



# ScienceWorld®

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ISSUE DATES	9/3	9/17	10/8	10/22	11/12-26	12/10	1/14	2/4	2/18	3/10	3/31	4/21	5/12
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**REALITY TV?** Six strangers will soon be locked up inside a small enclosed space. There, they will live and work for 520 days. Will living in isolation cause them to go bonkers? These people aren't the next reality TV stars. To find out what they are doing, read "Mission: Mars" (p. 12).

As always, we welcome your comments or suggestions. Remember: If you have a "Teacher to Teacher" tip (see below), be sure to share it with us. As always, we welcome your suggestions. E-mail us at [scienceworld@scholastic.com](mailto:scienceworld@scholastic.com). — The Editors

## Features

PAGE	CONTENT	TITLE SUMMARY	NATIONAL SCIENCE EDUCATION STANDARDS	LESSON IDEAS
8	Life: Animal Adaptations	<b>Hanging Out at a Bat Hospital</b> Saving threatened bats.	<b>Grades 5-8:</b> Regulation and behavior <b>Grades 9-12:</b> Behavior of organisms	Have students learn more about bats with the <b>chart-reading activity</b> on <b>TE 6</b> .
12	Earth: Mars Exploration	<b>Mission: Mars</b> Scientists simulate a mission to the Red Planet.	<b>Grades 5-8:</b> Earth in the solar system <b>Grades 9-12:</b> Understandings about science and technology	Turn to <b>TE 7</b> for the <b>teacher's instructions</b> to this issue's <b>hands-on activity</b> (p. 15).
16	Physics: Forces and Motion	<b>Spin Master</b> Physics helps a teen become a yo-yo champ.	<b>Grades 5-8:</b> Motions and forces <b>Grades 9-12:</b> Motions and forces	The <b>crossword puzzle</b> on <b>TE 8</b> will help students review the vocabulary words covered in this issue.
20	Special Supplement	<b>Heads Up: Real News About Drugs and Your Body</b> Read about the consequences of being impaired from drug abuse.	<b>Grades 5-8:</b> Personal health <b>Grades 9-12:</b> Personal and community health	This Web site has related resource material: <a href="http://www.scholastic.com/headsup">www.scholastic.com/headsup</a> .

### Coming Next Issue

#### Special Issue on Teen Life

Learn the science behind

- autism
- energy drinks
- eating disorders
- winning dance moves
- ... and more

## Teacher to Teacher

### Tips for using *Science World* in the classroom

**Gary Pinkall, a science teacher at Great Bend Middle School in Great Bend, Kansas,** suggests using this demonstration prior to reading "Spin Master" (p. 16) to teach students about inertia:

Balance a wooden embroidery hoop upright on the opening of an empty sparkling-grape-juice bottle. Place a dime on the inside rim of the hoop, directly above the bottle's opening. If you carefully—and quickly—pull the hoop to one side, the inertia of the dime will keep the coin from flying outward. (I usually put my hand inside the hoop and pull out the hoop quickly.) Result: The dime falls inside the bottle. The kids are amazed by this activity and enjoy trying it.

**TIP FINDER:** Is there an activity that you use to help keep students updated on breaking news in science? Please e-mail a tip to [scienceworld@scholastic.com](mailto:scienceworld@scholastic.com) by December 19, 2007.



Gary Pinkall





LIFE: Animal Adaptations  
**Hanging Out at a Bat Hospital**

### PRE-READING PROMPTS

- Sick bats have been found plummeting to the ground from trees in Australia. What do you think is making the animals sick?
- How are bats beneficial to humans?

### DID YOU KNOW?

- The spectacled flying fox got its name from the pale yellow-colored fur that circles its eyes. This fuzz makes the bat look as if it is wearing glasses, or spectacles.
- Spectacled flying foxes live in camps consisting of several thousand bats. These bat species very rarely sleep, and they are known to be very chatty. Scientists have described their camps as being deafeningly loud with squawking noises.
- Pups rescued by the Tolga Bat Hospital are fed infant formula for human babies or cow's whole milk.
- Each year, the Tolga Bat Hospital takes care of between 100 and 200 orphaned pups.

### CRITICAL THINKING:

- How might the extinction of certain animal or plant species affect your life? Explain your reasoning.

