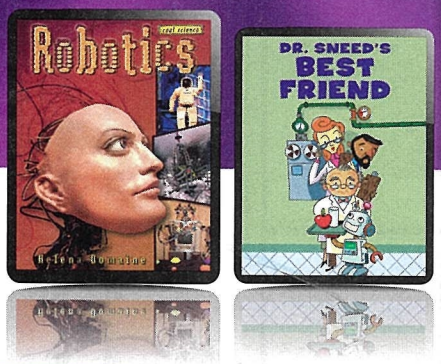
Lesson

25



Vocabulary in Context

1 artificial

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

2 interaction

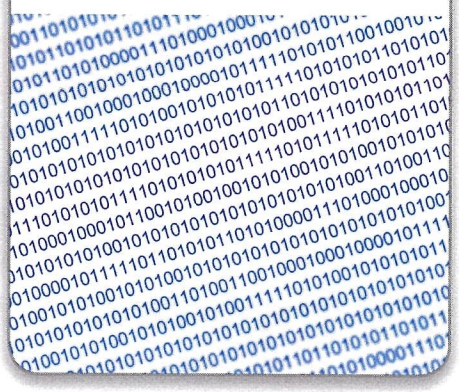
A controller allows the interaction between a player and video game. The game and the player act on each other.

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.



LANGUAGE DETECTIVE

Talk About the Writer's Words

Nouns are words that name people, places, animals, or things. Work with a partner. Find the blue Vocabulary words that are nouns. What clues did you use? Use the nouns in new sentences.

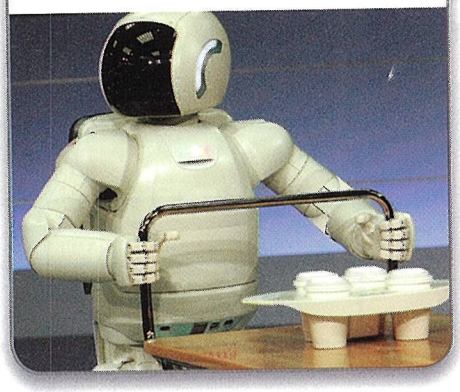
- Study each Context Card.
- Tell a story about two or more pictures, using Vocabulary words of your choice.

5 ultimate

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

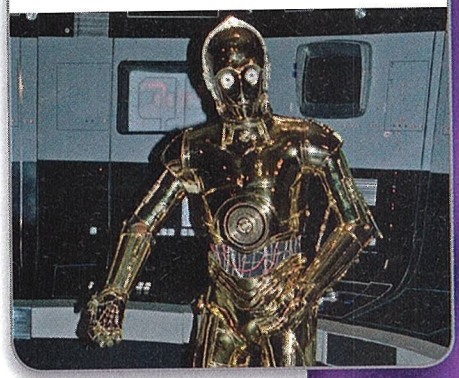
6 domestic

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



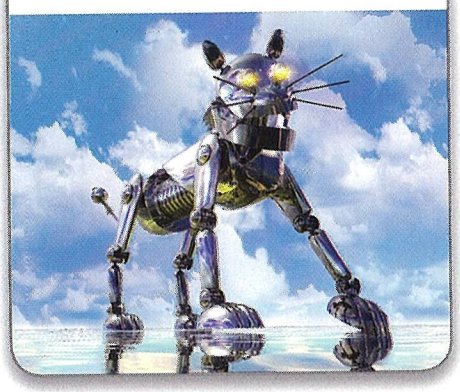
7 uncanny

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.

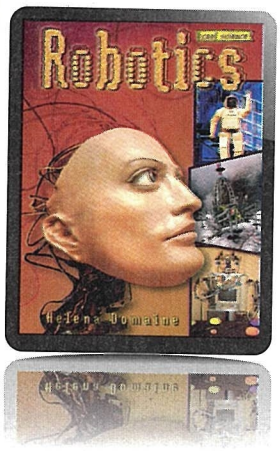


9 literally

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

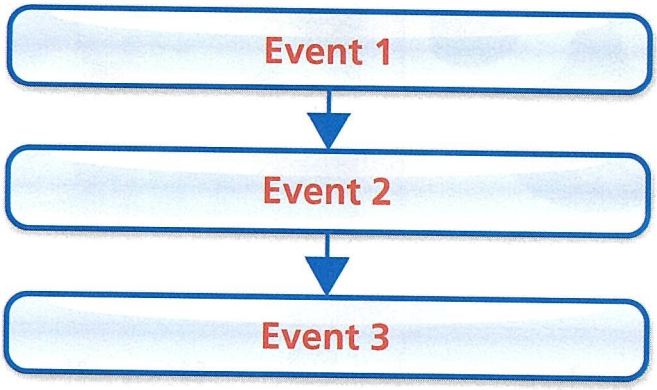
A robot can dive to an ocean depth that is inaccessible to people. Scuba divers could not go there.



Read and Comprehend

TARGET SKILL

Sequence of Events As you read "Robotics," keep track of the **sequence,** or time order, of events in the history and development of robots. Text evidence, such as dates and signal words such as *first*, *after*, *next*, and *finally,* will help you follow the sequence of events. Keeping track of how events are sequenced helps readers understand how each event fits into the overall structure of the text. Use a graphic organizer like this one to help you keep track of events in the text.



TARGET STRATEGY

Visualize Use text details to **visualize,** or picture in your mind, what you are reading.

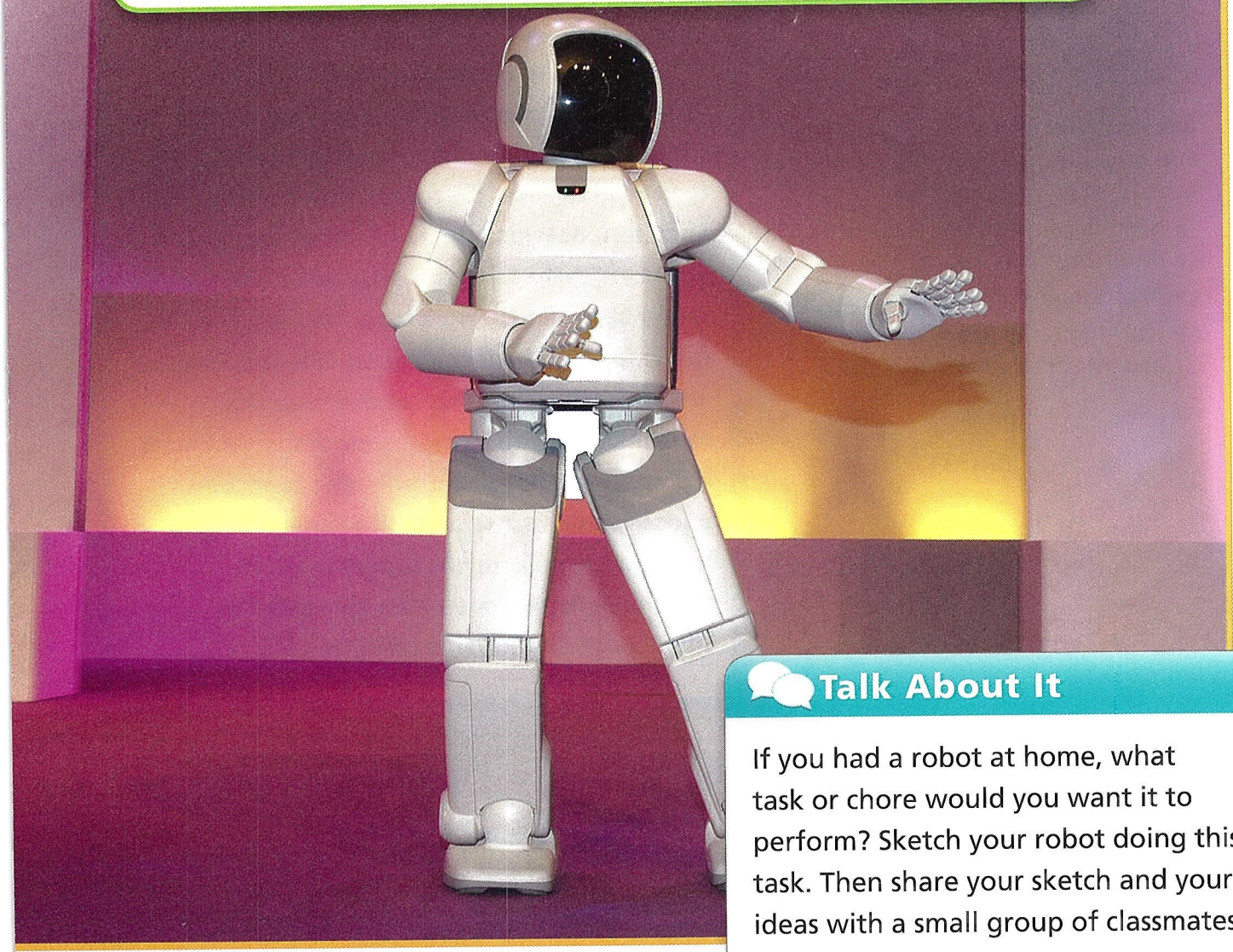
 ELA RI.6.5, SL.6.1c

PREVIEW THE TOPIC

Robots

Robotics is the branch of technology that focuses on the many uses of robots. It also focuses on robot design and structure, how robots are built, and how they work. Some robots are machines that do the same tasks that humans do. They can operate like "mechanical people." Others do jobs that are too dangerous or too difficult for humans to do. These robots help humans accomplish tasks that were once thought impossible.

