

LESSON 2: Protect Your Melon!



OVERVIEW

Educational Goal: To understand the brain, brain functions, and importance of bike helmets and proper helmet fit.

Preparation

- Set up technology to show video and diagram of the brain.
- Set up a large open space for the melon drop demonstration.
- Arrange helmets for students to try on.

Topics Covered

- (OPTIONAL) Brain functions
- Brain damage
- Protecting the brain

Learning Objectives and National Health

Education Standards (SEE PAGE VI FOR "STANDARDS")

At the end of this lesson, students will be able to:

- 1 Understand the impacts of a bicycle crash on the head and brain. (Standard 3)
- 2 Demonstrate how to wear a bicycle helmet properly. (Standards 5 and 7)

LESSON 2

Timeline

	15 MINUTES Protecting Your Brain (OPTIONAL)	36
	15 MINUTES Melon Drop	40
	15 MINUTES Helmet Fit	42

Materials and Equipment

- Diagram of the brain and labeled sections (RESOURCE GUIDE PAGE 167)
- Waterproof barrier (plastic trash bags)
- Rags for cleanup
- Two ripe watermelons
- Ladder or step stool (OPTIONAL)
- Helmets of various sizes (recommend the majority of helmets to fit 21"-23¼" head circumference)
- Painters' caps or surgical caps—one for each student
- Overhead of helmet fitting instructions
- Computer, speakers, and projector with Internet connection, white wall or Smartboard
- How-To: The Bike Helmet Fit Test Video: www.bikemn.org/education/walk-bike-fun/supplemental-resources
- "Helmet Fit: Step-by-Step Guide" (RESOURCE GUIDE PAGE 168-69)
- Permanent marker



PROTECTING YOUR BRAIN

(OPTIONAL)

Focus Point: This activity introduces students to the integral role of the brain and encourages use of the bicycle helmet to keep it protected.

Materials and Equipment

- Overhead diagram of the brain and labeled sections (RESOURCE GUIDE PAGE 167)
- Whiteboard and markers or Smartboard

Discussion

- 1 Explain to students that every part of the human body is important to staying alive, but one part of the body is the computer that makes everything else run.
 - *Does anyone know what part that is?*
 - > *The brain.*
 - *What does it do that is so important?*
 - > *Helps you see, hear, smell, breathe, and helps your heart beat.*
- 2 Compare back to the “computer” analogy and ask students:
 - *Would you ever drop your parent’s or school’s computer?*
 - *Throw your cell phone?*
 - *Then you would want to protect your brain and care for it like you would a computer or a cell phone.*
- 3 It is critically important to emphasize to students that helmets are a tool to protect your brain, not the first line of defense. Write the “Five Layers of Crash Protection” from the League of American Bicyclists on the board:
 - *Control your bike. (Don’t fall.)*
 - *Obey the laws. (Don’t cause a crash.)*
 - *Discourage others’ mistakes. (Lane position.)*
 - *Learn hazard avoidance.*
 - *Wear a helmet.*

BACKGROUND

Force. Research shows that up to 60 percent of deaths from bicycle crashes are the result of head trauma. A properly worn and certified bicycle helmet cushions and protects the head from damaging impacts with hard surfaces such as asphalt and concrete. Scientists measure how hard something hits something else with a “g force” measurement (G). Things that hit hard have a high g force and high potential for damage. 300 Gs is enough to cause permanent brain damage. 500 Gs can fracture the skull and cause death. The head of someone who falls from cycle height to a concrete surface can receive a force of more than 1,800 Gs. Helmets can reduce the 1,800 Gs of bicycle falls to less than 200 Gs, which is not enough to fracture a skull.

- 4 Ask the students to:
 - *Raise your hand if you've ever crashed a bike or hit your head.*
 - *Raise your hand if you've ever felt dizzy, had a bump on your head, needed stitches, etc.*

- 5 Explain to students:
 - *The human brain is responsible for overseeing the daily operations of the human body and for interpreting the vast amount of information it receives. The adult human brain weighs an average of three pounds, or about 2 percent of the total body weight. Despite this relatively small mass, the brain is responsible for many of the qualities that make each individual unique: thoughts, feelings, emotions, talents, memories, and the ability to process information. Much of the brain is dedicated to running the body, and controlling and integrating the various systems that make up the body.*

- 6 Present/display the overhead or slide of the brain diagram. Explain to students:
 - A. **REGIONS OF THE BRAIN**
 - *Different regions of the brain have different functions and control specific activities. These include voluntary functions and involuntary functions.*

 - *The brain is divided into three main areas:*
 - > **The brain stem**, responsible for basic body functions such as heartbeat regulation.
 - > **The cerebellum**, responsible for things such as balance and muscular coordination.
 - > **The cerebrum**, made of two distinct hemispheres and responsible for higher brain functions including thinking and emotions.

