first president of the United States.

The president needed to find a permanent location for the country's seat of government. It was decided that the capital would move to Philadelphia, Pennsylvania, in 1791. Philadelphia would be the capital for ten years. Then, it would be located somewhere on the Potomac River. Washington chose an area that included land from the states of Maryland and Virginia. At this time the area was mostly farmland and swamps.

"Our Capital, Washington, D.C." Ben's Guide to U.S. Government for Kids. http://bensguide .gpo.gov/6-8/nation/capital.html

---

2) from "Washington D.C."

Which of the following best describes how this text is organized?

A) comparison and contrast

B) cause and effect

C) chronological order

D) classification schemes

Organizational Structure Test

"Breakfast"

Breakfast is the most important meal of the day because it breaks our "fast" after a night's sleep. Breakfast can give us energy and nutrients we need to begin our day.

What you eat for breakfast will affect how you feel. If you begin your day with a sugar-filled, fiber-free cereal, along with a doughnut and a few cookies, then you will not have energy for very long. Instead, sugar will race through your bloodstream, first making you very awake and then leaving you hungry and tired.

However, if you begin your day with foods such as scrambled egg whites and whole grain cereals with fresh fruit, then your day will be off to a great start. The protein and fiber in such a meal will provide you with long-lasting energy.

---

3) from "Breakfast"

Which best describes how this text is organized?

A) pro and con

B) cause and effect

C) classification schemes

D) chronological order

Organizational Structure Test

"The Oval Office"

Its Beginnings

On an early October morning in 1909, President William Howard Taft became the first president to walk into the Oval Office. The Oval Office, in the West Wing of the White House, is part of a long tradition of oval rooms. At his home in Philadelphia, George Washington added rounded ends to rooms used for formal receptions. Washington would stand in the center to greet his guests. Everyone was at an equal distance from the president. The circle became a symbol of democracy.

Its Contents

The Oval Office is the president's formal office. He meets with his staff and heads of state here. The Oval Office has the presidential seal set into the ceiling, and two flags are always placed behind the president's desk—the U.S. flag and the president's flag. The desk is known as the Resolute desk, which was made from the wood of the H.M.S. Resolute, an abandoned British ship discovered by Americans. The Americans returned the ship to the Queen of England as a token of goodwill. When the ship was retired, Queen Victoria had the desk made and presented it to President Hayes in 1880. Most presidents have used the Resolute desk. The desk was made famous to Americans by a photograph of President John F. Kennedy at work while his son, John, Jr., peeked out from beneath the desk.

Its Meaning

The Oval Office itself has become a symbol of the presidency. In times of national crisis, many presidents have addressed the American people and the world from the Oval Office. It is the most important symbol of American strength and democracy.

---

4) from "The Oval Office"

Which best describes how this text is organized?

A) comparison and contrast

B) cause and effect

C) classification schemes

D) chronological order

6th Grade

Week 3

Math

Parent/Student Directions - Instrucciones para padres / estudiantes
Math: April 13th- April 17th 2020

Monday/Lunes:

- Today's lesson will focus on volume of rectangular prisms.
- Starting on p. 739, fill in the Vocabulary Start-Up diagram and then answer the Real-World Link questions.
- Then, read and answer the questions on p. 740-741 making sure to focus on the concept box if you need help.
- After these pages have been completed, complete the Guided Practice problems on p. 742, the Independent Practice problems on p. 743 and then Hot Problems #11-12 on p. 744.
- If you are having trouble, here is a link to a video explaining the topic: https://www.youtube.com/watch?v=IxujNKKGBP4

- La lección de hoy se centrará en el volumen de prismas rectangulares.
- A partir de la p. 739, complete el diagrama de inicio de vocabulario y luego responda las preguntas del enlace del mundo real.
- Luego, lea y responda las preguntas de la pág. 740-741 asegurándose de enfocarse en el cuadro de concepto si necesita ayuda.
- Después de completar estas páginas, complete los problemas de Práctica guiada en la pág. 742, los problemas de la práctica independiente en la pág. 743 y luego Hot Problems # 11-12 en la pág. 744.
- Si tiene problemas, aquí hay un enlace a un video que explica el tema: https://www.youtube.com/watch?v=IxujNKKGBP4

Tuesday/Martes:

- Today's lesson will focus on volume of triangular prisms.
- Starting on p. 747, complete the Real-World Link questions based on the Camping description.
- Then, read and answer the questions on p. 748-749 making sure to focus on the concept box if you need help.
- After these pages have been completed, complete the Guided Practice problems on p. 750, the Independent Practice problems on p. 751 and then Hot Problems #11-12 on p. 752.
- If you are having trouble, here is a link to a video explaining the topic: https://www.youtube.com/watch?v=E6fW6wlWlqE

- La lección de hoy se centrará en el volumen de prismas triangulares.
- A partir de la p. 747, complete las preguntas de Real-World Link basadas en la descripción del Camping.
- Luego, lea y responda las preguntas de la pág. 748-749 asegurándose de enfocarse en el cuadro de concepto si necesita ayuda.
- Después de completar estas páginas, complete los problemas de Práctica guiada en la pág. 750, los problemas de la práctica independiente en la pág. 751 y luego Hot Problems # 11-12 en la pág. 752.
- Si tiene problemas, aquí hay un enlace a un video que explica el tema: https://www.youtube.com/watch?v=E6fW6wlWlqE

Wednesday/Miercoles:

- Today's lesson will focus on surface area of rectangular prisms.
- Starting on p. 763, fill in the Vocabulary Start-Up diagram and then answer the Real-World Link questions.
- Then, read and answer the questions on p. 764-765 making sure to focus on the concept box if you need help.
- After these pages have been completed, complete the Guided Practice problems on p. 766, the Independent Practice problems on p. 767 and then Hot Problems #9-10 on p. 768.
- If you are having trouble, here is a link to a video explaining the topic: https://www.youtube.com/watch?v=Jt_fMEg7KXs

- La lección de hoy se centrará en la superficie de los prismas rectangulares.
- A partir de la p. 763, complete el diagrama de inicio de vocabulario y luego responda las preguntas del enlace del mundo real.
- Luego, lea y responda las preguntas de la pág. 764-765 asegurándose de enfocarse en el cuadro de concepto si necesita ayuda.
- Después de completar estas páginas, complete los problemas de Práctica guiada en la pág. 766, los problemas de la práctica independiente en la p. 767 y luego Hot Problems # 9-10 en la pág. 768.
- Si tiene problemas, aquí hay un enlace a un video que explica el tema: https://www.youtube.com/watch?v=Jt_fMEg7KXs

Thursday/Jueves:

- This is a catch-up day.
- Students can use the day complete any unfinished assignments and get any questions answered they may have by their teacher.
- You can ask me questions through phone, email or Dojo. Use the rest of your day to "sharpen the saw!"

- Este es un día de recuperación.
- Los estudiantes pueden usar el día para completar cualquier tarea no terminada y obtener cualquier pregunta que su maestro pueda responder.
- Puede hacerme preguntas por teléfono, correo electrónico o Dojo. Use el resto de su día para "afilar la sierra".

Friday/Viernes:

- Today's lesson will focus on working with exponents.
- Using the ATI Galileo pages, read through the Working with Exponents slides and answering the questions that go with each slide.
- The information in the slides before the questions will help you if you are having trouble.
- Complete the Working with Exponents Test after going through the slides.