In "Robotics," you'll learn about the history of robots. You'll also learn some amazing things robots can do.

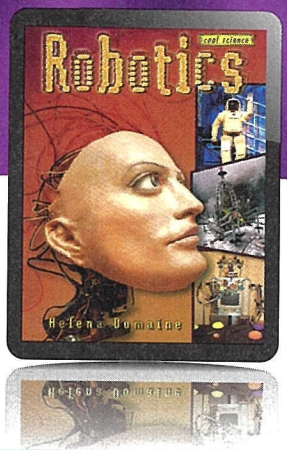


Talk About It

If you had a robot at home, what task or chore would you want it to perform? Sketch your robot doing this task. Then share your sketch and your ideas with a small group of classmates.

Lesson 25

ANCHOR TEXT



GENRE

Informational text gives facts and other information about a topic. As you read, look for:

- headings that begin sections of related text
- photographs and captions
- text structure—the way facts and information are organized

MEET THE AUTHOR

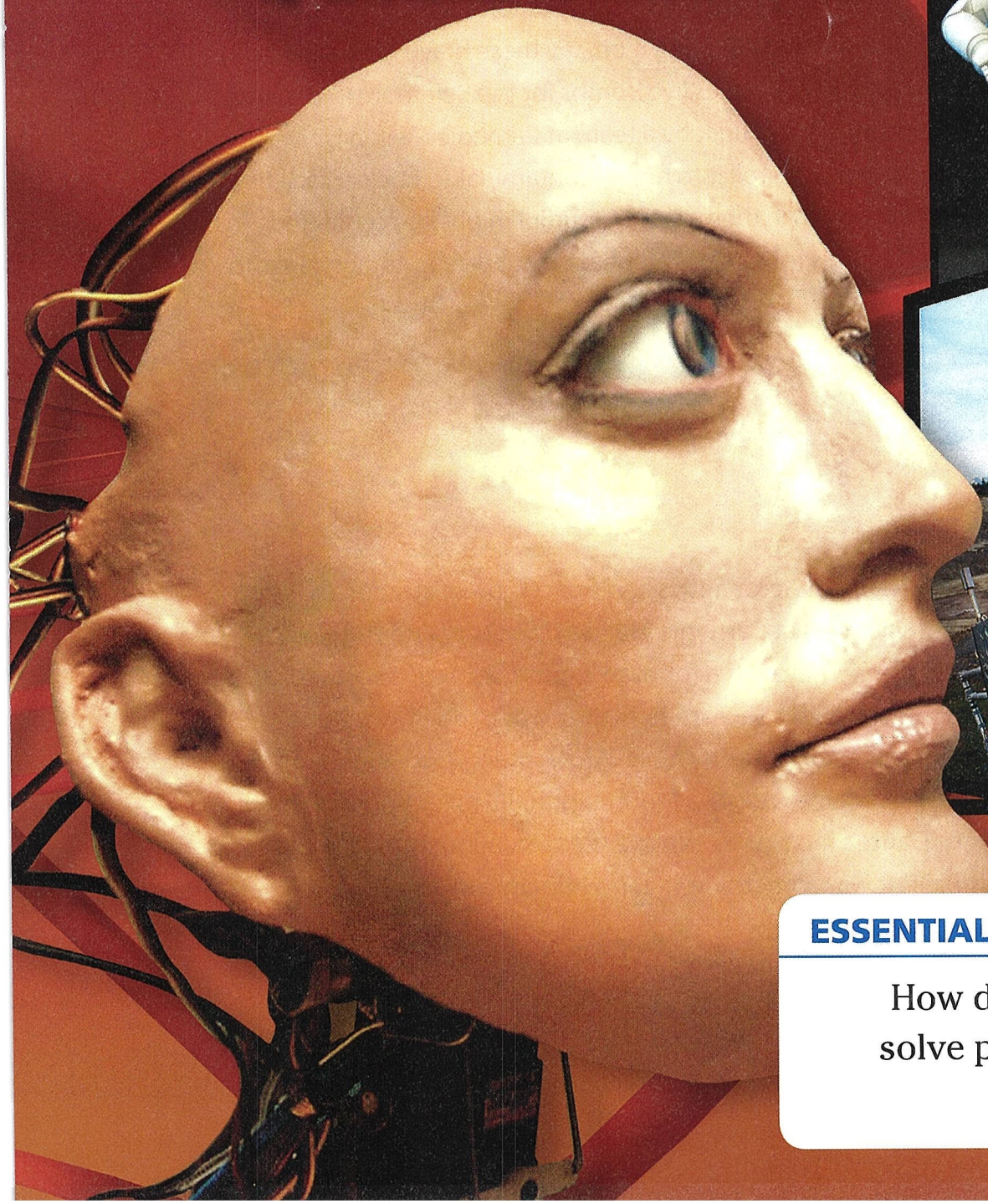
HELENA DOMAINE

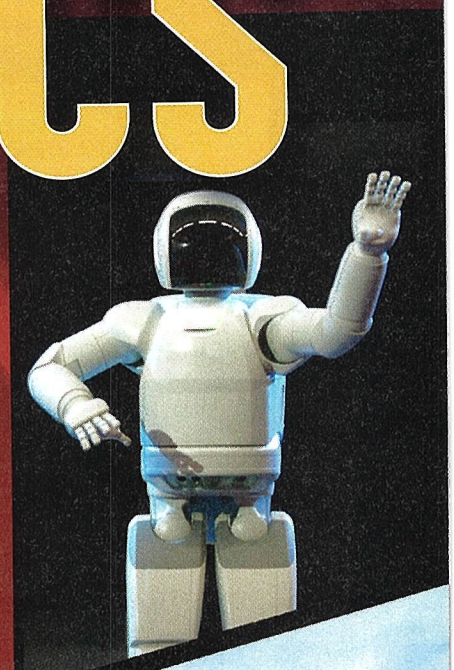
As a young girl, Helena Domaine viewed Fritz Lang's classic 1927 silent movie *Metropolis,* which is a renowned German expressionist science-fiction film starring Alfred Abel, Brigitte Helm, Gustav Frohlich, and Rudolf Klein-Rogge, and she became fascinated by the interaction between the robots and humans. *Metropolis* is set in a futuristic urban dystopia in which wealthy but corrupt intellectuals residing in towers rule over and oppress the throngs of suffering laborers who subsist beneath them. From the catacombs of the city emerges a virtuous woman who ultimately has a malevolent robotic double made of her by a megalomaniac scientist, with her robot double eventually inciting a catastrophic melee between the laborers and intellectuals. By the end of the film, the robot has been destroyed and the apocalypse averted, after which a truce ensues, with the laborers and intellectuals finally beginning to work together. Based on the fascination she had with this scintillating movie and with other characters in science fiction, Helena Domaine became a book author who now writes science fiction and scientific nonfiction, and she remains interested in a variety of topics including popular myths such as the Loch Ness monster, Bigfoot (or "Sasquatch"), the Abominable Snowman, and UFOs.

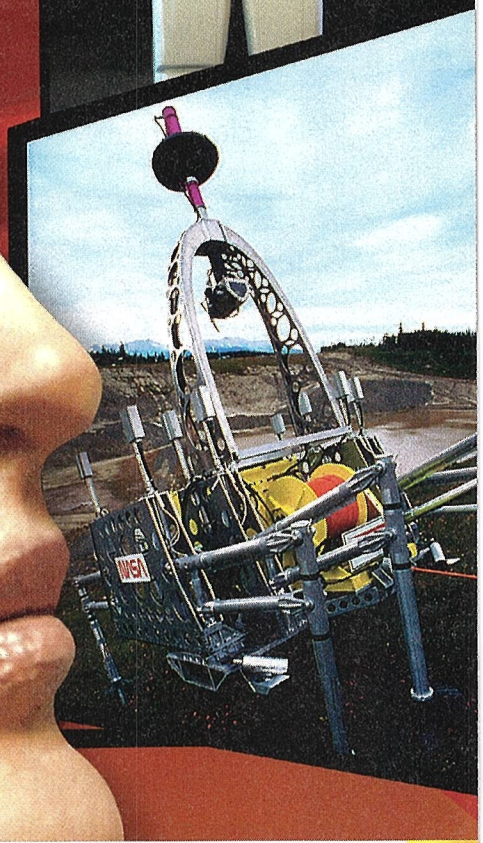
ELA RI.6.2, RI.6.4, RI.6.5, RI.6.10

Robotics

by Helena Domaine







ESSENTIAL QUESTION

How do robots solve problems?

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.

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.

Dante II makes its way beside a river in Alaska.

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.