### CROSS-CURRICULAR CONNECTIONS:

**GEOGRAPHY:** Australia is home to several unique species. Have each of the students pick an animal that is indigenous to Australia, and then have them create a fact sheet about the animal. Each fact sheet must include a map showing the animal's distribution range, as well as information about the climate in which the species thrives. Be sure to include the animal's scientific name.

### RESOURCES

- For information about bats in Australia, visit this Web site from the Australian Museum: [www.amonline.net.au/bats/index.htm](http://www.amonline.net.au/bats/index.htm)
- To learn more about saving endangered bats, visit the Web site of Bat Conservation International at [www.batcon.org/](http://www.batcon.org/)



EARTH: Mars Exploration  
**Mission: Mars**

### PRE-READING PROMPTS

- Space agencies have yet to send humans to Mars. What are some challenges that astronauts might face on a future mission to the Red Planet? How might humans prepare for a Mars mission?

### DID YOU KNOW?

- A day in the Mars500 simulation will be divided into eight-hour blocks of work, sleep, and free time. To help keep participants entertained during free time, the simulation spacecraft will carry a supply of books, DVDs, and computer games.
- Mars500 candidates must be between 25 and 50 years old, and be a citizen of one of the following countries: Austria, Belgium, Switzerland, Germany, Denmark, Spain, France, Greece, Italy, Ireland, Norway, the Netherlands, Portugal, Sweden, Britain, and Canada. At press time, the program plans to pay each simulation participant 120 Euros (approximately \$169) per day.

### CRITICAL THINKING:

- Suppose you are an astronaut about to depart on a Mars mission and you're allowed to bring five pieces of personal belongings on the trip. What would you bring? Explain why. Be sure to consider the size of your objects and whether they are safe to carry on board a spacecraft.

### CROSS-CURRICULAR CONNECTIONS:

**ART/LANGUAGE ARTS:** Mars exploration has long been a theme in science-fiction stories and comic books. Have students write a short story or create a comic strip about humans' first trip to the Red Planet.

### RESOURCES

- To learn more about Mars500, visit this Web site from the European Space Agency: [www.esa.int/esaCP/SEMYNY6DWZE\\_index\\_0.html](http://www.esa.int/esaCP/SEMYNY6DWZE_index_0.html)
- For kid-friendly information and activities on Mars, visit this NASA Web site: [http://mars.jpl.nasa.gov/funzone\\_flash.html](http://mars.jpl.nasa.gov/funzone_flash.html)

## ANSWERS

answers available in print edition  
of teachers edition



## PHYSICAL: Forces and Motion **Spin Master**

### PRE-READING PROMPTS

- What is the most important trick that a competitive yo-yoer must learn?
- Yo-yos, along with juggling balls, are considered skill toys. You need patience and practice to pull off tricks with these toys. What types of “skills” would a person need to become a good yo-yoer?

### DID YOU KNOW?

- The yo-yo was first introduced to America in the 1920s by Pedro Flores, who brought the toy from his native Philippines.
- The term yo-yo means “come back” in the Philippine language of Tagalog. Early versions of the toy were also called “Twirler” and “Whirl-a-gig.”
- In 2005, 30-year-old Tim Redmond got his yo-yo to sleep for 16 minutes and 17 seconds—the longest yo-yo spin to date.

### CRITICAL THINKING:

- Today’s yo-yos have strings looped loosely around the bar connecting their two halves. But the first yo-yos had strings tied directly to their axels. Why would a tied string limit the number of possible yo-yo tricks?

### CROSS-CURRICULAR CONNECTIONS:

**HISTORY:** Research the origin of the yo-yo and how the toy has changed over time. Then create a timeline highlighting design improvements made to the yo-yo. Be sure to explain how each improvement affected the art of yo-yoing.

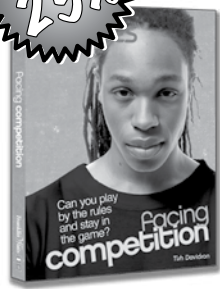
### RESOURCES

- For more on yo-yo physics, read the *Science News* article “Reinventing the Yo-Yo,” by Peter Weiss, at: [www.sciencenews.org/articles/20040417/bob9.asp](http://www.sciencenews.org/articles/20040417/bob9.asp)
- This Web site provides students interested in yo-yoing with how-to videos: [www.howtoyoyo.com/](http://www.howtoyoyo.com/)

## ANSWERS

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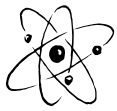
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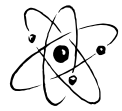
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Name: \_\_\_\_\_



# Science News



**DIRECTIONS:** Read the Science News section on pages 3 to 7.

Then, test your knowledge by filling in the letters of the correct answers below.