- La lección de hoy se centrará en trabajar con exponentes.
- Utilizando las páginas de ATI Galileo, lea las diapositivas Trabajar con exponentes y responda las preguntas que acompañan a cada diapositiva.
- La información en las diapositivas antes de las preguntas lo ayudará si tiene problemas.
- Complete la prueba Trabajar con exponentes después de pasar por las diapositivas.

Analyze and Reflect

Collaborate

Work with a partner to complete the table. Use models, if needed. The first one is done for you.

	Prism	Height (units)	Length (units)	Width (units)	Volume (units^3)
	A	6	3	2	36
7.	B	$2\frac{1}{2}$	$1\frac{1}{2}$	2	
8.	C	5	$1\frac{1}{2}$	2	
9.	D	2	5	$1\frac{1}{2}$	
10.	E	5	3	4	

11. Compare the dimensions for prism *C* to the dimensions of prism *D*. Compare the volume of the two prisms. What do you notice?

12. The length and width of prisms *B* and *C* are equal. Compare the height of the two prisms. How does the change in height affect the change in volume?

13. Compare the dimensions for prism *B* to the dimensions of prism *E*. Compare the volume of the two prisms. What do you notice?

14. MP **Reason Inductively** Describe the relationship between the number of cubes needed and the dimensions of the prism.

Create

On Your Own

15. MP **Model with Mathematics** Write a real-world problem that involves volume of rectangular prisms. Include the dimensions and the volume of the rectangular prism in your response.

16. Inquiry HOW can you use models to find volume?

Volume of Rectangular Prisms

Vocabulary Start-Up

Define Volume	When would you use volume?
volume	
Example	Nonexample

Essential Question

HOW is shape important when measuring a figure?

Vocabulary

three-dimensional figure
prism
rectangular prism
volume
cubic units

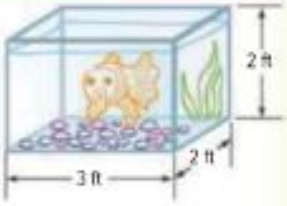
Common Core State Standards

Content Standards
6.G.2

Mathematical Practices
1, 3, 4, 5, 6, 7

Real-World Link

Aquarium The dimensions of an aquarium are shown.



1. What is the area of the base of the aquarium? _____

2. What is the height of the aquarium? _____

3. Fill in the blanks to find the volume.

_____ (length) × _____ (width) × _____ (height) = 12 ft^3

Which **Mathematical Practices** did you use? Shade the circle(s) that applies.

1. Persevere with Problems
2. Reason Abstractly
3. Construct an Argument
4. Model with Mathematics
5. Use Math Tools
6. Attend to Precision
7. Make Use of Structure
8. Use Repeated Reasoning

Key Concept

Volume of a Rectangular Prism

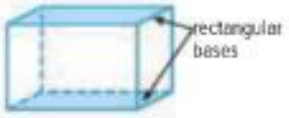
Words The volume V of a rectangular prism is the product of its length ℓ, width w, and height h.

Symbols $V = \ell wh$ or $V = Bh$

Model

Work Zone

A **three-dimensional figure** has length, width, and height. A **prism** is a three-dimensional figure with two parallel bases that are congruent polygons. In a **rectangular prism**, the bases are congruent rectangles.

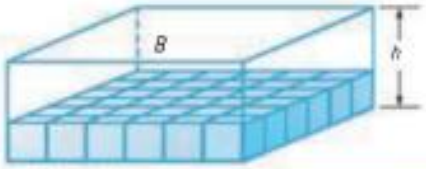


Volume is the amount of space inside a three-dimensional figure. It is measured in **cubic units**, which can be written using abbreviations and an exponent of 3, such as units^3 or in^3.

Cubes
Cubes are special rectangular prisms. All three side lengths are equal. So, the volume of a cube can be written using the formula $V = s^3$.

Decomposing the prism tells you the number of cubes of a given size it will take to fill the prism. The volume of a rectangular prism is related to its dimensions, length, width, and height.

Another method to decompose a rectangular prism is to find the area of the base (B) and multiply it by the height (h).

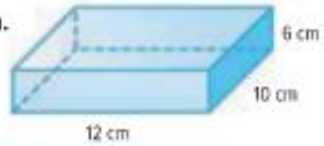


$V = Bh$ ← number of rows of cubes needed to fill the prism

area of the base, or the number of cubes needed to cover the base

Example

1. **Find the volume of the rectangular prism.**



B, or the area of the base, is 10×12 or 120 square centimeters. The height of the prism is 6 centimeters.

$V = Bh$ Volume of rectangular prism

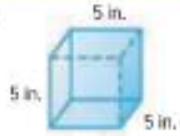
$V = 120 \times 6$ Replace B with 120 and h with 6.

$V = 720$ Multiply.

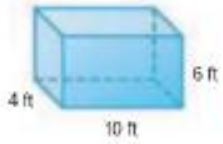
The volume is 720 cubic centimeters.

Got it? **Do these problems to find out.**

a.



b.



Example

2. **A cereal box has the dimensions shown. What is the volume of the cereal box?**

Estimate $10 \times 3 \times 10 = 300$

$V = \ell wh$ Volume of a rectangular prism.

$V = 8 \times 3\frac{1}{4} \times 12\frac{1}{2}$ Replace ℓ with 8, w with $3\frac{1}{4}$, and h with $12\frac{1}{2}$.

$V = \frac{8}{1} \times \frac{13}{4} \times \frac{25}{2}$ Write as improper fractions. Then divide out common factors.

$V = \frac{325}{1}$ or 325 Multiply.

The volume of the cereal box is 325 cubic inches.

Check for Reasonableness $325 \approx 300$ ✓

Got it? **Do this problem to find out.**

c. Find the volume of a container that measures 4 inches long, 5 inches high, and $8\frac{1}{2}$ inches wide.

Decomposing Figures

You can think of the volume of the prism as consisting of six congruent slices. Each slice contains the area of the base, 120 cm^2, multiplied by a height of 1 cm.

Show your work.

a. _____

b. _____

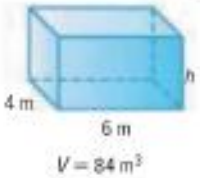
c. _____

Find Missing Dimensions

To find missing dimensions of a rectangular prism, replace the variables with known measurements. Then solve for the unknown measurement.

Example

3. **Find the missing dimension of the prism.**



$V = 84 \text{ m}^3$

$V = \ell wh$	Volume of rectangular prism
$84 = 6 \times 4 \times h$	Replace V with 84, ℓ with 6, and w with 4.
$84 = 24h$	Multiply.
$\frac{84}{24} = \frac{24h}{24}$	Divide each side by 24.
$3.5 = h$	Simplify.

The height of the prism is 3.5 meters.

Check $6 \times 4 \times 3.5 = 84$ ✓

Got it? **Do this problem to find out.**

d. $V = 94.5 \text{ km}^3$, $\ell = 7$ km, $h = 3$ km, $w = ?$

d. _____

Guided Practice

1. A rectangular kitchen sink is 25.25 inches long, 19.75 inches wide, and 10 inches deep. Find the amount of water that can be contained in the sink. (Examples 1 and 2) _____

2. Find the missing dimension of a rectangular prism with a volume of 126 cubic centimeters, a width of $7\frac{7}{8}$ centimeters, and a height of 2 centimeters. (Example 3) _____

3. **Building on the Essential Question** Why can you use either the formula $V = \ell wh$ or $V = Bh$ to find the volume of a rectangular prism?