 - B. **VOLUNTARY FUNCTIONS**
 - *Voluntary functions are those of which you are aware, and which you voluntarily control. Ask the students to name some voluntary functions: writing, running, chewing, etc.*

 - *The cerebral cortex is the control center of the brain that controls voluntary activities, such as learning, intelligence, and judgment. This is the thinking tool.*

 - *The cerebellum coordinates muscle movements including balance, posture, and general coordination. It helps coordinate our body parts to do physical activities. These include walking, dancing, playing basketball, video games, and riding a bike.*

 - C. **INVOLUNTARY FUNCTIONS**
 - *Involutionary functions are those that are not under our conscious control.*

 - *What are some involuntary functions of the brain? Is breathing a voluntary or an involuntary function?*



PROTECTING YOUR BRAIN

(OPTIONAL-CONT.)

D. THE BRAIN IS DELICATE

- *The brain has a consistency similar to jello, and unlike other parts of our bodies, it usually cannot repair itself. If we cut our finger, what happens? We bleed, our blood clots and stops the bleeding, and eventually we get a scab. Sometimes these cuts are beyond repair. Have you ever seen someone with a body part amputated? Someone with just four fingers or one leg? Well, those injuries were probably really big and maybe even very bloody. To injure our brain permanently, it does not require a big bloody injury. Permanent brain injury can happen without blood, from something as simple as cracking your head against the ground. And, any injury to the brain is very, very difficult to repair.*

7 Ask students:

- *What does brain injury mean to you?*

8 Explain to students:

- *Depending on how the brain is injured, a person's speech, movement, learning, and behavior may be affected. Examples include: losing memory, and losing ability to do basic tasks such as speak, read, write, or walk. Very severe brain injury can leave your motor functions disabled, while your body is still alive and breathing.*

9 Ask students:

- *How would you feel if you couldn't play your favorite sport or participate in your favorite outdoor activity—not because your body wasn't good, but because your brain couldn't figure out how to do the skills needed?*

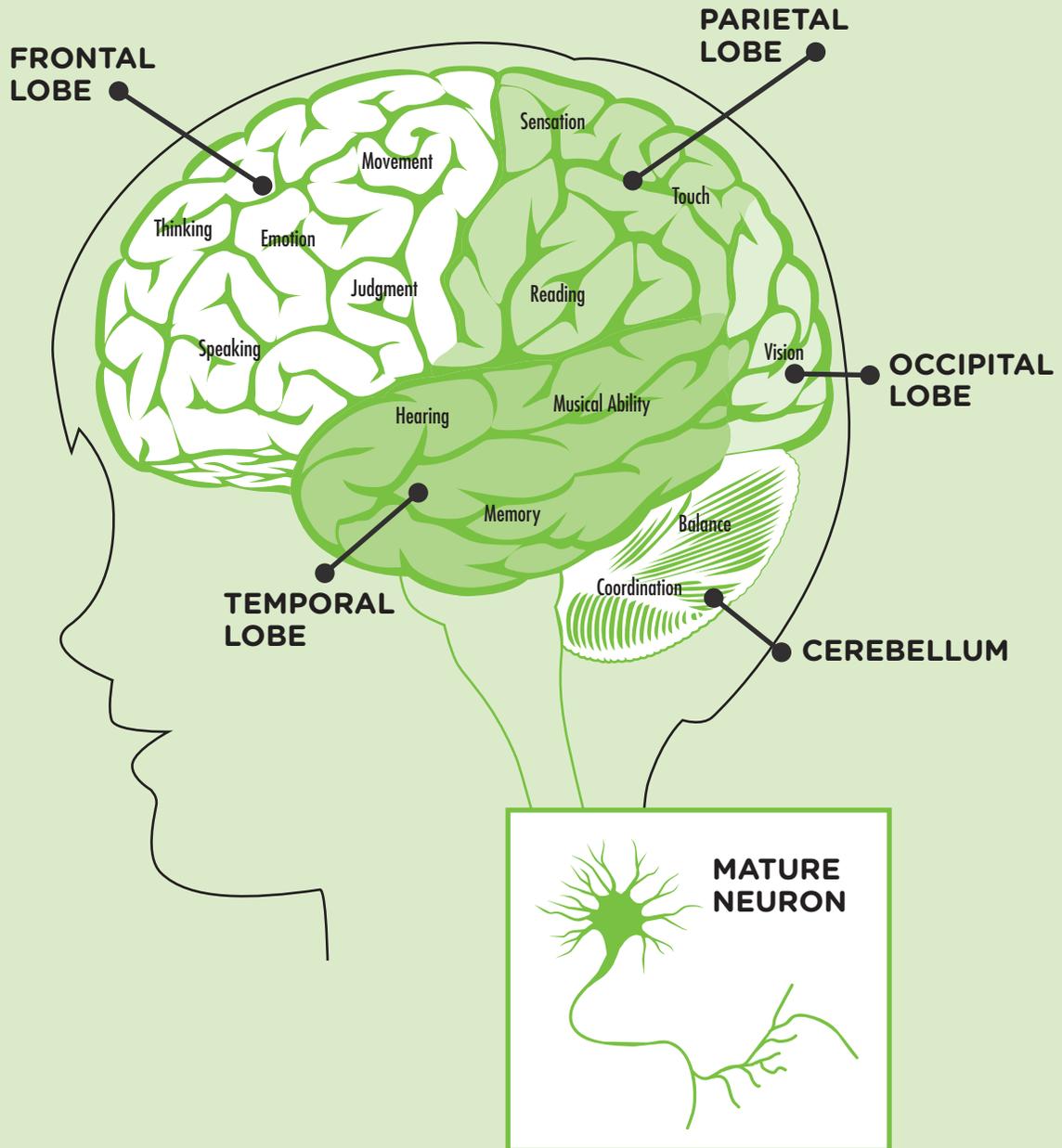
10 Explain to students:

- *Not only bicyclists wear helmets. Who else does?*
 - > *Skate boarders, rollerbladers, football players, hockey players, baseball players, skiers, snowboarders, motorcycle and car racers, construction workers, astronauts, firefighters.*

11 Reiterate that helmets are a last resort, not the first line of defense; refer back to the “Five Layers of Crash Prevention” from the League of American Bicyclists:

- *Control your bike. (Don't fall.)*
- *Obey the laws. (Don't cause a crash.)*
- *Discourage others' mistakes. (Lane position.)*
- *Learn hazard avoidance.*
- *Wear a helmet.*

THE BRAIN





MELON DROP

Focus Point: An activity where a melon is dropped to simulate impacts of a bicycle crash on the head and brain. This activity demonstrates the importance of wearing a bicycle helmet to protect the brain from injury.

Materials and Equipment

- Waterproof barrier (plastic bag) and rags for cleanup
- Two ripe watermelons
- A permanent marker
- Consumer Product Safety Commission (CPSC)-approved bicycle helmet
- A cracked or damaged bicycle helmet (OPTIONAL)

Discussion

- 1 The Melon Drop consists of two drops. The first is with a helmet (and the melon shouldn't break) and the second without. The melon should break on the second drop.
- 2 Introduce melon with eyes, mouth, nose, and ears drawn on it:
 - *This is my friend "Mel" or "Bob," or whatever.* Have students inspect the melon for bruises or damage.
 - *Mel is wearing a properly adjusted helmet, which covers the forehead.* (Demonstrate level helmet fit on melon.)
 - *Helmets work because the hard plastic foam liner inside breaks instead of your head. The shiny plastic on the outside keeps the helmet sliding with you and not twisting your neck or coming off your head.* (Demonstrate sliding the helmet on the pavement.)
- 3 Cut the trash bag open and cover the hard floor surface with it. Strap the melon in a helmet (helmet down) and drop it six feet onto the surface. Observe the results. The melon should not break, demonstrating how a head can be saved and the brain protected because the helmet absorbed the force of the fall. If the melon gets injured, note that even with a helmet, heads can get injured—but watch to see what happens when we drop it without a helmet.

BACKGROUND

Beginning in February 1999, all bike helmets manufactured or imported for sale in the United States had to meet the new federal safety standard set by the Consumer Product Safety Commission (CPSC). The new standard ensures that bike helmets will adequately protect the head and that chin straps will be strong enough to prevent the helmet from coming off in a crash, collision, or fall. Helmets meeting this new standard carry a label stating that they meet CPSC's new safety standard.

- 4 **NOTE:** If the first melon is not damaged and did not break, use the same melon again. If it did break, use the second melon.