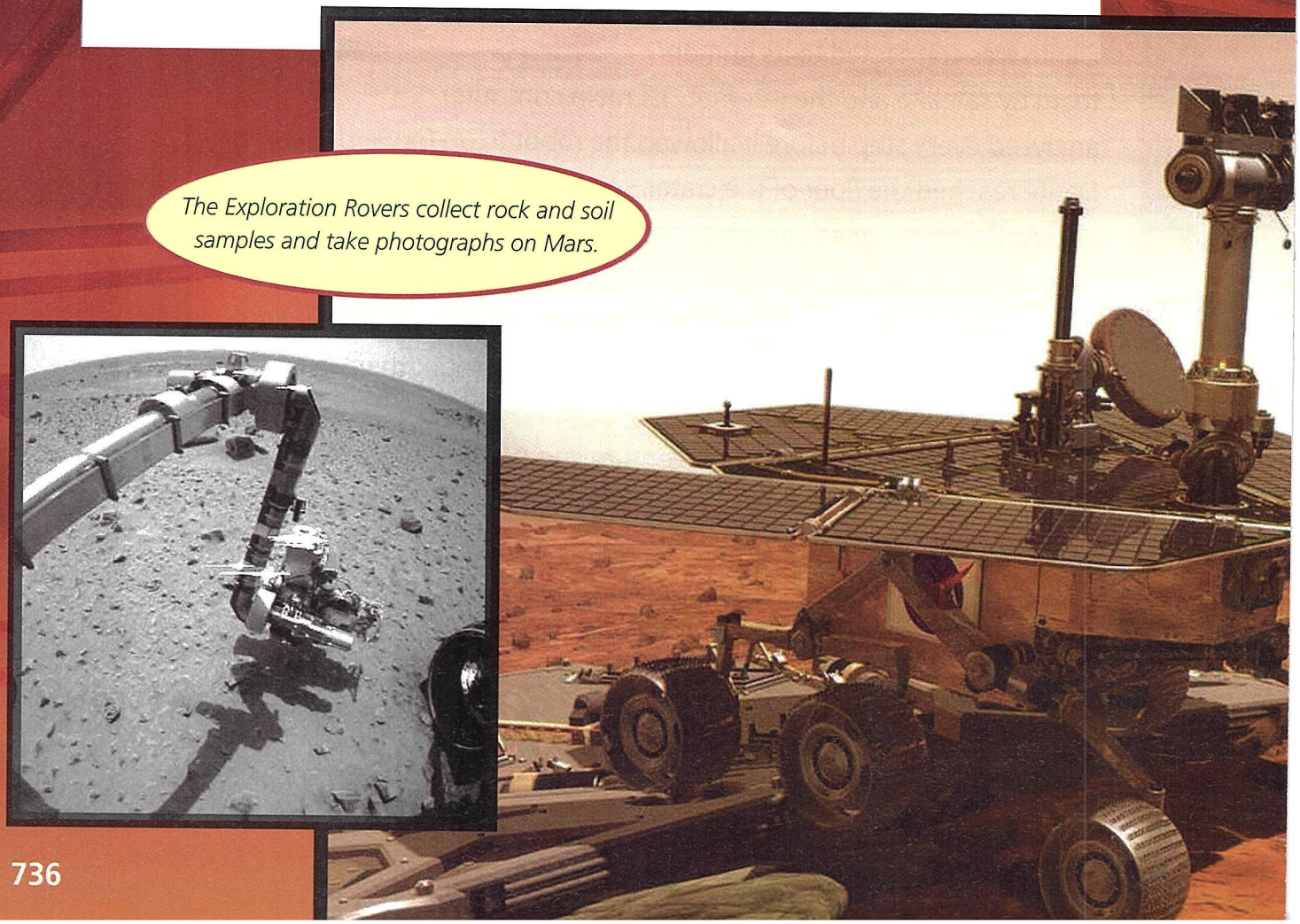
But a near-perfect robotic adventure ended in a way familiar to anyone who's ever climbed a steep hill. Dante slipped in some loose dirt on the way out of the volcano and could not climb out. The science team had to call in a helicopter to rescue the robot.

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.

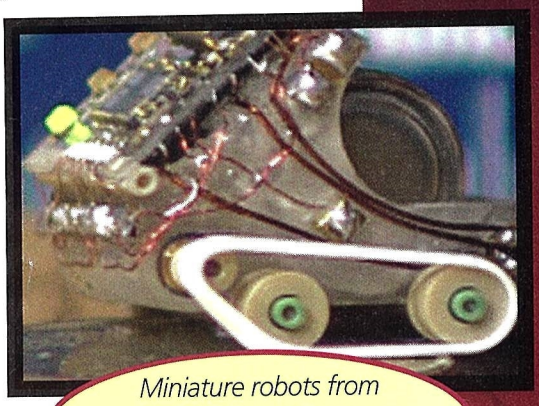
The Rovers' connection to NASA is tricky, too. Communications between the robots and NASA scientists are sent through millions of miles of space. The information travels via computer connections to orbiting spacecraft and antennas on Earth. As the Rovers roll across Mars, any helpful messages from their 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

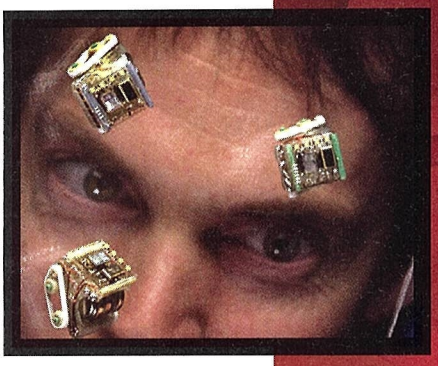
Scientists at the California Institute of Technology are working on the designs for a tiny snake-bot to travel through the human gastrointestinal system (the stomach and intestines). As a doctor looks down a patient's throat for swelling or other signs of illness, the snake-bot would look at a patient's 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.



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

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.

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.

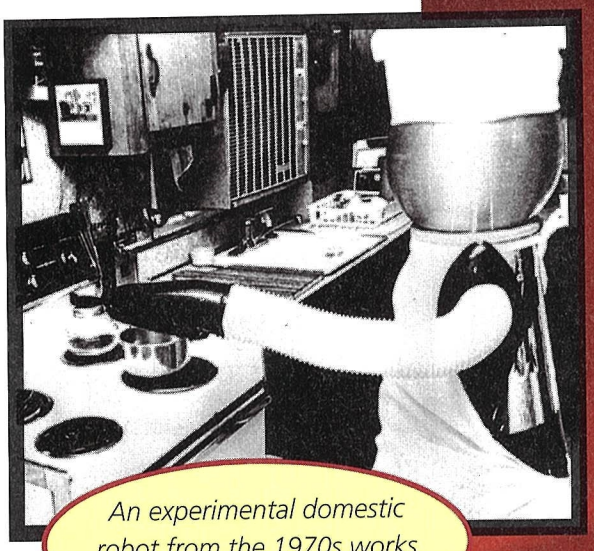
That first 1997 tournament was a little chaotic. The robots had a tough time finding the ball. They struggled to recognize their teammates and figure out which goal they were supposed to aim for. As engineers improved the robots' vision systems, play improved. By the 2001 games, the 8-inch (20-cm)-tall, 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.

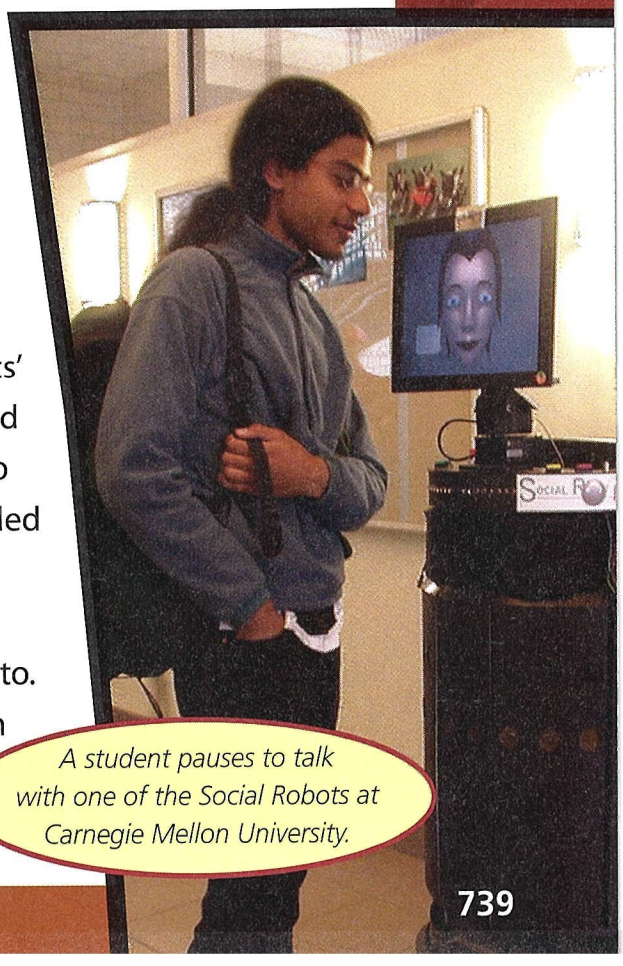


An experimental domestic robot from the 1970s works in the kitchen.