_____

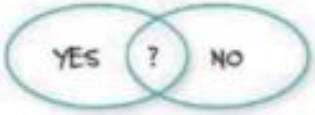
_____

_____

_____

Rate Yourself!

Are you ready to move on? Shade the section that applies.



For more help, go online to access a Personal Tutor.

FOLDABLES Time to update your Foldable!

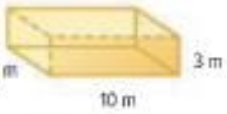
Name _____ My Homework _____

Independent Practice

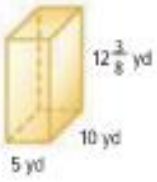
Go online for Step-by-Step Solutions

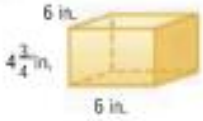
Find the volume of each prism. (Example 1)

1.



2.



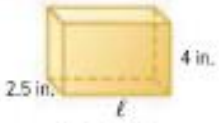


4. A fishing tackle box is 13 inches long, 6 inches wide, and $2\frac{1}{2}$ inches high. What is the volume of the tackle box? (Example 2)

5. Find the length of a rectangular prism having a volume of 2,830.5 cubic meters, width of 18.5 meters, and height of 9 meters. (Example 3)

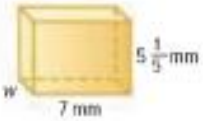
Find the missing dimension of each prism. (Example 3)

6.



$V = 60$ in^3

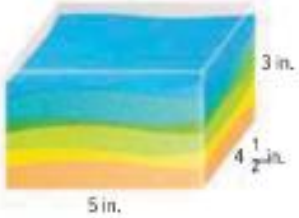
7.



$V = 109\frac{1}{5}$ mm^3

8. MP **Be Precise** In Japan, farmers have created watermelons in the shape of rectangular prisms. Find the volume of a prism-shaped watermelon in cubic inches if its length is 10 inches, its width is $\frac{2}{3}$ foot, and its height is 9 inches.

9 The glass container shown is filled to a height of 2.25 inches.



a. How much sand is currently in the container?

b. How much more sand could the container hold before it overflows?

c. What percent of the container is filled with sand?

10. **Identify Structure** Refer to the graphic novel frame below for Exercises a–c.

a. Pilar chose the box on the left. If it is 8 inches long, 8 inches wide, and 8 inches tall, what is the volume of Pilar's box?

b. Amanda chose the box on the right. If it is 8 inches long, 6 inches wide, and 10 inches tall, what is the volume of Amanda's box?

c. Who received more popcorn, Pilar or Amanda? How much more?

H.O.T. Problems Higher Order Thinking

11. **Persevere with Problems** Refer to the prism at the right. If all the dimensions of the prism doubled, would the volume double? Explain your reasoning.

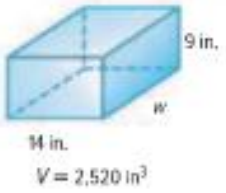
12. **Justify Conclusions** Which has the greater volume: a prism with a length of 5 inches, a width of 4 inches, and a height of 10 inches, or a prism with a length of 10 inches, a width of 5 inches, and a height of 4 inches?

Justify your selection.

13. **Model with Mathematics** Write a real-world problem in which you need to find the volume of a right rectangular prism. Solve your problem.

Power Up! Common Core Test Practice

21. The volume of the rectangular prism shown is 2,520 cubic inches. Fill in the boxes to complete each statement.



a. To find the width of the prism, divide ☐ by the product of ☐ and ☐.

b. The width of the prism is ☐ inches.

22. A pet carrier company is creating a new size carrier. It has a length of 27 centimeters, a width of 7 centimeters, and a volume of 6,426 cubic centimeters. Select values to complete the formula below to find the height h of the carrier.

7
27
6,426
h

☐ = ☐ × ☐ × ☐

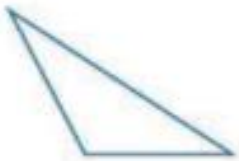
What is the height of the pet carrier? ☐

Common Core Spiral Review

Classify each triangle by the measure of the angles. 5.G.4

23. _____

24. _____



25. _____

26. Draw the next figure in the pattern below. 4.OA.5, 4.G.2

27. Triangles are often used in designing bridges. Classify the triangle shown by the measure of its sides. Explain. 5.G.4

_____

_____

Volume of Triangular Prisms

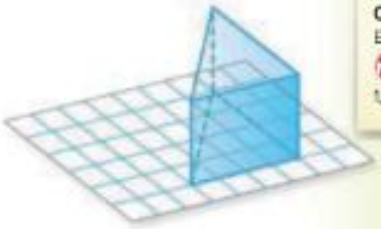
Real-World Link

Camping Ari has a pup tent like the one shown. The opening of the tent has a base and a height of 6 feet. The length of the tent is 8 feet.

What is the area of the front triangular face? _____

Collaborate

On a piece of grid paper, draw a right triangle with a base and height of 4 units as shown.



1. What is the area of the triangle?

_____

2. Suppose you cover the triangle with cubes the size of one square on the grid paper. How many cubes would you use? (*Hint*: You can cut and reassemble the cubes.) _____

3. How many cubes would you use if you had 4 layers? _____

4. **Make a Conjecture** Write a formula to find the volume of a triangular prism. _____

Essential Question

HOW is shape important when measuring a figure?

Vocabulary

triangular prism

Common Core State Standards

Content Standards
Extension of 6.G.2

Mathematical Practices
1, 3, 4, 6, 8

Which **Mathematical Practices** did you use? Shade the circle(s) that applies.

1 Persevere with Problems	5 Use Math Tools
2 Reason Abstractly	6 Attend to Precision
3 Construct an Argument	7 Make Use of Structure
4 Model with Mathematics	8 Use Repeated Reasoning

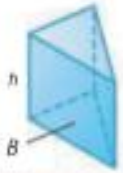
Key Concept

Volume of a Triangular Prism

Words The volume V of a triangular prism is the area of the base B times the height h.

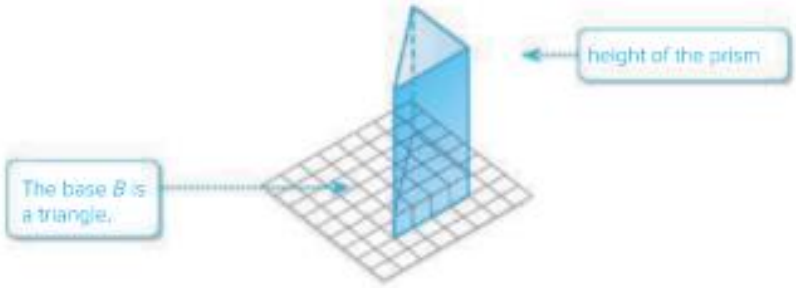
Symbols $V = Bh$, where B is the area of the base

Model



Work Zone

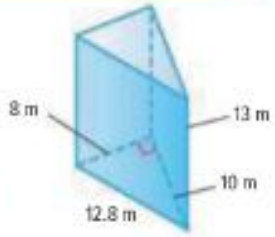
In a **triangular prism**, the bases are congruent triangles. The diagram below shows that the volume of a triangular prism is also the product of the area of the base B and the height h of the prism.