Drop the melon six feet without a helmet. Explain to students:

- *The melon should break. This is because it received the full amount of force from the fall. Heads are fragile: they may crack and you may get permanent brain damage because of high-impact falls. If the melon does not break, it will bruise and that will show up in a few days. Look for a soft spot. That type of damage may still cause permanent brain damage and you should see a doctor.*

- 5 (OPTIONAL) Pass around a cracked helmet and discuss helmet care. Helmets are fragile and shouldn't be dropped; they are intended to absorb force one time. Once involved in a crash, they should be replaced. Helmets should not be stored in hot places such as cars or garages. Manufacturers strongly recommend replacement every three to five years.
- 6 Take the "good" bicycle helmet and have students pass it around the room. As it's being passed say, "Stop!" and ask the student with the helmet to tell you why it is important to wear a helmet. Continue this after several students have answered appropriately and thoroughly.

BIKE FUN! LESSON 2: Protect Your Melon!



HELMET FIT

Focus Point: This activity teaches students how to properly fit helmets and do a helmet check.

Materials and Equipment

- Provide helmets or have students bring one. Helmets of various sizes (recommend the majority of helmets to fit 21”–23¹/₄” head circumference or sized small to medium)
- Painters’ caps or surgical caps—one for each student
- Overhead of helmet fitting instructions
- Computer, speakers, and projector with Internet connection, white wall or Smartboard
- How-To: The Bike Helmet Fit Test Video: <http://www.bikemn.org/education/walk-bike-fun/supplemental-resources>
- Handout: “Helmet Fit: Step-by-Step Guide” (RESOURCE GUIDE PAGE 168–69)

Tips to Differentiated Learning

- Provide students with visual or hearing impairments the proper equipment to view the video.
- Students with sensitivity to materials unfamiliar to them may need to slowly progress to putting a helmet on their head. Allow the student to feel, touch and hold the helmet before putting the helmet on.

Discussion

- 1 Explain to students:
 - *Helmets protect your head from the impact of crashes. It is essential to put them on properly. Helmets must be snug so they don't slide off your head. It is not okay to wear the helmet to the back or top of your head; protecting the front of your head is very important. During crashes, bicyclists generally go forward and hit the front of their head. So, it is essential that the helmet is always strapped, and that it covers the forehead and cannot be easily pushed back on the head.*
- 2 Watch the “How-To: The Bike Helmet Fit Test Video.” Turn on “Closed Captions” if available. Ask a student to volunteer to be the model as you explain proper helmet fit.

NOTE

Head lice are a potential problem for schools who want to use the same set of helmets for students in different classes. To control lice in helmets, The National Pediculosis Association recommends vacuuming and wiping out the helmets, noting that a louse can survive less than twenty-four hours away from a human host, but the nits on a hair left in the helmet could survive up to ten days. It is suggested that using painters caps or surgical caps under the helmet help control the transfer of lice. The caps are thin and should not interfere with the fit of the helmet.

3 How to fit a helmet:

- *Putting a helmet on isn't as straightforward as you may think. Helmets must pass the proper-fit test to ensure they are on right. The helmet should be snug and not wobble excessively side to side.*

EYES *The helmet must be level on your head, covering your forehead. To test this, you place two fingers above your eyebrows. Your top finger should touch the bottom of your helmet.*

EARS *Sliders should be positioned in a "V" or "Y" under your earlobes. This makes the helmet fit comfortable and helps it to stay in place.*

MOUTH *You should be able to open your mouth wide and talk normally, but you should feel your helmet pull down on your head by opening your mouth wide. No more than two fingers should fit under the chinstrap.*

4 Ask students when they think they should replace their helmet.

- *Never wear a helmet that has been involved in a crash. Bicycle helmets are designed to be crashed only once. If your helmet shows signs of having been crushed, cracked, or damaged in any way, the integrity of the helmet may have been compromised, and it needs replacing. A crashed helmet may not show any visible signs of wear, but still be damaged internally enough that it won't protect your head. Scratches on the plastic coating might be okay, but if the plastic foam has any cracks, the helmet will not absorb an impact and your brain will not be protected. Also, the foam in helmets breaks down over time, mainly from heat and sun. Don't leave your helmet in a hot car or garage. Also, replace any helmet when it is more than three to five years old. Usually a date is printed inside.*

5 Properly fitting a helmet:

- *There are different sizes and brands of helmets, and each company might have different sizing. Demonstrate helmet sizing—too big and too small. Prior to starting, put on a poorly fitted helmet and have students identify problems with the helmet that you have on.*

6 Give each student "Helmet Fit: Step-by-Step Guide" handout (RESOURCE GUIDE PAGE 168–69).

7 After the demonstration, have students get with a partner, get a surgical or painters' cap, and try helmets on. Each student should check their partner for proper fit and make suggestions for adjustments if needed.