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.



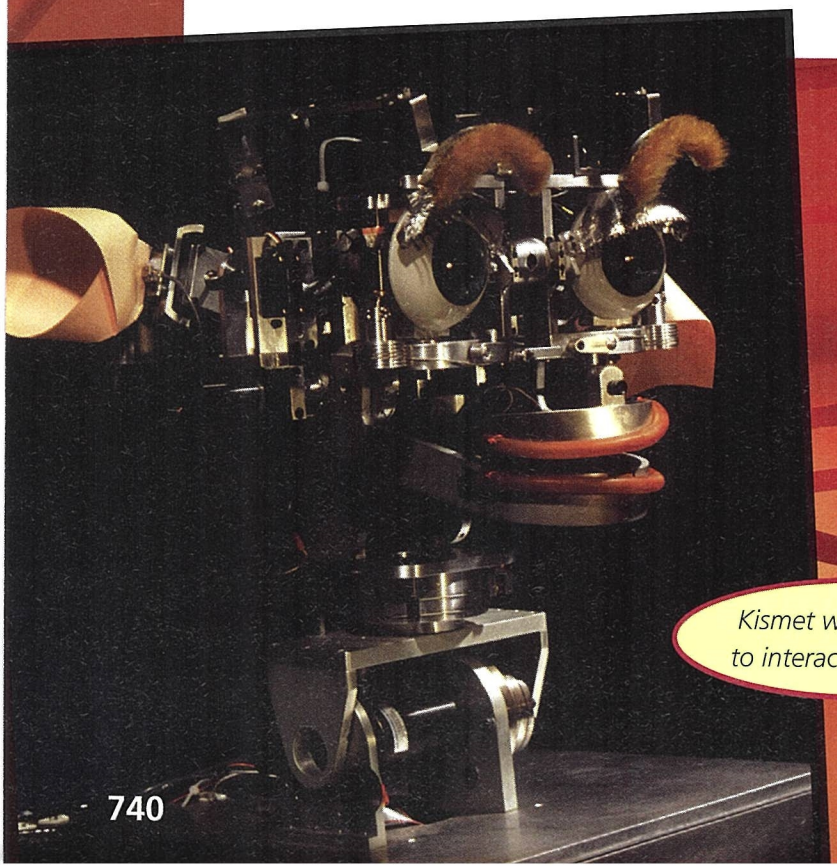
A student pauses to talk with one of the Social Robots at Carnegie Mellon University.

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."

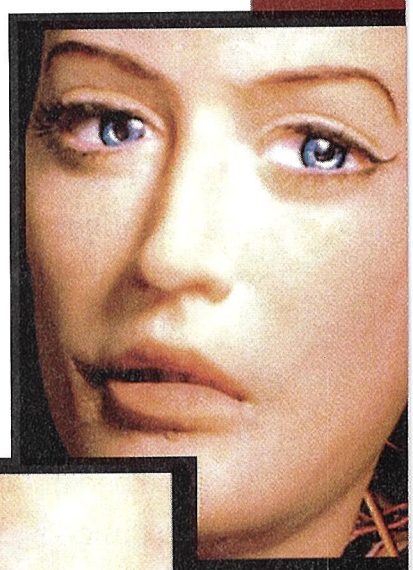


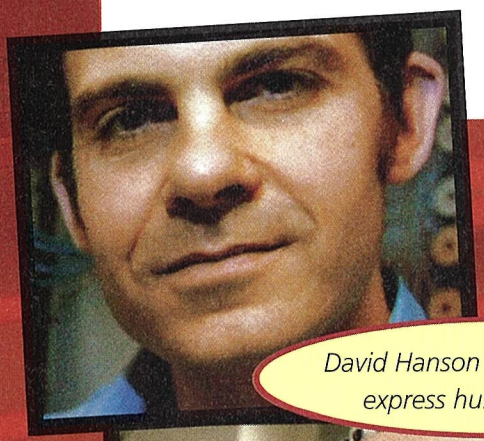
Kismet was developed to interact with people.

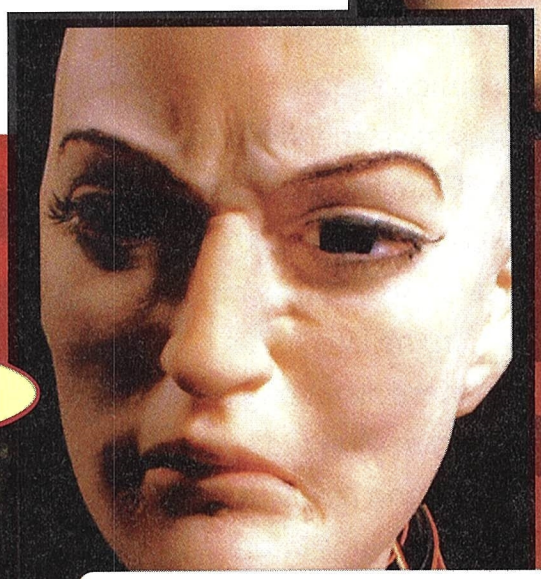
Heads Will Roll!

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.

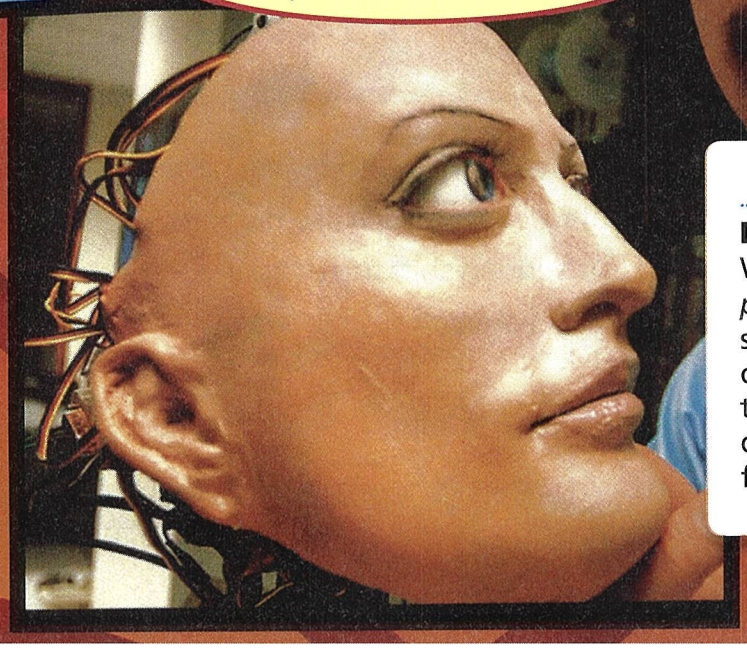
Moments later, the head began to move, turning right and left. It smiled, sneered, and frowned. Hanson, a robot scientist at the University of Texas at Dallas, called the head K-bot. K-bot can mimic the major muscles in a human face. It has 24 servomotors under its specially developed skin. Digital cameras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







David Hanson designed K-bot to express human emotions.



ANALYZE THE TEXT

Domain-Specific Vocabulary
When the author uses a term such as *polymer skin,* she is using language specific to her own field of study. How does the author help you understand this term? What other technical words does the author use? How can you figure out their meanings?

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.

In one photograph, a Tokyo University of Science student poses with a look-alike humanoid robot. In the other, a student makes an adjustment to a robot that does not have human features.

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.

