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Maureen Van Ackooy, science teacher at Union Vale Middle School in LaGrangeville, New York, contributed to this issue's Teacher's Edition.

Take a brief survey to give us your feedback on *Science World!* Please be sure to visit www.scholastic.com/scienceworldspring09survey to share your thoughts about the magazine and its accompanying Teacher's Edition. And as always, feel free to email any other comments or suggestions to us at: scienceworld@scholastic.com.

—The Editors

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Features

PAGE	CONTENT	TITLE SUMMARY	NATIONAL SCIENCE EDUCATION STANDARDS	LESSON IDEAS
8	Physical: Forces and Motion	Wheelchair Wheelies A Nevada teen hits the skate park in a wheelchair	Grades 5-8: Motions and forces Grades 9-12: Motions and forces	How does radius affect an object's rotation? Check out the Hands-on activity on p. 11.
12	Physical: Chemistry	Name That Element! Can your students guess the mystery element?	Grades 5-8: Properties and changes of properties in matter Grades 9-12: Structure of atoms	The activity on TE 6 will help students learn more about melting points of various elements.
16	Earth: Trees	Bats Striking Out Why are baseball bats breaking in record numbers?	Grades 5-8: Populations, natural resources, and environments Grades 9-12: Natural resources	Students will work on reading comprehension and critical thinking in the activity on TE 7 .
20	Special Supplement	Heads Up: Real News About Drugs and Your Body	Grades 5-8: Personal health Grades 9-12: Personal and community health	For related information, visit: www.scholastic.com/headsup .

Coming Next Issue

- Explore the Pacific Ocean's three newest marine preserves.
- Teens go to a farm school to learn about food production.
- Say goodbye to sorting trash with new single-stream recycling.
- Why does Africa's Congo River have such unique fish?

Teacher to Teacher

Tips for using *Science World* in the classroom

Maureen Van Ackooy, this Teacher's Edition's contributor, suggests: Try this activity that stretches the imagination, increases vocabulary, and familiarizes your students with the element symbols. Using the periodic table on p. 14 from "Name That Element!", have students create words with the element symbols. Then, write each element's full name underneath. The rules are simple: You may not split up the symbol, you must write the symbols exactly as they appear, and the words must be school appropriate. For example: SnOB—Tin, Oxygen, and Boron. In my classroom, we have a Wall of Fame of students' words and sentences!



Maureen Van Ackooy





PHYSICAL: Forces and Motion

Wheelchair Wheelies

PRE-READING PROMPTS:

- If you were confined to a wheelchair, how would you stay active? What would you do to keep your muscles strong?
- If you were suddenly unable to use your legs, would you continue your favorite sport or pastime?

DID YOU KNOW?

- The spinal cord begins to develop at approximately 4 weeks during the embryonic stage of development.
- The first skateboards from the 1940s and 1950s were very different from today's skateboards. They were more like a scooter with roller-skate wheels attached to a plank that had a handle. Eventually, the handle was removed, the board's shape was modified, different wheels were added, and the modern skateboard was born.
- According to *Forbes* magazine, professional skateboarder and snowboarder Shaun White made more than \$9 million last year.

CRITICAL THINKING:

- Folate is a natural mineral that helps the body develop new cells. Folic acid is an artificial mineral that manufacturers add to cereals, breads, and vitamins. Similarly, manufacturers of some brands of orange juice and canned pasta sauce add calcium to their products. Why do you think the manufacturers of processed foods add folic acid and other vitamins and minerals to foods?

CROSS-CURRICULAR CONNECTIONS:

ART/TECHNOLOGY: Divide the class into groups. Have them discuss and list the challenges that a person in a wheelchair faces. Then ask the groups, "How would you modify a skateboard, bicycle, or a go-kart for someone who uses a wheelchair?" Have each of the groups pick one of the three choices. Allow them ample time to discuss and draw their design. When their design is complete, they can present it to the entire class.

RESOURCES

- Learn more about the physics of skateboarding at this Web site: www.exploratorium.edu/skateboarding.
- Want to know more about the physics of wheelchairs? Check this out: www.disabilityhistory.org/dwa/edge/curriculum/physics.htm.
- Watch a slideshow on the different types of spinal injuries here: www.nlm.nih.gov/medlineplus/tutorials/spinalcordinjury/hm/index.htm.

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PHYSICAL: Chemistry

Name That Element!