**1. The amount of \_\_\_\_\_ a motocross rider has determines the maximum number of backflips possible.**

- (A) friction
- (B) kinetic energy
- (C) elasticity
- (D) gravity

**2. Trees become petrified when**

- (A) their barks are dried up.
- (B) they are buried for centuries in coal.
- (C) their tissues become replaced with minerals, turning them into stone.
- (D) they endure decades of hot and cold spells.

**3. During cold spells, trees grow \_\_\_\_\_, leading to \_\_\_\_\_ growth rings.**

- (A) less, no
- (B) more, wider
- (C) unevenly, uneven
- (D) less, narrower

**4. People can only see**

- (A) X-rays.
- (B) visible light.
- (C) ultraviolet rays.
- (D) near infrared waves.

**5. A study shows that when given a choice, tamarins and marmosets prefer to listen to**

- (A) slow lullabies.
- (B) fast techno music.
- (C) their trainers' voices.
- (D) silence.

**6. What is NOT a possible clue that the Egyptian wooden toe might have been a functional prosthesis?**

- (A) The toe was carved to look as if it has a toenail.
- (B) The toe is bendable.
- (C) The toe has scuffmarks.
- (D) The mummy wearing it has a missing right toe.



**7. What would be considered the strongest evidence to suggest that the Egyptian wooden toe was a functional prosthesis?**

- (A) The toe helps ease a test subject's walk.
- (B) The toe fits well on the foot of real human beings.
- (C) The toe does not break during the testing process.
- (D) Test subjects enjoy wearing the toe.

**8. If a family generates 25 metric tons of carbon dioxide per year, how much would it cost to offset the amount through personal carbon credits from the U.S. Forest Service?**

- (A) \$25
- (B) \$150
- (C) \$240
- (D) \$1,500

**9. What is NOT a reason why planting trees can help offset carbon dioxide?**

- (A) Carbon dioxide comes from burning fossil fuels.
- (B) Trees' dry wood is one-half carbon.
- (C) Trees absorb carbon dioxide from the atmosphere.
- (D) Carbon dioxide becomes sugar during photosynthesis.

**10. Based on New Yorkers' reactions to their city's overflowing litter baskets, you can infer that**

- (A) they plan to throw out less garbage.
- (B) they want their hometown to be known as the "Big Trash Heap," not the "Big Apple."
- (C) they like to file complaints.
- (D) they want better sanitation services.

Name: \_\_\_\_\_

PAGE **8** **Hanging Out at a Bat Hospital****DIRECTIONS:** Fill in the blanks to complete the following sentences.

1. Ticks have been found to cause \_\_\_\_\_ in spectacled flying foxes. When a bat is found with a tick embedded in its skin, scientists pluck the tick off and then inject the bat with \_\_\_\_\_ to counteract the tick's poison.
2. Baby bats are called \_\_\_\_\_, and they are raised in \_\_\_\_\_ sites. Baby bats start flying at around \_\_\_\_\_ old.
3. About 200,000 spectacled flying foxes live in northern Queensland in this country: \_\_\_\_\_. There, they are listed as \_\_\_\_\_ in danger of dying out.
4. Spectacled flying foxes \_\_\_\_\_ flowering trees as they move from blossom to blossom, licking the flowers' sweet \_\_\_\_\_ and inadvertently spreading pollen. The bats also help \_\_\_\_\_, or scatter, fruit seeds.
5. A \_\_\_\_\_ is a chemical that targets the body's nervous system. It specifically acts on \_\_\_\_\_, or nerve cells, which carry electrical signals up the spinal cord to the brain.

PAGE **12** **Mission: Mars****DIRECTIONS:** On a separate piece of paper, use details from the story to help you write the following.

1. You're the scientist in charge of the Mars500 simulation, and you've been asked to brief news reporters about the project. Write a mission statement that you plan to read on TV.
2. You're in charge of training NASA astronauts for a mission to Mars. Tell the astronauts why it's important to remember to wear spacesuits while exploring the Red Planet.

PAGE **16** **Spin Master****DIRECTIONS:** Answer the following in complete sentences.