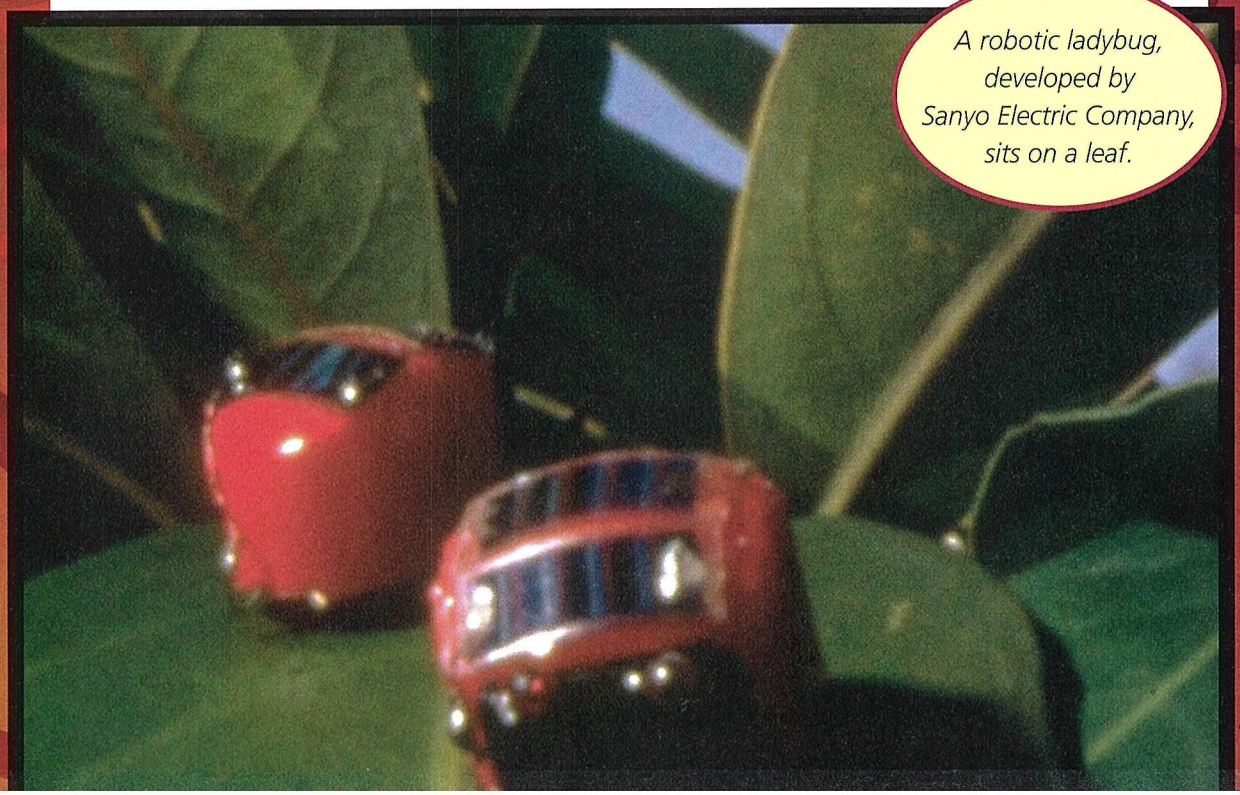
Experience Is the Best Teacher

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.



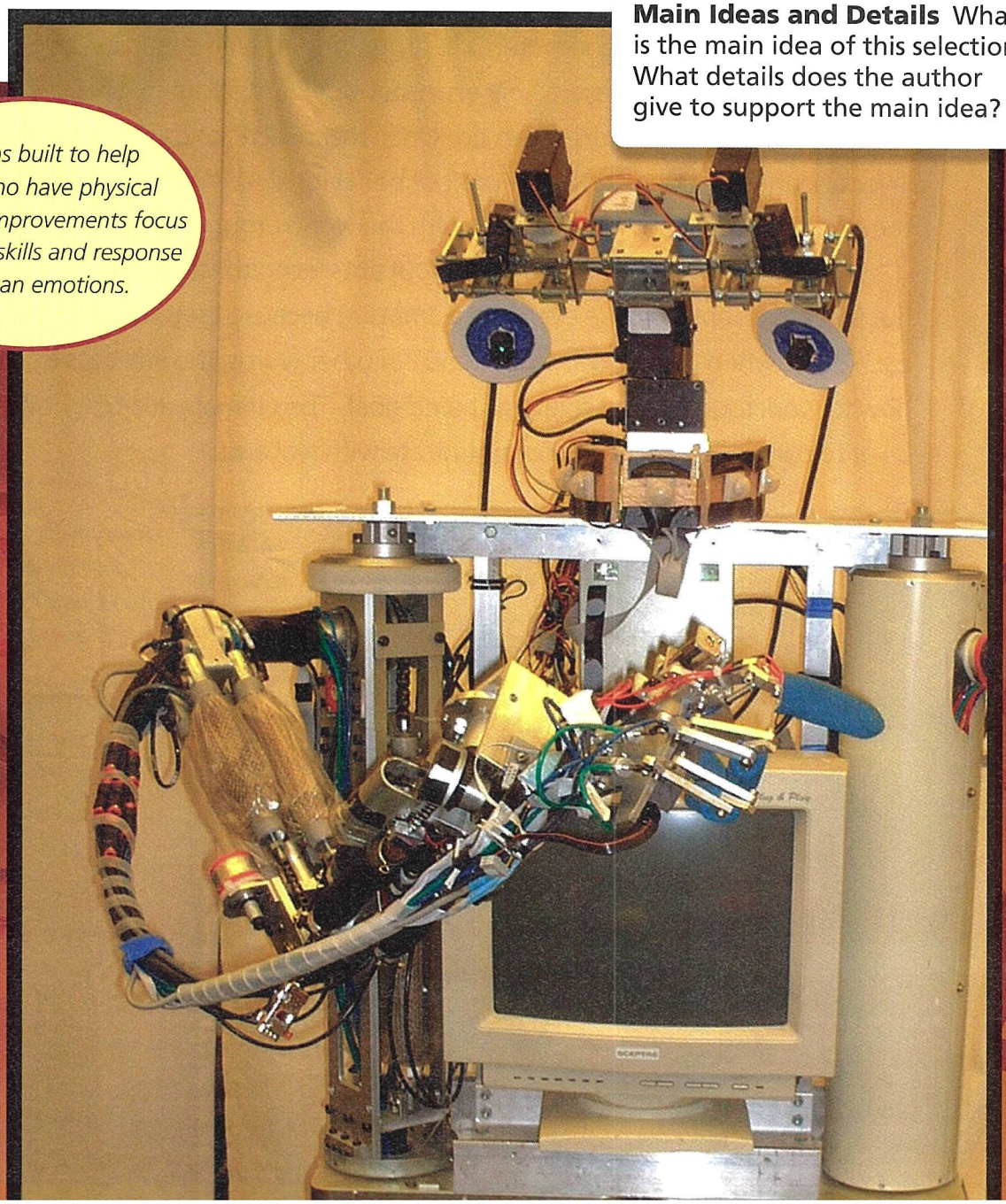
A robotic ladybug, developed by Sanyo Electric Company, sits on a leaf.

"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.

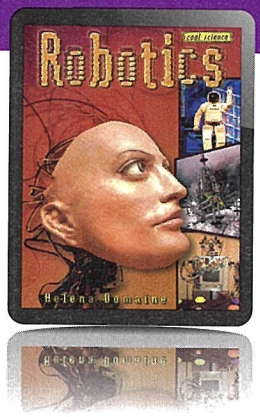
Will Robots Obey the "Laws"?

In the informational article you just read, author Helena Domaine asks whether the future's highly intelligent robots will be loved by humanity or loathed and feared by us. The answer to this question may hinge upon whether robots can either be designed to regulate their own behavior or somehow restrained from breaking certain basic rules of behavior. Fans of science fiction are already familiar with one proposed set of rules to govern robotic "morals" and keep our robotic servants from becoming our masters.

In 1942, science-fiction patriarch Isaac Asimov, in a short story titled "Runaround," enumerated the Three Laws of Robotics, which were thenceforth integrated into much of Asimov's future fiction involving robots; the Three Laws form an interdependent series and may be paraphrased as follows:

- First Law of Robotics: A robot may not cause injury to a human through the robot's actions or allow a human to be injured as a result of the robot's failure to act.
- Second Law of Robotics: A robot must obey the edicts or orders of its human rulers, unless such orders would cause the robot to violate the First Law.
- Third Law of Robotics: A robot must not allow itself to be eradicated or destroyed, unless its own self-protection would violate the First Law or the Second Law.

Here is a theoretical puzzle for you: Can you imagine any scenario in which the Three Laws of Robotics, if built into a robot's software so that it was forced to follow them, would not ensure the safety of humanity? If robots obeyed Asimov's Laws, could we feel secure with them working, playing, and "living" among us?



Dig Deeper

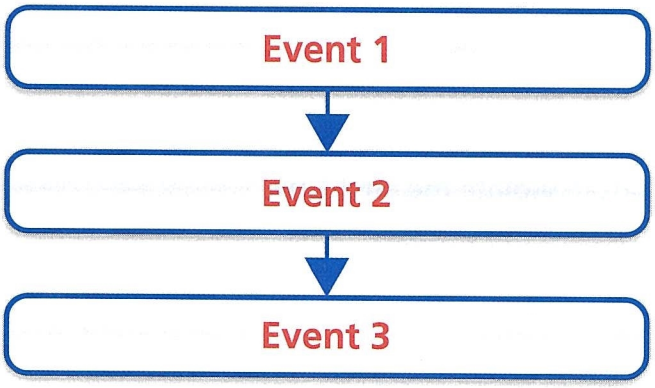
Use Clues to Analyze the Text

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.