Example

Tutor

1. **Find the volume of the triangular prism.**



The area of the triangle is $\frac{1}{2} \cdot 8 \cdot 10$, so B is $\frac{1}{2} \cdot 8 \cdot 10$.

$V = Bh$ Volume of a prism

$V = \left(\frac{1}{2} \cdot 8 \cdot 10\right)h$ Replace B with $\frac{1}{2} \cdot 8 \cdot 10$.

$V = \left(\frac{1}{2} \cdot 8 \cdot 10\right)13$ Replace h with 13, the height of the prism.

$V = 520$ Multiply.

The volume is 520 cubic meters or 520 m^3.

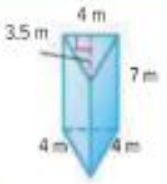
Base
Before finding the volume of a triangular prism, identify the base. In Exercise b, the base is not on the "bottom." The base is one of the parallel faces.

Got it? **Do these problems to find out.**

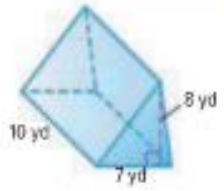
a. _____

b. _____

a.



b.



Example

2. **A large skateboard ramp is shown. Find the volume of the triangular prism.**

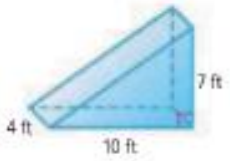
The base is a triangle with a base length of 10 feet and a height of 7 feet. The height of the prism is 4 feet.

$V = Bh$ Volume of a prism

$V = \left(\frac{1}{2} \cdot 10 \cdot 7\right)h$ Replace B with $\frac{1}{2} \cdot 10 \cdot 7$.

$V = \left(\frac{1}{2} \cdot 10 \cdot 7\right)4$ Replace h with 4, the height of the prism.

$V = 140$ Multiply.



The volume is 140 cubic feet or 140 ft^3.

Got it? **Do this problem to find out.**

c. Find the volume of a triangular prism-shaped model with a base of 32 square centimeters and a height of 6 centimeters.

c. _____

Find Missing Dimensions

To find missing dimensions of a triangular prism, replace the variables with known measurements. Then solve for the unknown measurement.

Example

3. **Find the height of the triangular prism.**

$V = Bh$ Volume of a triangular prism

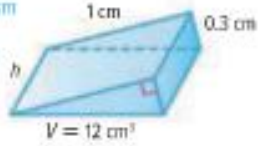
$V = \left(\frac{1}{2} \cdot 1 \cdot 0.3\right)h$ Replace B with $\frac{1}{2} \cdot 1 \cdot 0.3$.

$12 = \left(\frac{1}{2} \cdot 1 \cdot 0.3\right)h$ Replace V with 12.

$12 = 0.15h$ Multiply.

$\frac{12}{0.15} = \frac{0.15h}{0.15}$ Divide each side by 0.15.

$80 = h$ Simplify.



So, the height of the prism is 80 cm.

Got it? **Do this problem to find out.**

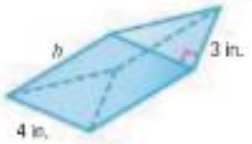
Find the missing dimension of the triangular prism.

d. $V = 55\ km^3$, base length = 2 km, base height = 5 km, h = ?

d. _____

Example

4. Dwane bought a cheese wedge for his March Madness party. The cheese wedge has the dimensions shown. The volume of the cheese wedge is 54 cubic inches. What is the height of the cheese wedge?



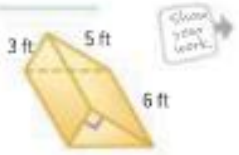
$V = Bh$	Volume of a triangular prism
$54 = \left(\frac{1}{2} \cdot 3 \cdot 4\right)h$	Replace V with 54, and B with $\frac{1}{2} \cdot 3 \cdot 4$.
$54 = 6h$	Multiply.
$\frac{54}{6} = \frac{6h}{6}$	Divide each side by 6.
$9 = h$	Simplify.

So, the height of the cheese wedge is 9 inches.

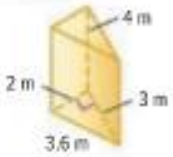
Guided Practice

Find the volume of each prism. Round to the nearest tenth if necessary. (Example 1)

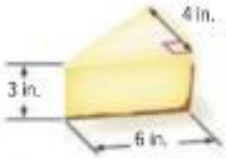
1.



2.



3. Dirk has a triangular-shaped piece of cheesecake in his lunch. Find the volume of the piece of cheesecake. (Example 2)



4. Find the base length of a shipping box in the shape of a triangular prism. The shipping box has a volume of 276 cubic feet, a base height of 6.9 feet, and a height of 10 feet. (Examples 3 and 4)

5. **Building on the Essential Question** How is the area of a triangle related to the volume of a triangular prism?

Rate Yourself!

How well do you understand volume of triangular prisms? Circle the image that applies.

For more help, go online to access a Personal Tutor.

FOLDABLES Time to update your Foldable!

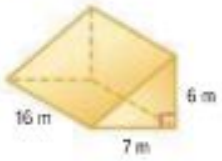
Name _____ My Homework _____

Independent Practice

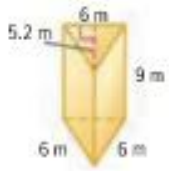
Go online for Step-by-Step Solutions

Find the volume of each prism. Round to the nearest tenth if necessary. (Example 1)

1. _____



2. _____



3 _____

4. A wheelchair ramp is in the shape of a triangular prism. It has a base area of 37.4 square yards and a height of 5 yards. Find the volume of the ramp. (Example 2)

_____

5 A triangular prism has a height of 9 inches. The triangular base has a base of 3 inches and a height of 8 inches. Find the volume of the prism. (Example 2)

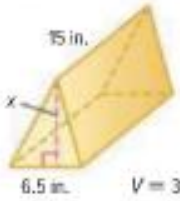
_____

Find the missing dimension of each triangular prism. (Example 3)

6. $x =$ _____

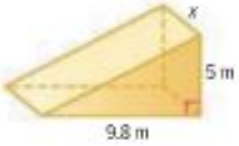
$V = 30 \text{ ft}^3$

7. $x =$ _____



$V = 390 \text{ in}^3$

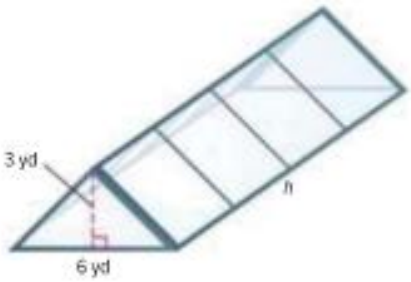
8. $x =$ _____



$V = 98 \text{ m}^3$

9. Mr. Standford's greenhouse has the dimensions shown. The volume of the greenhouse is 90 cubic yards. Find the missing dimension of the greenhouse. (Example 4)

_____



10. **Be Precise** Darcy built the dollhouse shown.

a. What is the volume of the first floor?