PRE-READING PROMPTS:

- Do you know what element is used in a light bulb's filament?
- What properties would you expect this element to possess in order to produce such bright light?

DID YOU KNOW?

- The first filament that Thomas Edison used for an incandescent light bulb was made from thin platinum. He actually did think about using tungsten, but the tools to work with it were unavailable to him at that time.
- Because of its strength and resistance to tarnishing, tungsten is becoming a popular metal to use in jewelry making. It is combined with carbon to form a silvery colored alloy called tungsten carbide. Jewelry made from tungsten carbide is said to not cause allergic skin reactions that can happen with other metals.
- Tungsten is used in the manufacturing of bulletproof vests used by law enforcement.

CRITICAL THINKING:

- Tungsten has a very high density, which makes it ideal for darts and NASCAR vehicles because they can pack more weight into a smaller package. Can you think of other uses for an element with a high density? What could an element with a low density be used for?

CROSS-CURRICULAR CONNECTIONS:

SOCIAL STUDIES/GEOGRAPHY: Tungsten is mined and produced in many countries around the world, such as the United States (California and Colorado), China, South Korea, Bolivia, and Russia. Download the United States Geological Survey's 2008 tungsten report here for a list of all the countries: <http://minerals.usgs.gov/minerals/pubs/commodity/tungsten/mcs-2008-tungs.pdf>. Using a map of the world, plot the sources of tungsten. Take it further by calculating the total percentage of tungsten produced by each country.

RESOURCES

- For a cool new tour of the periodic table, look for the book: *The Periodic Table: Elements With Style*, by Basher and Adrian Dingle (Kingfisher Publishing, 2007).
- More about all of the elements at the It's Elemental Web site: <http://education.jlab.org/itselemental/ele074.html>.

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EARTH: Trees
Bats Striking Out

PRE-READING PROMPTS:

- Have you ever seen a baseball game in which the bat broke after a hit? What do you think made that happen?
- What are some things that you think could be done to prevent a baseball bat from breaking?

DID YOU KNOW?

- There is actually a “sweet spot” on a bat. This is the spot that transfers the most energy to the ball and sends the ball flying at the greatest speed. Players hope that hitting the ball at the bat’s sweet spot will produce a home run.
- In addition to the emerald ash borer beetle discussed in the feature, the gypsy moth is another invasive species that can kill trees. Leopold Trouvelot, an entrepreneur who was trying to start a silkworm business, imported the gypsy moth to the United States in the mid 1800s. But the bugs escaped and started to wreak havoc on the trees of the Northeast. The moth’s larvae eat through a forest’s canopy by chewing holes in the trees’ leaves. The gypsy moth favors the leaves of deciduous hardwood trees, but it will eat any type of tree if there is competition for food.

CRITICAL THINKING:

- We are learning more about medicine and technology every day, which is leading to new innovations. Some of these new innovations are helping athletes break records. Should the new records be in the same category as the old records? Should the new records be somehow footnoted because of the new technologies?

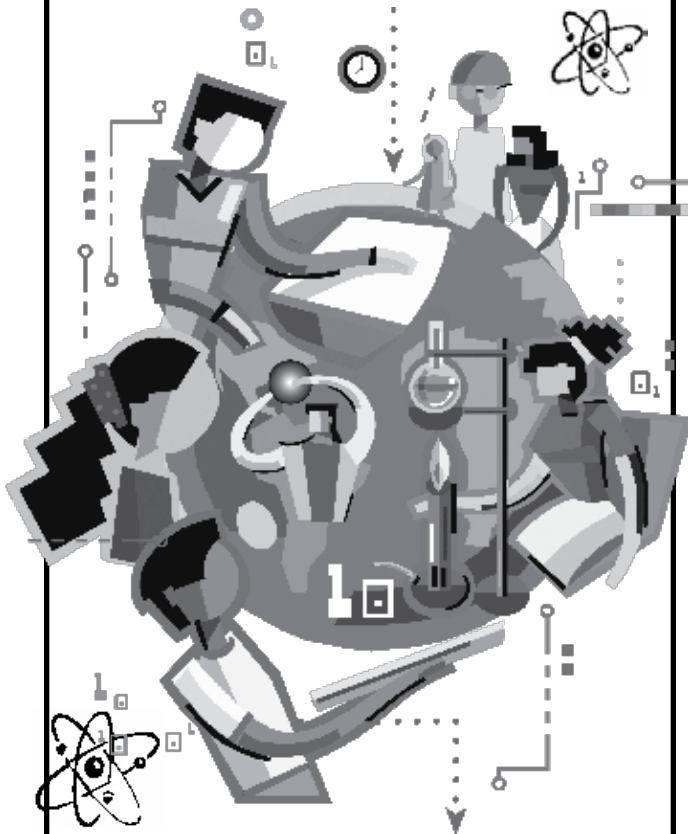
CROSS-CURRICULAR CONNECTIONS:

PHYSICAL EDUCATION: Have a “Home Run Derby”! Pitch underhanded so the students will be able to connect with the ball. Each student should get 3 chances to hit. Have the other students measure and mark the hits, and then record the measurements and graph the results. Another way to do this activity is to vary the ball or bat. For example, try a plastic bat and whiffle ball, a ruler and ping-pong ball, and a craft stick and pompom.

RESOURCES

- Learn more about the emerald ash borer at this Web site run by Michigan State University: www.emeraldashborer.info.
- Listen to a Podcast from NPR’s Science Friday about the difference between ash and maple bats: www.npr.org/templates/story/story.php?storyid=9222323.
- Find out more about the science and engineering of baseball at the University of Massachusetts-Lowell’s Baseball Research Center: <http://m-5.uml.edu/umlbrc/index.htm>.
- Want to know more about Louisville Sluggers? Check out this site: www.slugger.com.

Do You Know Teens Who Are Making a Difference?



If you know of teens making achievements in areas related to life, Earth, or physical sciences, we’d like to learn about them. *Science World* is scouting for dynamic teens to feature in upcoming issues. If you have a class or a particular student who is making cool science contributions, e-mail us at scienceworld@scholastic.com, or write us at:

**Attn: Amazing Teens
 Science World
 Scholastic Inc.
 557 Broadway
 New York, NY 10012**

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 engineer who designed the Skycar took his invention on a "test drive" from _____.

- Ⓐ the United Kingdom to Mali
- Ⓑ the United States to Spain
- Ⓒ Africa to Europe
- Ⓓ England to Malaysia

2. To generate enough _____, a flying car would need a big wing to carry it aloft.

- Ⓐ thrust
- Ⓑ drag
- Ⓒ forward momentum
- Ⓓ lift

3. What is a coprophage?

- Ⓐ An animal that kills and eats its young.
- Ⓑ An organism that lives off dead organic matter.
- Ⓒ An animal that feeds on other organisms' waste.
- Ⓓ An animal that eats plants.

4. Why are Texas officials considering changing the name of their state dinosaur?

- Ⓐ The *Pleurocoelus* officially represents another state.
- Ⓑ Fossils of the current state dino were misidentified.
- Ⓒ Footprints thought to belong to *Pleurocoelus* actually belong to *Paluxysaurus jonesi*.
- Ⓓ A large number of bones from another species were recently found in the state.

5. Methicillin-resistant *Staphylococcus aureus*, or MRSA, is an infection caused by a type of _____.

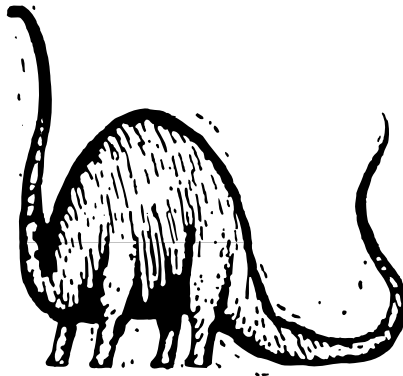
- Ⓐ virus
- Ⓑ fungus
- Ⓒ parasite
- Ⓓ bacterium

6. Which of the following best summarizes why MRSA is hard to cure?

- Ⓐ The infection spreads quickly.
- Ⓑ The overuse of antibiotics has enabled some bacteria to develop resistance to these treatments.
- Ⓒ The infection goes unnoticed until it is too late.
- Ⓓ The bacteria are resistant to all types of drugs.

7. Doctors have detected a rise in head and neck MRSA infections in _____.

- Ⓐ teens
- Ⓑ kids 18 and younger
- Ⓒ children under 12
- Ⓓ adults



8. Coca-Cola's new recycling plant in South Carolina can transform _____ kilograms of PET into _____ 20-ounce drink containers each year.