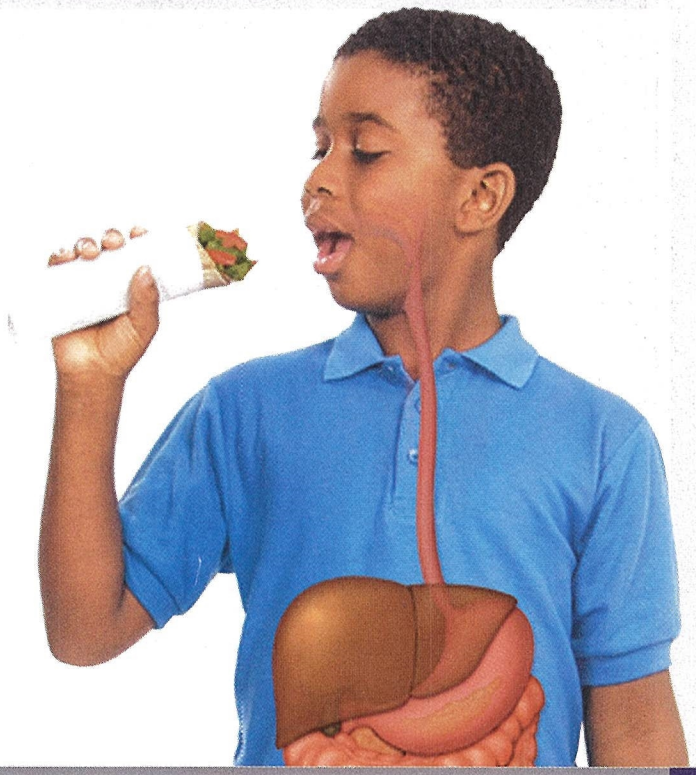
Look back at page 738 in "Robotics." The author explains the sequence of events in the RoboCup Open, which began in 1997. What happened from 1997 to 2003 that shows how the robots' soccer competition changed and improved through the years?



ELA RI.6.2, RI.6.4, RI.6.5, L.6.6

Domain-Specific Vocabulary

Authors of informational text often use words and phrases specific to one domain, or field of study. This **vocabulary** can include words only used in the field, such as *micro-bot*. It can also include familiar words with **technical meanings,** such as *stroke*. Look back at page 737 for words used in medicine, such as *diagnose* and *bloodstream*. As you read informational text, look for clues that help you figure out the meaning of domain-specific vocabulary.



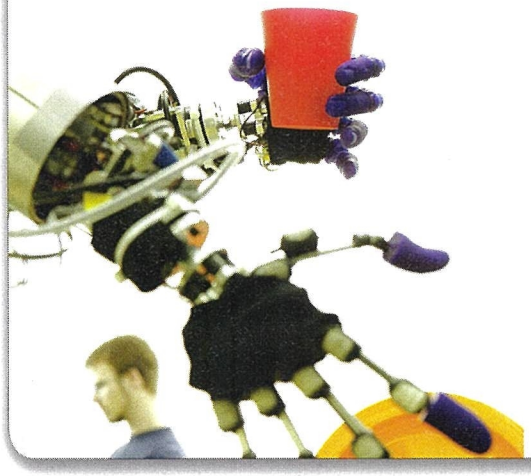
Main Ideas and Details

The **main idea** of a selection is the **central idea,** or most important idea. It tells what the selection is mainly about. **Details** support the main idea by giving facts and other text evidence. Look back at "First to Fly" in Lesson 22. The main idea of the selection is that the Wright brothers invented the first airplane. Many details support this main idea by telling about the brothers' work with gliders, their building of the airplane, and their first flights. Identifying the main idea of a selection and the details that support it helps you better understand the selection.

Your Turn

RETURN TO THE ESSENTIAL QUESTION

Turn and Talk Review the selection with a partner to prepare to discuss this question: *How do robots solve problems?* As you discuss, use text evidence to review and explain your key ideas, asking questions to clarify your partner's responses.



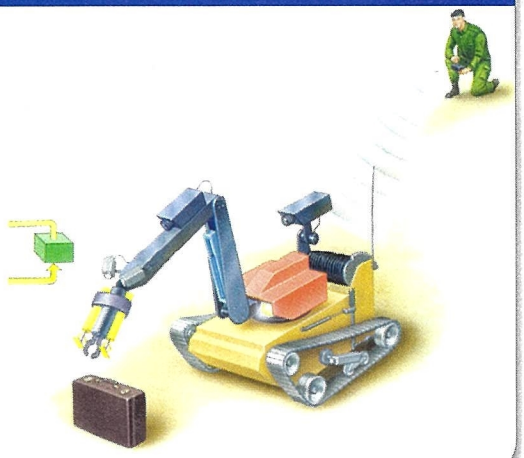
Classroom Conversation

Continue your discussion of "Robotics" by explaining your answers to these questions using text evidence:

1. The author suggests that robotics "may even improve upon its own technology." What does she mean by this statement?
2. In what ways are Dante and the NASA twin Rovers alike and different?
3. What might the author's purpose have been in choosing the headings in the selection?

WHAT DOES IT MEAN?

Use Reference Sources Choose three of these words from the selection: *contaminated*, *hazardous*, *descent*, *compound*, *behavior*. Find each word in the selection. Then look up each word in a print or digital dictionary. Write a new sentence for each word that gives a clue to its meaning. Share your sentences with a partner.



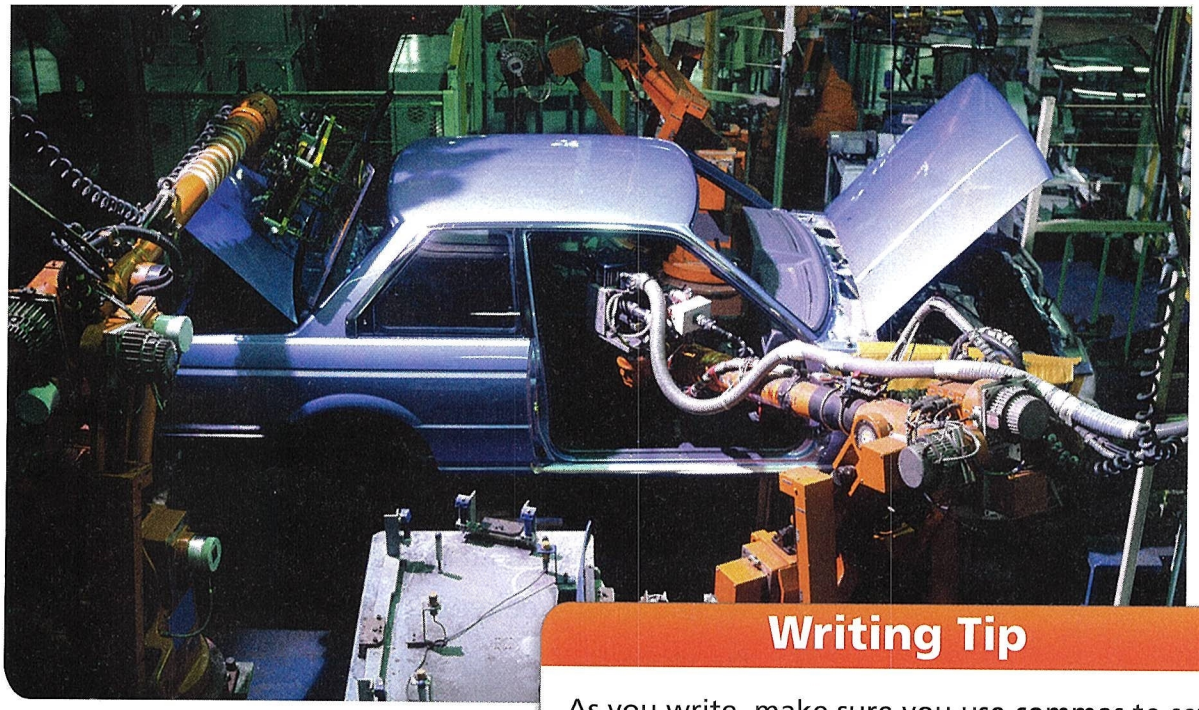
ELA RI.6.1, W.6.1a, W.6.9b, SL.6.1c, L.6.2a, L.6.4c

Performance Task

WRITE ABOUT READING

my WriteSmart

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.

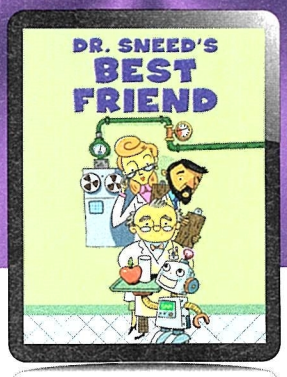


Writing Tip

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.

Lesson 25

PLAY



GENRE

A **play** tells a story through the words and actions of its characters. It is meant to be performed for an audience.

TEXT FOCUS

Stage directions in a play identify a time or place, describe a setting, or tell about a character's feelings or actions.

DR. SNEED'S BEST FRIEND

by Nick James

Cast of Characters

Dr. Garcia
Dr. Watkins
Dr. Sneed
Sam

Scene 1

(It is Monday morning at a robotics laboratory. Two scientists enter to find Dr. Sneed, hard at work.)

Dr. Garcia: (*looking around*) Wow, Sneed, it looks as if you've been working all weekend.

Dr. Watkins: Yes, I thought the data for our new project wasn't due yet.

Dr. Sneed: (*nervously*) Well, actually, ah, I've been working on a top-secret project that requires my undivided attention. I didn't even have time to eat breakfast.

ELA RL.6.5, RL.6.10

Dr. Garcia: Top-secret? Hmm. Interesting. Care to share any information about it?

Dr. Sneed: Impossible. All I can say is that it's about artificial intelligence.

Dr. Watkins: Well, that's what we all do. Come on, Sneed, you can trust us.