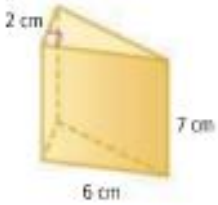
_____

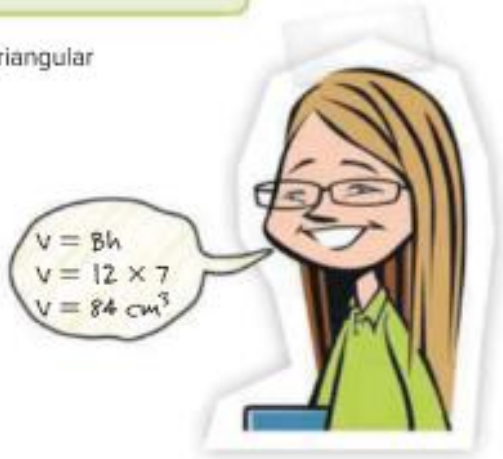
b. What is the volume of the attic space?

_____

H.O.T. Problems Higher Order Thinking

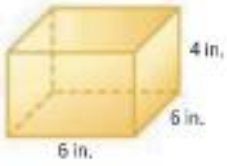
11. Find the Error Amanda is finding the volume of the triangular prism. Find her mistake and correct it.



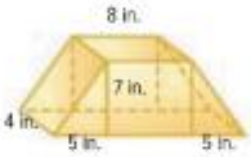


12. Identify Repeated Reasoning A rectangular prism and a triangular prism each have a volume of 210 cubic meters. Find possible sets of dimensions for each prism.

13. Persevere with Problems A candy company sells mints in two different containers. Which container shown below holds more mints? Justify your answer.



14. Persevere with Problems Explain a method you could use to find the volume of the prism below. Then find the volume of the prism.



Surface Area of Rectangular Prisms

Vocabulary Start-Up

Define Surface	Define Area
What is surface area?	Example:

Essential Question

HOW is shape important when measuring a figure?

Vocabulary

surface area

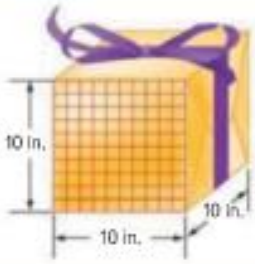
Common Core State Standards

Content Standards
6.G.4

Mathematical Practices
1, 3, 4, 8

Real-World Link

Gifts Roberta is wrapping a gift for her sister's quinceañera. She places it in a box with the measurements shown.



1. What is the area of one face of the box?

2. How many faces does the box have?

3. What operations would you use to find the surface area of the box?

Which **Mathematical Practices** did you use? Shade the circle(s) that applies.

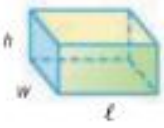
1. Persevere with Problems
2. Reason Abstractly
3. Construct an Argument
4. Model with Mathematics
5. Use Math Tools
6. Attend to Precision
7. Make Use of Structure
8. Use Repeated Reasoning

Key Concept

Surface Area of a Rectangular Prism

Words The surface area S.A. of a rectangular prism with length ℓ, width w, and height h is the sum of the areas of the faces.

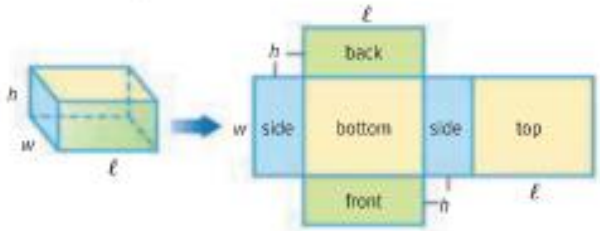
Model



Symbols $S.A. = 2\ell h + 2\ell w + 2hw$

Work Zone

The surface area of a prism is the sum of the areas of its faces.

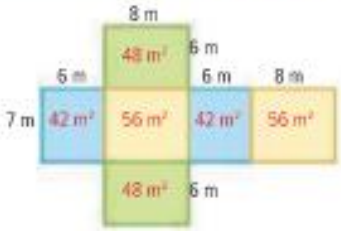


front and back: $\ell h + \ell h = 2\ell h$
top and bottom: $\ell w + \ell w = 2\ell w$
two sides: $hw + hw = 2hw$
} $2\ell h + 2\ell w + 2hw$

Example

Watch Tutor

1. **Find the surface area of the rectangular prism.**



Find the area of each pair of faces.

front and back: $2(8 \cdot 6) = 2(48)$

top and bottom: $2(7 \cdot 8) = 2(56)$

sides: $2(7 \cdot 6) = 2(42)$

$48 + 48 + 56 + 56 + 42 + 42 = 292$ Add the area of each face.

So, the surface area is 292 square meters.

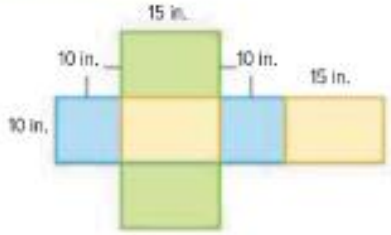
Note

The net shows that a rectangular prism has six faces. The faces can be grouped as three pairs of congruent sides. The colors indicate which faces are congruent.

Show your work.

Got it? **Do this problem to find out.**

a. Find the surface area of the rectangular prism.



a. _____

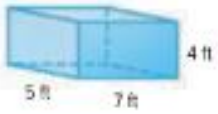
Find Surface Area Using a Formula

You can use nets or models to find the surface area of a rectangular prism. You can also use the surface area formula, $S.A. = 2\ell h + 2\ell w + 2hw$.

Examples

Tutor

2. **Find the surface area of the rectangular prism.**



Find the area of each face.

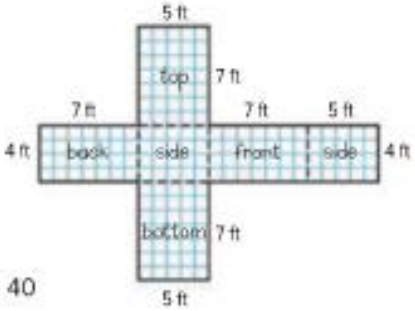
front and back:
$2\ell h = 2(7)(4)$ or 56

top and bottom:
$2\ell w = 2(7)(5)$ or 70

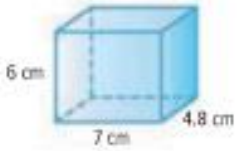
left and right sides:
$2hw = 2(4)(5)$ or 40

Add to find the surface area.

The surface area is 56 + 70 + 40 or 166 square feet.



3. **Find the surface area of the rectangular prism.**



To find the area of each face, determine the dimensions.

$\ell = 7, w = 4.8, h = 6$

front and back: $2\ell h = 2(\quad)(\quad)$ or ☐

top and bottom: $2\ell w = 2(\quad)(\quad)$ or ☐

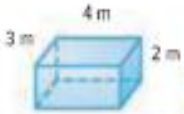
two sides: $2hw = 2(\quad)(\quad)$ or ☐

Add to find the surface area.

☐ + ☐ + ☐ or ☐ square centimeters

Got it? **Do this problem to find out.**

b. Find the surface area of the rectangular prism.



b. _____

Example

4. STEM **A geode is being sent as a gift. It is packed in a box that measures 7 inches long, 3 inches wide, and 16 inches tall. What is the surface area of the box?**

$S.A. = 2\ell h + 2\ell w + 2hw$ Surface area of a prism

$S.A. = 2(7)(16) + 2(7)(3) + 2(16)(3)$ $\ell = 7, w = 3, h = 16$

$S.A. = 14(16) + 14(3) + 32(3)$ Multiply.

$S.A. = 224 + 42 + 96$ Multiply.

