LESSON PLANS

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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/htm/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?

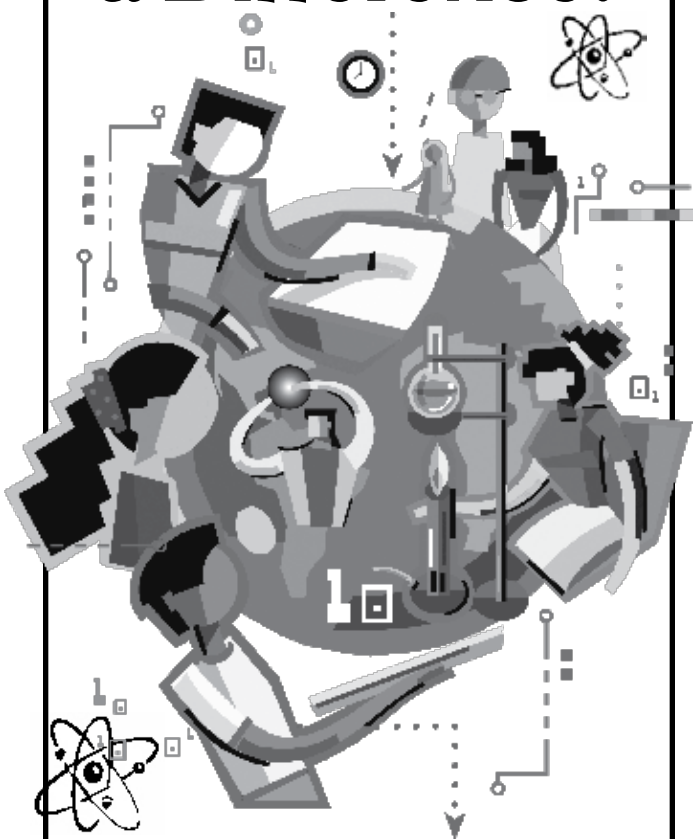
CROSS-CURRICULAR CONNECTIONS:

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=92222323**.
- 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