Dr. Sneed: (*pacing*) Fine, if you must know, the project concerns the use of sensors in a domestic setting.

Dr. Garcia: I have an uncanny feeling there is a lot more to it than that—but I've got work to do. Now, good day, gentlemen.

Scene 2

(Later that morning, a small robot knocks and enters, carrying an apple and a glass of milk.)

Dr. Watkins: (*to the robot*) Hello, little dude. Can I help you?

Sam: (*in a flat, mechanical voice*) No, I do not require any help.

Dr. Sneed: (*rushing over to the robot*) Sam, what are you doing here?

Sam: I am delivering your apple and glass of milk, Dr. Sneed. A healthy snack!

Dr. Sneed: (*in an embarrassed whisper*) Sam, you were programmed to come here at noon. It's only nine o'clock.

Sam: I am sorry, Dr. Sneed. A stimulus in my motherboard overrode my internal clock.

Dr. Garcia: What's he talking about?

Sam: You did not eat breakfast, Dr. Sneed. I sensed that your stomach was growling.

Dr. Garcia: Well, Dr. Sneed, I see you've achieved a new interaction between human and machine.

Dr. Watkins: Yes, I always thought this kind of friendship from a robot was impossible. I suppose this is your top-secret project?

(*Dr. Sneed nods, embarrassed. He takes a big bite of the apple.*)

Sam: Goodbye, Dr. Sneed. (*He turns around and rolls toward the door.*)

Dr. Sneed: Hold on a second, Sam.

Sam: A second is not an object that I can hold, Dr. Sneed.

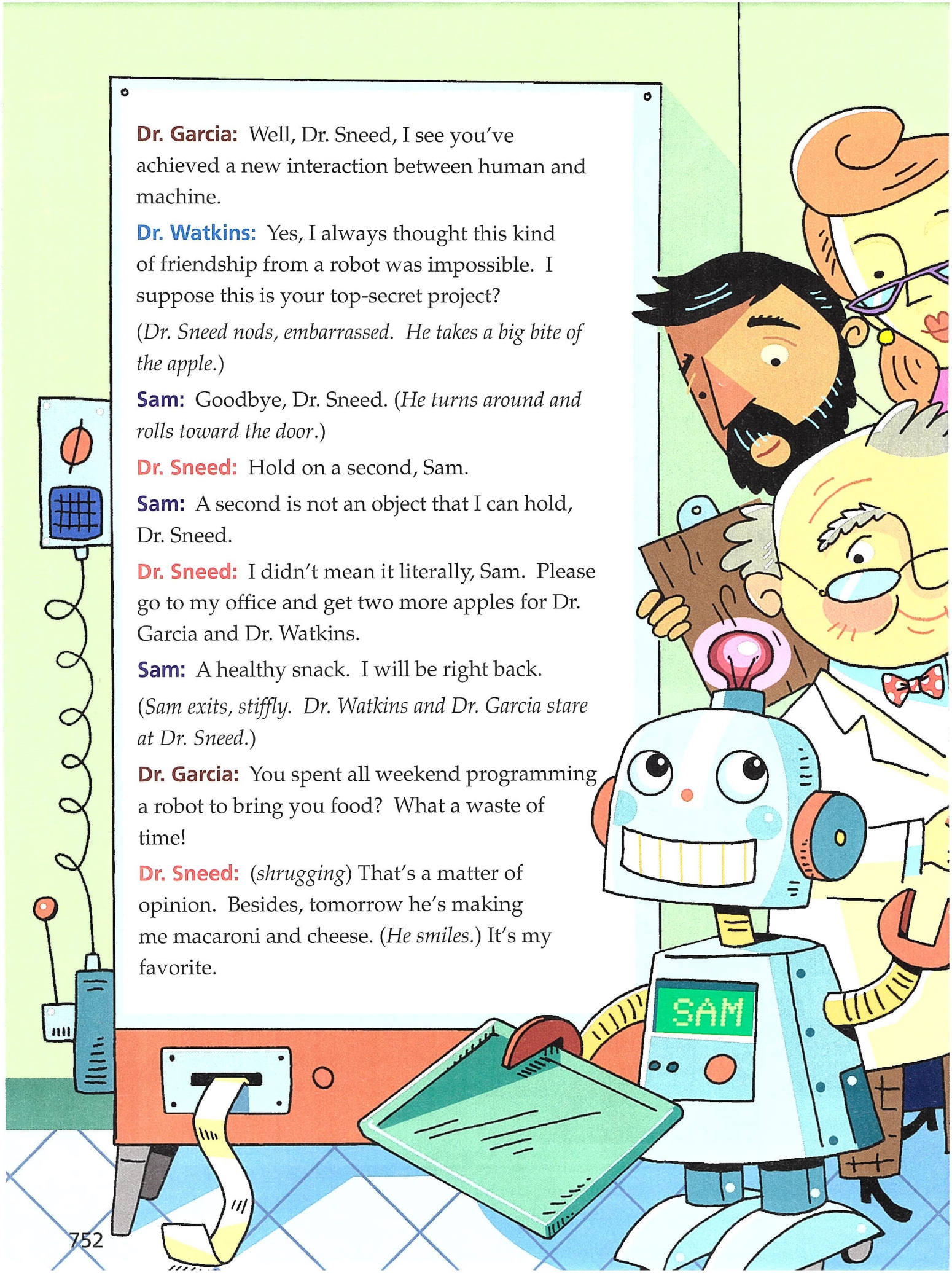
Dr. Sneed: I didn't mean it literally, Sam. Please go to my office and get two more apples for Dr. Garcia and Dr. Watkins.

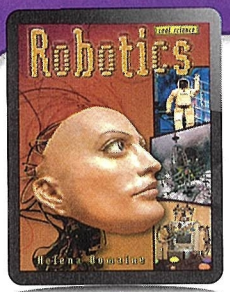
Sam: A healthy snack. I will be right back.

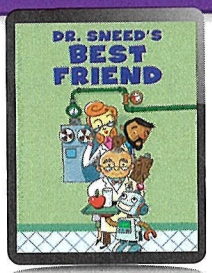
(*Sam exits, stiffly. Dr. Watkins and Dr. Garcia stare at Dr. Sneed.*)

Dr. Garcia: You spent all weekend programming a robot to bring you food? What a waste of time!

Dr. Sneed: (*shrugging*) That's a matter of opinion. Besides, tomorrow he's making me macaroni and cheese. (*He smiles.*) It's my favorite.







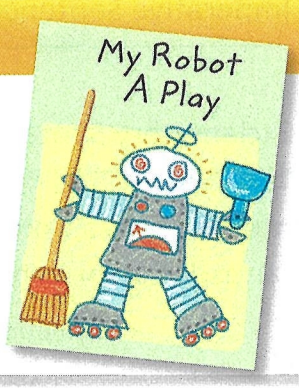
Compare Texts

TEXT TO TEXT

Evaluate Robot Tasks The robots in "Robotics" and in "Dr. Sneed's Best Friend" perform a variety of tasks. Which tasks do you think are most worthy of the time, effort, and resources required to develop a robot? Which are least worthy? Think about all the robot tasks you have read about, and then list them from most to least important. Use text evidence to support your ideas.

TEXT TO SELF

Write a Scene Choose one of the robots mentioned in "Robotics." Write a short play scene in which the robot helps you do a typical activity in your life, whether for school, work, or fun.



TEXT TO WORLD

Use Robot Resources Choose a kind of robot that interests you, such as a robot used in school competitions, a robot from a movie, or a robot used to work in space. Use print and online sources to find out more about that kind of robot.

ELA RL.6.1, RI.6.1, W.6.8

Grammar

What Are the Mechanics of Writing? *Mechanics* refers to the correct use of **capitalization** and **punctuation.** You have learned to capitalize proper nouns and proper adjectives. You have learned how to punctuate declarative, interrogative, imperative, and exclamatory sentences, too.

Declarative Sentence	proper noun — period A robot named Dante II will descend into a volcano.
Interrogative Sentence	proper adjective — question mark Which Alaskan volcano will it explore?
Imperative Sentence	period Let me see the viewing screen.
Exclamatory Sentence	exclamation point What strength that robot has!

An **interjection** is a word or words that show feeling. If it stands alone, follow it with an exclamation point. If it begins a sentence, set it off with a comma.

exclamation point
Wow! The robot is walking on red-hotrock!