1. What physical forces help put a yo-yo to sleep?
2. You can get a sleeping yo-yo to wind back up by jerking your hand upward. Explain the physics that allows this to happen.
3. To maximize a yo-yo's snooze time, toy engineers made competition yo-yos heavier by attaching metal edges. Explain how Newton's first law of motion allows heavier yo-yos to sleep longer.

Name: \_\_\_\_\_



# Bat Ears



In "Hanging Out at a Bat Hospital" (p. 8), you learned that spectacled flying foxes are bats. But these *nocturnal* creatures are quite unlike most bat species. For instance, flying foxes rely on keen vision and an excellent sense of smell to locate foods or to find their way in the night skies. Most bat species, however, use *echolocation* to do the same. They emit high-frequency sound waves and listen for them to bounce off objects to determine the distances of the objects. That's why most bats have sharp hearing. Complete this activity to learn more about the hearing ranges of certain animals.

Hearing Range in Animals (in hertz)

Animal	Low	to	High
Humans	20		20,000
Bats	1,000		150,000
Grasshoppers and locusts	100		50,000
Horses	31		40,000
Whales and dolphins	70		150,000

Source: *Encyclopedia Britannica*

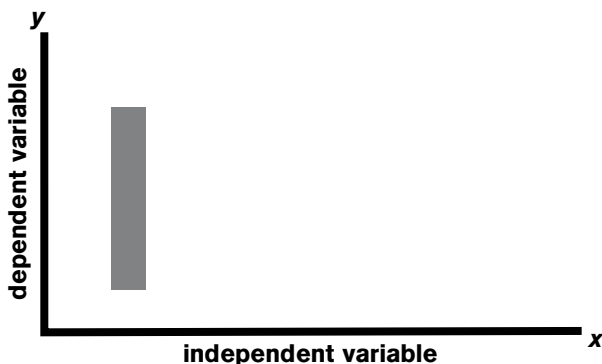


### A. GRAPH IT!

**Directions:** On a separate sheet of paper, use the above data to construct the following:

Create a bar graph showing the hearing ranges of all the animals featured in the chart.

**Hint:** None of the hearing ranges begin at "0." So a bar in your graph should begin above the *x*-axis, similar to the one in the example below.



### B. ANALYZE THE DATA

**Directions:** Use the chart above and your graph to help you answer the following in complete sentences.

- Which featured animal has the widest hearing range?
- Which animal on the chart has the narrowest hearing range?
- The hearing range of spectacled flying foxes is similar to that of humans. What is the bat's approximate hearing range?
- Human hearing range is most similar to that of which other animal featured on the chart?
- Why do you think the hearing of spectacled flying foxes is not as attuned to high frequencies as that of most other bat species?

# Astronaut Training

## Instructions for Teachers

In the “Hands-On Activity” on p. 15, students will simulate a sample-gathering mission to Mars. Before students begin the activity, they will need your help to prepare.

### WHAT YOU NEED TO DO:

**1.** Instruct students to read the activity on p. 15. Then, divide your class into teams of four. Assign two people on each team to be “astronauts,” one person to be “mission control,” and one person to be a “satellite.”

**2.** Give each pair of astronauts a zip bag containing 20 red kidney beans, 20 white lima beans, 20 black beans, and 20 pinto beans. Explain to the class that each type of bean represents a different substance found on Mars: Red kidney beans represent dust, white lima beans represent ice, black beans represent solid lava, and pinto beans represent rocks.

**3.** Provide each pair of astronauts with a quart-size zip bag, a small Tupperware container, a paper bag, and a pint-size zip bag. Explain that for the sample-

gathering mission, astronauts must collect substances into the appropriate container. Collect “dust” into the quart-size zip bag, “ice” into the Tupperware container, “solid lava” into the paper bag, and “rocks” into the pint-size zip bag. Remind astronauts that they will be allowed to ask mission control questions if they forget which substance belongs in which container.

**4.** Send each team’s two astronauts to a corner of the room, away from the other teams’ astronauts. Send each mission control and satellite to the center of the room. It is OK for these team members to be near each other.

**5.** Copy and cut out a set of instruction cards and “cheat sheet” (*below*) for each team’s mission control.

#### Instruction #1:

Fine-grained dust covers most of the surface of Mars. Collect some of this dust so we can study what it’s made of.

#### Instruction #2:

The poles of Mars have large ice caps. Collect some of this ice and bring it back so we can look for possible signs of life. Store the sample in the appropriate container so it doesn’t melt!