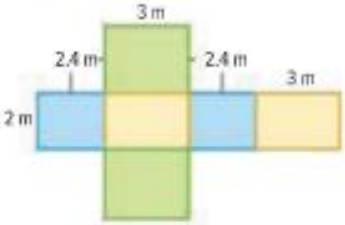
$S.A. = 362$ Add.

The surface area of the box is 362 square inches.

Guided Practice

Find the surface area of each rectangular prism. (Examples 1–3)

1.



2.

3.

4. Tomás keeps his diecast car in a glass display case as shown. What is the surface area of the glass, including the bottom? (Example 4)

5. **Building on the Essential Question** What is the relationship between area and surface area?

Rate Yourself!

Are you ready to move on? Shade the section that applies.

For more help, go online to access a Personal Tutor.

FOLDABLES Time to update your Foldable!

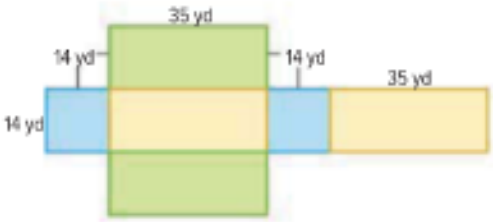
Name _____ My Homework _____

Independent Practice

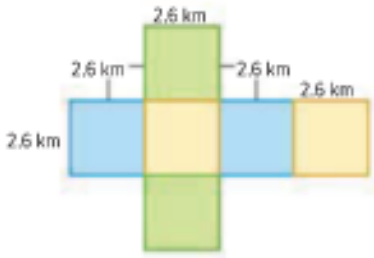
Go online for Step-by-Step Solutions

Find the surface area of each rectangular prism. (Examples 1–3)

1.

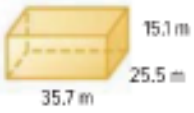


2.



show your work

3



4.

5. **STEM** A game box for video games is shaped like a rectangular prism. What is the surface area of the game box? (Example 4)

6. MP **Justify Conclusions** Martina estimates that the surface area of a rectangular prism with a length of 13.2 feet, a width of 6 feet, and a height of 8 feet is about 460 square feet. Is her estimate reasonable? Explain your reasoning.

7 MP **Justify Conclusions** Find the surface area of each shipping package. Which package has the greater surface area? Does the same package have a greater volume? Explain your reasoning to a classmate.

Package A

Package B

8. **Model with Mathematics** Refer to the graphic novel frame below for Exercises a–c.

a. The box on the left is 8 inches long, 8 inches wide, and 8 inches tall. What is the surface area of the box? _____

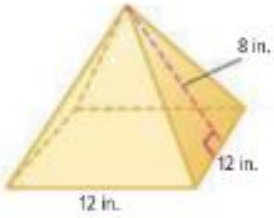
b. The box on the right is 8 inches long, 6 inches wide, and 10 inches tall. What is the surface area of the box? _____

c. How much more surface area does the larger container have?

_____

H.O.T. Problems Higher Order Thinking

Persevere with Problems **All of the triangular faces of the figure are congruent.**



9. What is the area of one of the triangular faces? the square face?

_____

10. Use what you know about finding the surface area of a rectangular prism to find the surface area of the square pyramid.

_____

11. **Model with Mathematics** Sketch two prisms such that one has a greater volume and the other has a greater surface area. Include real-world units.

Working with exponents

Slide 1

What You Will Learn

Today we will talk about **exponents.** Exponents are very important in mathematics and you will see more and more of them later. They also have some interesting properties. For now, we will only use them to write in a different (and shorter) way expressions like these:

$10 \times 10 \times 10 \times 10$

$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

Slide 2

From Addition to Multiplication

Before we proceed with exponents, let's look back at **addition.** A long time ago you learned that instead of writing

$2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2$ (nine twos),

you could write 2×9.

If we want a short way of writing repeated addition**, we use multiplication!**

Next, we ask, is there a short way of writing **repeated multiplication**?

Working with exponents

Slide 3

From Multiplication to Exponents

To write repeated multiplication in a short form, we use **exponents**:

$10 \times 10 \times 10 \times 10 = 10^4$

$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^9$

Count how many numbers you multiply and write the total as the exponent.

Slide 4

Easier Words For Talking About Exponents

In 10^4, 10 is the **base** and 4 is the **power.**

We say: ten raised to the fourth power
or
ten raised to the power of four.

1.5 raised to the third power means 1.5^3.

You can call the 3 in 1.5^3 the exponent, or you can call it the power.

Working with exponents

Slide 5

How We Write It

Did you notice that we did not need help of a special symbol

like +, −, x, or ÷

to show that we are using exponents? We just raise the exponent above the rest of the line and place to the right of the base.

Exponents are also smaller in font size than the base.

$3 \times 3 \times 3 \times 3 = 3^4$

base → 3^4 ← exponent or power

Slide 6

What is "5 raised to the 7th power?"

A) 5^7

B) 7^5

Working with exponents

Slide 7

Which is the same as 3^4?

A) 3 raised to the power of 4

B) 4 raised to the power of 3

Slide 8

Calculating With Exponents

$10^4 = 10{,}000$ $(10 \times 10 \times 10 \times 10)$

$2^3 = 8$ $(2 \times 2 \times 2)$

$3^2 = 9$ (3×3)

Notice that 2^3 and 3^2 are **not the same.** If we switch the base and the power, the answer almost always changes**.**

Mind your bases and powers!

There is only one pair of different whole numbers *a* and *b* such, that $a^b = b^a$**.** Can you find these numbers?

Working with exponents

Slide 9

$8^5 =$

A) 8×5

B) $5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5$

C) $8 \times 8 \times 8 \times 8 \times 8$

D) $8 \times 8 \times 8 \times 8 \times 8 \times 8$

Slide 10

What is 6 x 6 x 6 x 6 x 6 written with exponents?

A) 4^6

B) 6^4

C) 5^6

D) 6^5

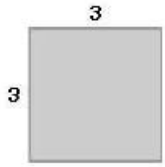
Working with exponents

Slide 11

Two Exponents With Special Names

Another way of saying that a number is raised to the power of 2 is to say that the **number is squared.**

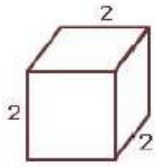
3^2 is three squared.



The area of this **square** is
$3 \times 3 = 3^2$
(three **squared**).

Another way of saying that a number is raised to the power of 3 is to say that the **number is cubed.**

2^3 is two cubed.



The volume of this **cube** is
$2 \times 2 \times 2 = 2^3$
(two **cubed**).

Slide 12

What is one cubed?

A) 0

B) 1

C) 2

D) 3

Working with exponents

Slide 13

Order of Operations

Exponents are senior to all four arithmetic operations:

$10 + 5^2 = 10 + 25 = 35$

$100 - 1^4 = 100 - 1 = 99$

$3 \times 2^5 = 3 \times 32 = 96$

$54 \div 3^3 = 54 \div 27 = 2$

Remember that parentheses are senior to all operations, exponents included:

$(4 + 3)^2 = (7)^2 = 49$

Slide 14

What is the value of this expression?

5×2^3

A) 30

B) 40

C) 45

D) 1,000

Working with exponents

Slide 15

What is 6^2?

A) 64

B) 36

C) 24

D) 12

Slide 16

What is 32?