- Ⓐ 5 million, 2 billion
- Ⓑ 45 million, 2 billion
- Ⓒ 100 million, 6 billion
- Ⓓ 2 billion, 75 million

9. Turning coconut husks into car parts will do all of the following EXCEPT:

- Ⓐ Create more eco-friendly sun visors, floorboards, and trunk liners.
- Ⓑ Use natural materials instead of synthetic ones.
- Ⓒ Provide added income for farmers in developing countries.
- Ⓓ Make cars that are 100 percent biodegradable.

10. Why are scientists concerned about the large number of frogs that end up on people's dinner plates?

- Ⓐ The amphibians are declining worldwide.
- Ⓑ The frogs are being taken illegally from the wild.
- Ⓒ Fried frog legs are an unhealthy delicacy.
- Ⓓ Some nations where food supplies are low have only frogs to eat.

Name: _____

PAGE **8** **Wheelchair Wheelies**

DIRECTIONS: The article explains two differences between Aaron's "hardcore sitting" and conventional skateboarding. Explain the differences using the terms *center of gravity* and *angular moment of inertia* in your answer.

PAGE **12** **Name That Element!**

DIRECTIONS: Match the word(s) in the left column with the correct phrase in the right column.

- | | |
|-------------------------|---|
| ___ 1. density | a. combination of metals |
| ___ 2. radiation | b. extra weight added to a race car for balance |
| ___ 3. period | c. column on the periodic table |
| ___ 4. ballast | d. high-energy waves used in cancer treatment |
| ___ 5. transition metal | e. temperature at which solids change to liquids |
| ___ 6. alloy | f. negatively charged particles |
| ___ 7. electron | g. row on the periodic table |
| ___ 8. melting point | h. a classification of a cluster of elements on the periodic table (Hint: Copper is one.) |
| ___ 9. group | i. an element's smallest unit |
| ___ 10. atom | j. how tightly atoms are packed together in matter |

PAGE **16** **Bats Striking Out**

DIRECTIONS: Fill in the blanks to complete the sentences below.

- _____ wood is the material used to make the majority of today's bats.
- The _____ is how straight the fibers are along a piece of wood.
- An _____ called the emerald ash borer beetle is killing off North America's ash trees.
- To combat breaking bats, Major League Baseball is placing small _____ on bats to allow the slope of grain to become more visible.
- The strongest surface of a wooden bat cuts across a tree's _____, where the grain is closest together.

Name: _____

I'm Melting!

One of the clues that helped you determine the mystery element in "Name that Element!" (pp. 12-14) was the element's high melting point. An element's melting point is the temperature at which it changes from a solid to a liquid. Complete the chart and answer the questions below in complete sentences to learn more about the melting points of a selection of elements from the periodic table. We did the first one for you.

Elements and Their Melting Points

Element Name	Element Symbol	Melting Point (in degrees Celsius)	Metal or Nonmetal?
Helium	He	-272	Nonmetal
Hydrogen		-259	
Neon		-249	
Oxygen		-218	
Nitrogen		-210	
Chlorine		-101	
Mercury		-39	
Francium		27	
Rubidium		39	
Sulfur		113	
Silver		962	
Gold		1,064	
Iron		1,535	
Tungsten		3,410	
Carbon		3,500	

SOURCE: www.webelements.com/periodicity/melting_point

Analyze the Data

- Which *metal* has the highest melting point on your chart? Lowest melting point?
- Which *nonmetal* has the highest melting point on your chart? Lowest melting point?
- Ice (solid water) melts at 0°C (32°F). Which element on your chart has a melting point nearest to water's melting point?
- At what temperature (in degrees Celsius) does water boil? Which element has a melting point closest to that temperature?
- Consider the statement: "Metals always have higher melting points than nonmetals." Use your data to evaluate whether that statement is true or false.

Name: _____

Maple Versus Ash

In "Bats Striking Out" (pp. 16-18), you read about the problems facing bats made from the wood of maple and ash trees. Use the information from the article to answer the following questions about the characteristics of each wood, and then use the answers to complete the Venn diagram below.

Characteristics of Maple and Ash Bats

Characteristic	Maple	Ash
Are bats made from this wood?		
When did this bat gain popularity?		
Is the MLB considering benching this wood?		
Are emerald ash borer beetles killing these trees?		
Do bats made from this wood ever break?		
How does this bat usually break?		
Does this bat break often?		
Is the slope of grain easy to detect?		
What is being done to fix this bat's problems?		