#### Instruction #3:

In 2006, the *Spirit* rover visited Mars’s Lorre Ridge and discovered chunks of solidified lava. That means that there were once active volcanoes on Mars. Collect some of this solid lava so we can see how long ago the volcanoes were active.

#### Instruction #4:

There are many craters on Mars. Collect rocks near a crater. The rocks might turn out to be remains of meteorites that hit the planet’s surface!

#### Mission Control Cheat Sheet:

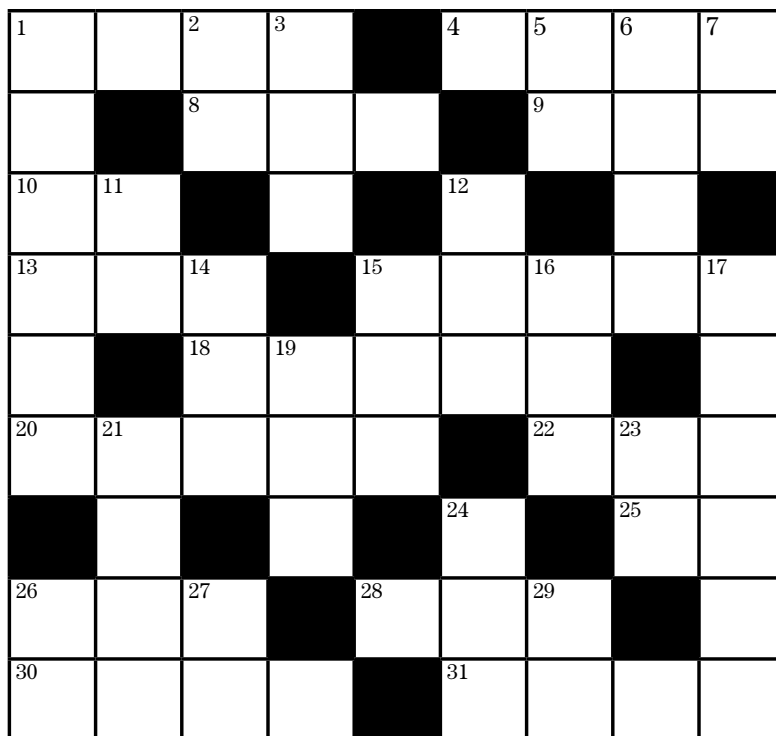
Use these tips to answer questions from your astronauts.

1. Red kidney beans represent dust. Place four samples of dust into the quart-size zip bag.
2. White lima beans represent ice. Place six samples of ice into the Tupperware container.
3. Black beans represent solid lava. Place nine samples of lava into the paper bag.
4. Pinto beans represent rocks. Place 12 samples of rock into the pint-size zip bag.

Name: \_\_\_\_\_

# Word Roundup

**DIRECTIONS:** First, read the feature articles in this issue. Then, solve the clues below to complete this crossword puzzle.



**ACROSS**

- \*1. Momentum: \_\_\_ × velocity
- \*4. Sterling Quinn's competitive tool: \_\_\_-\_\_\_
- \*8. Endangered species are dying \_\_\_.
- \*9. Mars: The \_\_\_ Planet
- 10. Trademark (*abbr.*)
- 13. Individual Retirement Account (*abbr.*)
- \*15. Earth and Mars \_\_\_ the sun.
- \*18. Low energy waves: \_\_\_ waves
- 20. Zimbabwe was formerly \_\_\_ Rhodesia
- 22. Expression of amazement

- 25. Do Re Mi \_\_\_ So La Ti Do
- 26. \_\_\_ as a fox
- \*28. Baby bat
- \*30. Astronauts \_\_\_ to exercise daily.
- \*31. Killer of spectacled flying foxes

**DOWN**

- \*1. Inertia: resistance to change in \_\_\_
- 2. \_\_\_ what?
- 3. Earth's nearest star
- 5. Either \_\_\_
- 6. The Abominable Snowman

- 7. Doctor of Optometry (*abbr.*)
- 11. Mister (*abbr.*)
- 12. Prefix for three
- 14. A limb
- 15. Not even
- 16. \_\_\_ and arrow
- 17. To smack with a flat object
- 19. First three vowels of the alphabet
- \*21. Yo-yo part
- \*23. Newton's laws \_\_\_ motion
- 24. Intestines
- 26. Tin (*chemical symbol*)
- 27. Hear \_\_\_!
- 29. 3.14159265

\*Starred clues relate to this issue's stories.