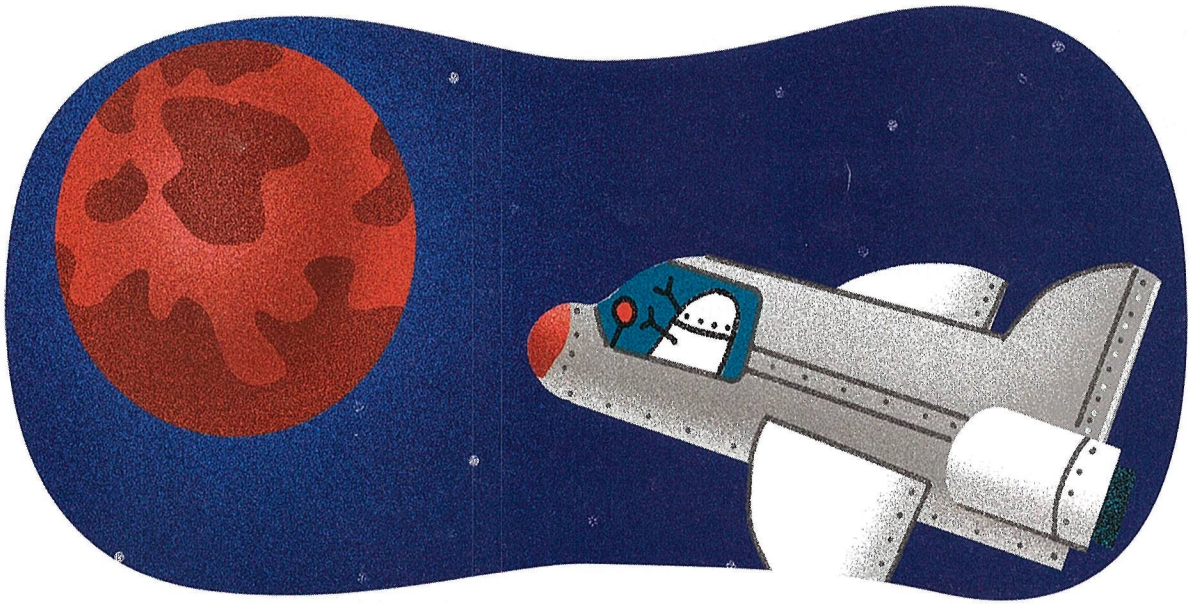
comma
Hey, its sensors have detected toxic fumes!

Try This!

Write the sentences below on another sheet of paper. Use correct capitalization and end punctuation. Place the correct punctuation after the interjection.

1. Look at this photo of the martian landscape
2. Did a robot take that photo while on mars
3. Oh What a breathtaking photo it is
4. I want to attend the california institute of technology

Your readers will have an easier time reading and understanding what you write if you use correct capitalization and punctuation.



Incorrect Capitalization and Punctuation	Correct Capitalization and Punctuation
will a robot be aboard the next american space vehicle. Hey here is an article about an upcoming flight to mars, According to the article, the passengers will be robots Give it a quick read, and then return it to me?	Will a robot be aboard the next American space vehicle? Hey, here is an article about an upcoming flight to Mars. According to the article, the passengers will be robots! Give it a quick read, and then return it to me.

Connect Grammar to Writing

As you revise your argument, correct any errors in capitalization or punctuation that you find.

Reading-Writing Workshop: Revise

Argument Writing

Interactive Lessons

- Writing as a Process: Revise and Edit
- Writing Arguments: Provide a Conclusion

my WriteSmart

Elaboration When writing a strong **argument,** good writers state a **claim,** or an opinion they want to express. To argue their claim, they include **reasons** supported by **evidence.** The evidence may take the form of facts, details, examples, and believable sources. As you revise your argument, be sure you have used strong, specific words in order to convince readers. Also check for transition words, phrases, and clauses that clarify relationships between the claim and its reasons.

Orlando wrote a first draft of his argument about cell phones. Then he revised his draft. He replaced a vague word with a strong word to make his claim clearer and his reason stronger.

Writing Process Checklist

Prewrite

Draft

▶ Revise

- ☑ Did I state my claim clearly?
- ☑ Did I order my reasons according to importance?
- ☑ Did I maintain a formal style and consistent tone?
- ☑ Did I clarify relationships between my claim and its reasons?
- ☑ Did I end with a conclusion?

Edit

Publish and Share

Revised Draft

For one thing, cell phones are ~~a good~~ the perfect tool for families to use to share important information quickly. ~~If~~ For example, i parents will be late picking up their children, cell phones can help. ~~If~~ Likewise, i children want permission to go somewhere, they can call or text on a cell phone. Whenever there is a change of plans, cell phones can help.

ELA W.6.1a, W.6.1b, W.6.1c, W.6.1d, L.6.3b

Final Copy

Cell Phones Are Beneficial

by Orlando Reyes

On a typical day, look around you. How many people are talking or texting on cell phones? Today, cell phones are widely used by both adults and kids. Cell phones are an invention that has changed people's lives for the better.

For one thing, cell phones are the perfect tool for families to use to share important information quickly. For example, if parents will be late picking up their children, cell phones can help. Likewise, if children want permission to go somewhere, they can call or text on a cell phone. Whenever there is a change of plans, cell phones can help.

A recent TV news report told of a family of five who got separated at the mall and couldn't find each other. They did not have cell phones with them. Once mall security helped them out using a cell phone, the family got together. Using cell phones can resolve problems quickly. Families benefit from having cell phones because family members can all stay connected.

Reading as a Writer

Which words did Orlando replace in his draft to make his argument stronger? What can you add to make your reasons clearer and stronger?

In my final paper, I made sure my claim was supported with reasons. I also added transition words to clarify the relationship between my claim and reasons. I made sure my essay had a conclusion.

Interactive Lessons
- Writing to Sources
- Writing Arguments: Support Your Claim
- Writing Arguments: Provide a Conclusion

Write an Argument

TASK In "Number the Stars," Uncle Henrik tells Annemarie, "That's all that *brave* means—not thinking about the dangers. Just thinking about what you must do." You have read other selections in which a character or subject takes a risk to achieve a goal. Which selection contains the best example of Uncle Henrik's definition of *brave*?

Reread "Number the Stars," "First to Fly," and "Harriet Tubman" and look for details about the risks that someone took. Then decide which selection best demonstrates Uncle Henrik's definition of *brave* and write an argument to persuade others to agree with you. Use text evidence to support your claim. Remember that your audience is your teacher and your classmates.

Make sure your essay

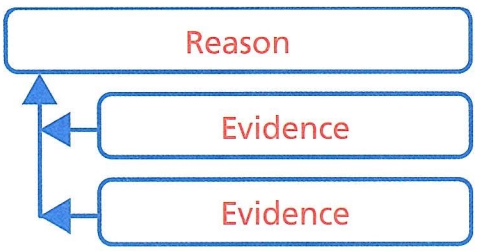
- includes an introduction, body, and conclusion
- clearly states your topic and your claim about the topic
- presents your reasons and supporting evidence
- uses transitions to link reasons and evidence to your claim

PLAN

myNotebook

Use the annotation tools in your eBook to gather evidence to support your claim.

Gather Details Which character best shows bravery by ignoring danger and focusing on what must be done? What details show this kind of bravery?



ELA W.6.1a, W.6.1b, W.6.1c, W.6.1d, W.6.1e, W.6.4, W.6.5, W.6.9, W.6.10, SL.6.4

DRAFT

my WriteSmart

Write your rough draft in *my*WriteSmart. Focus on getting your ideas down rather than perfecting your word choices.

Write Your Argument Now begin working on your argument. Use the flowchart and what you have already learned about writing an argument to create your draft.

INTRODUCTION

Write the **introduction** for your essay. Consider starting with a question or a quotation that will grab readers' attention. Let your readers know the **topic** you are writing about. Then **introduce your claim** about the topic and suggest how you plan to **support** it.

BODY

Develop the **body** of your essay by providing clear **reasons** and relevant **evidence** from the text. Give enough evidence to show that you understand the topic and the text well. Your **ideas** should flow smoothly, with **transition words and phrases** showing the relationships between claim, reasons, and evidence. **Organize** your paragraphs in a logical order that makes your argument easy to understand.

CONCLUSION

In your **conclusion,** restate your claim and summarize your support in a way readers will remember.

REVISE

Review Your Draft Remember that the revision and editing steps give you a chance to look carefully at your writing and make changes. Work with a partner to determine whether your argument includes a clearly stated claim and provides supporting evidence in a logical way.

my WriteSmart

Have your partner review your argument in *my*WriteSmart and note where your claim needs clarification or more support. Discuss how to make improvements.

Purpose and Organization	Evidence and Elaboration	Conventions
☑ Will my introduction grab readers' attention?	☑ Have I used reasons and evidence from the text to support my claim?	☑ Does my argument include a variety of complete sentences?
☑ Does my introduction present the topic and clearly state my claim about the topic?	☑ Is all of my evidence relevant to my claim?	☑ Have I used quotation marks around any phrases or sentences taken directly from the text?
☑ Does the body of my argument contain ideas that flow well and are logically organized?	☑ Do transitions clearly show the relationships between my claim, reasons, and evidence?	☑ Is my spelling, punctuation, and capitalization correct?
☑ Does my argument have a strong and memorable conclusion?	☑ Have I used a formal style of writing throughout my argument?	

PRESENT

Create a Finished Copy Write or type a final copy of your argument. You may want to include an illustration of a scene in which your chosen subject or character demonstrates bravery.

Choose a way to share your argument with your classmates. Consider these options:

1. Read your argument aloud to your classmates, using appropriate tone and expression.
2. Post your argument on the school website and invite your classmates to respond to your ideas.
3. Present your argument as a debate with a classmate who has chosen a different person or character as the best example of bravery.