A) 8 to the power of 4

B) 6 squared

C) 4 cubed

D) 2 to the 5^{th} power

Working with exponents

Slide 17

Putting It All Together

We can rewrite repeated multiplication with exponents:

$4 \times 4 \times 4 = 4^3$ base → 4^3 ← exponent or power

The **exponent** tells us how many times the **base** shows in the multiplication expression.

A number **squared** is a number raised to the power of **2**.
A number **cubed** is a number raised to the power of **3**.

Do you think that 2^3 is the same as
2 multiplied by itself three times?
Open the resource link to the right for a useful tip.

Resources

Saying exponents as repeated multiplication

Working with exponents Test

1) What is the value of this expression?

$(16 \div 4)^2$

A) 1

B) 2

C) 8

D) 16

---

2) What is eleven squared?

A) 11

B) 22

C) 44

D) 121

Working with exponents Test

3) $8^4 =$

A) 8 x 8 x 8 x 8

B) 4 x 4 x 4 x 4 x 4 x 4 x 4 x 4

C) 8 x 4

D) 32

---

4) 6^3 =

A) 18

B) 36

C) 216

D) 1,296

---

5) Which is equal to the number below?

10^5

A) 1050

B) 1,000

C) 10,000

D) 100,000

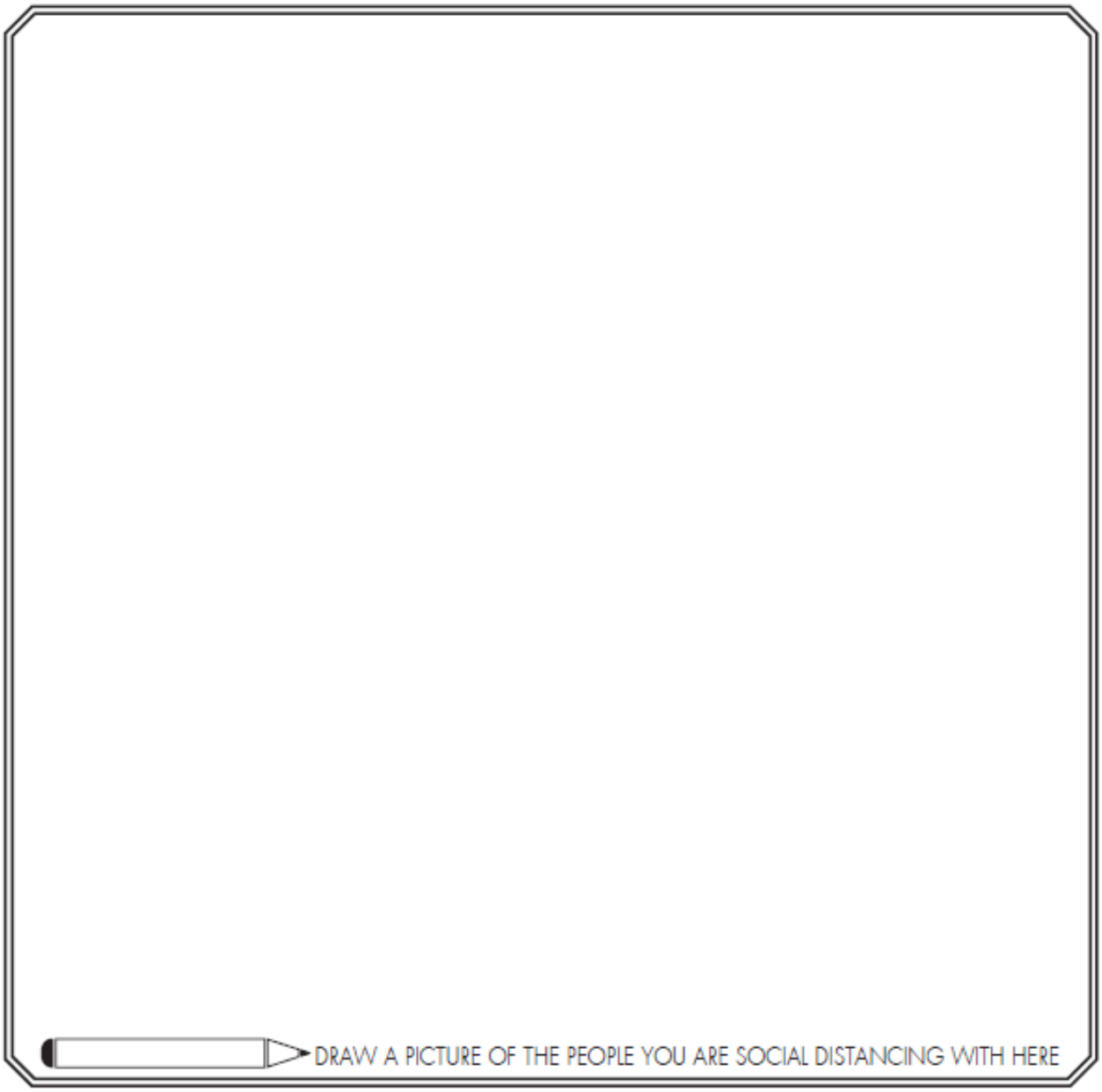
MY 2020 COVID-19 TIME CAPSULE

BY: _____

YOU ARE LIVING THROUGH HISTORY RIGHT NOW

TAKE A MOMENT TO FILL IN THESE PAGES FOR YOUR FUTURE SELF TO LOOK BACK ON. AND HERE ARE SOME OTHER IDEAS OF THINGS TO INCLUDE:

- ☐ SOME PHOTOS FROM THIS TIME
- ☐ A JOURNAL OF YOUR DAYS
- ☐ LOCAL NEWSPAPER PAGES OR CLIPPING
- ☐ ANY ART WORK YOU CREATED
- ☐ FAMILY / PET PICTURES
- ☐ SPECIAL MEMORIES



ALL ABOUT ME

I AM

YEARS OLD

I STAND

INCHES TALL

I WEIGH

POUNDS

SHOE SIZE

MY FAVOURITES

TOY: _____

COLOUR: _____

ANIMAL: _____

FOOD: _____

SHOW: _____

MOVIE: _____

BOOK: _____

ACTIVITY: _____

PLACE: _____

SONG: _____

MY BEST FRIEND/S:

_____

_____

_____

WHEN I GROW UP I WANT TO BE:

_____

_____

DATE:

PAGES BY LONG CREATIONS

HOW I'M FEELING

WORDS TO DESCRIBE HOW I FEEL:

HOW MY FACE LOOKS

WHAT I HAVE LEARNT MOST FROM THIS EXPERIENCE:

I AM MOST THANKFUL FOR

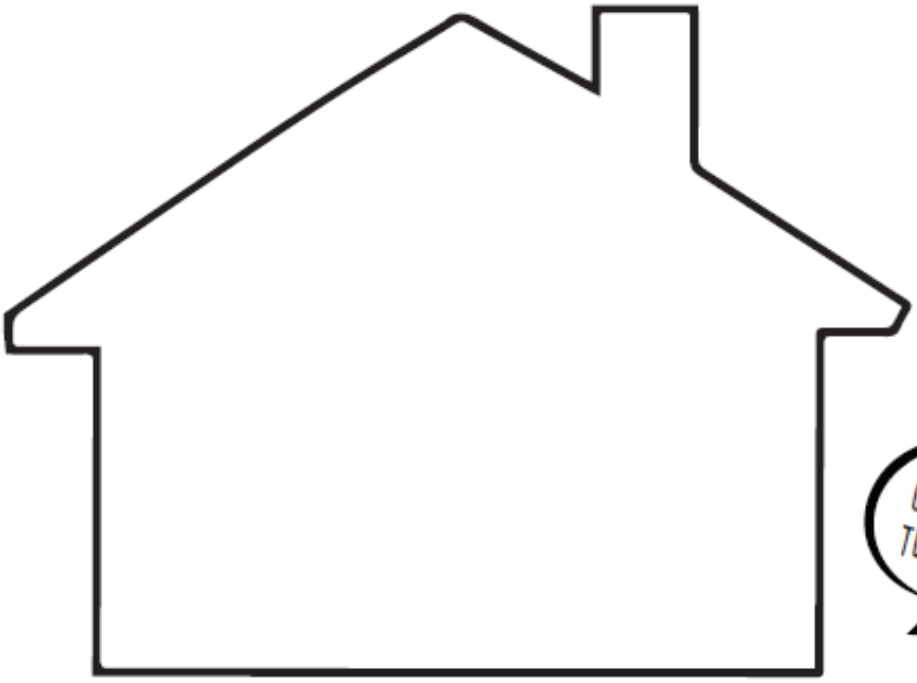
THE 3 THINGS I AM MOST EXCITED TO DO WHEN THIS IS OVER:

1

2

3

MY COMMUNITY



COLOUR THIS HOUSE TO LOOK LIKE YOURS

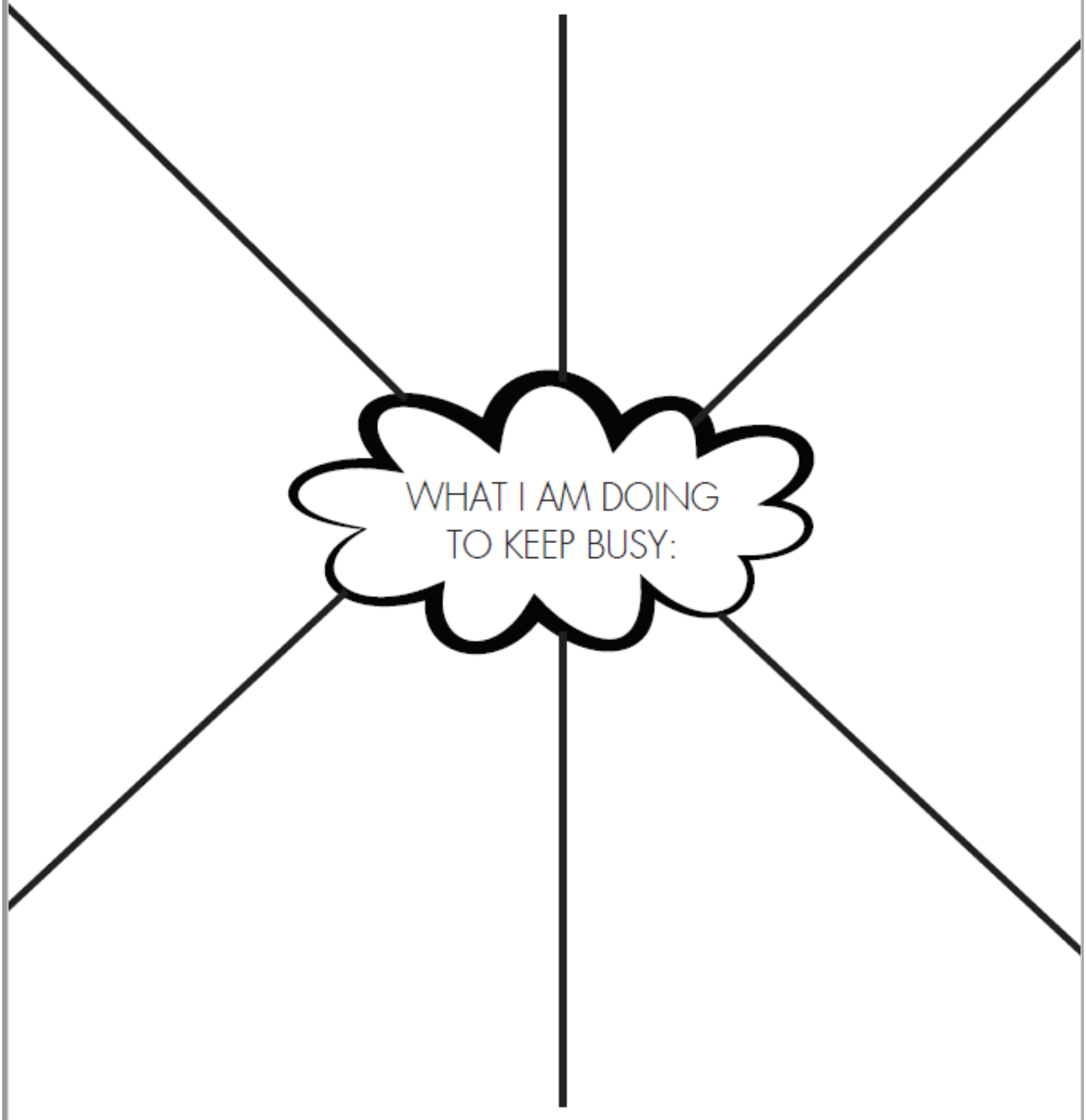
WHERE I AM LIVING DURING THIS TIME:

WHAT THINGS ARE YOU DOING TO HELP FEEL CONNECTED/HAVE FUN OUTSIDE (e.g hearts in windows, chalk notes on sidewalk, etc)

HOW ARE YOU CONNECTING WITH OTHERS?

PAGES BY LONG CREATIONS

YOU ARE NOT STUCK AT HOME. YOU ARE SAFE AT HOME!



PAGES BY LONG CREATIONS

OUR HANDPRINTS

PRINT THE HANDS OF ALL THE PEOPLE LIVING IN YOUR HOME
(IN DIFFERENT COLOURS) AND PLACE YOUR HANDS HERE

SPECIAL OCCASIONS

WHAT OCCASIONS DID YOU CELEBRATE DURING THIS TIME?
WRITE THE LIST DOWN HERE AND WHAT YOU DID TO CELEBRATE
(E.G. ST. PATRICK'S DAY, EASTER, BIRTHDAYS, ANNIVERSARIES)

EVENT	DATE	HOW YOU CELEBRATED

LETTER TO MYSELF

_____

DEAR, _____

LOVE, _____

PAGES BY LONG CREATIONS

INTERVIEW YOUR PARENTS

WHAT HAS BEEN THE BIGGEST CHANGE?

HOW ARE YOU FINDING HOMESCHOOLING?

DAYS SPENT INSIDE

HOW ARE YOU FEELING?

YOUR TOP 3 MOMENTS FROM THIS EXPERIENCE:

1. _____

2. _____

3. _____

WHAT ACTIVITIES/HOBBIES HAVE YOU MOST ENJOYED DOING?

WHAT ARE YOU MOST THANKFUL FOR?

WHAT TV SHOW YOU WATCHED : _____

YOUR NEW FOUND FAVOURITE INSIDE FAMILY ACTIVITY:

_____

FAVOURITE FOOD TO BAKE:_____

FAVOURITE TIME OF DAY: _____

GOAL/S FOR AFTER THIS:

PAGES BY LONG CREATIONS

LETTER FROM YOUR PARENTS

DEAR,

LOVE,