

Helmets, bike gear and parts



OVERVIEW

Purpose:

Students learn the importance and proper fit of bicycle helmets in order to reduce fatal crashes. Familiarize students with bicycle parts and gear for proper use and safety.

Topics covered:

- Helmet use and fit
- Bike parts
- Other gear
- Survey

LESSON 2

?	5 MINUTES	
	Importance of the brain	14
!	5 MINUTES <i>Optional</i>	
	Melon drop	16
!	30 MINUTES	
	Helmet fitting	17
!	5-10 MINUTES	
	Signs	19
!	10 MINUTES <i>Optional</i>	
	Bike parts and components	20
!	10 MINUTES	
	Bike gear	21
!	HOMEWORK	
	Journal	22
?	20 MINUTES <i>Optional</i>	
	Bicycle investigation	22
!	15 MINUTES <i>Optional</i>	
	Survey overview; survey	24

EQUIPMENT

Helmet Drop	• Tape measures (15)
• Melon	• Pre-test score sheet to grade class
• Bicycle helmet (can be fairly old)	Other Gear
• Small tarp / trash bag	• Bike parts worksheet
• Rags for cleaning	• Night and rain gear
Helmet Fit	• Bicycle
• Bicycle helmets (30-40, various sizes)	• Pannier
• Helmet fitting brochure (15)	• Bike stand (<i>optional</i>)
	• Sample of bicycle system

STATEWIDE EDUCATION GOALS

Health

Controllable health risks

- Understand and apply prevention and risk reduction strategies

Safe and healthy environment

- Understand and apply strategies to improve and maintain health
- Apply injury prevention

Informed consumer

- Analyze influences of culture on health related products as a consumer

Physical education

Self-management and social behavior

- Apply rules, procedures and etiquette that are safe and effective for specific activities / solutions.

Helmets, bike gear and parts

BACKGROUND

LESSON

WHAT: A discussion of the importance of the brain and its functions.

PURPOSE: This discussion informs students of the reasons why brains are so important to protect with a helmet.

Helmets



IMPORTANCE OF THE BRAIN

Ask the question: “what do you all think the most important part of the human body is?” The brain is the most or equally as important as any other part of the human body. Let’s discuss why.

The brain is the central control station for the whole body. Like a computer’s hard drive, the brain controls all functions of the body, even ones that you don’t realize. The brain obviously is our thinking tool and is the thing that enables us to read and do exciting things like math (most exciting). But the brain also controls our ability to speak, walk, talk, laugh, cry, dance, kick, coordinate ourselves to play basketball, video games, ride a bike, and much more. Without our thinking about it, our brains also tell our bodies when we are hungry, control our breathing, digestion, chewing, all muscular movements, and other things like peeing, pooping, sneezing, and coughing. Yes folks, the brain is pretty important.

Not only is the brain super important, it is also delicate. That’s why it is in that thick skull of mine (pretty thick!). The brain has consistency similar to jello and unlike other parts of us, can not repair itself. For example, if we cut our finger what happens? We bleed, our blood clots up and stops the bleeding and eventually we get a scab, probably pick it off 15 times, and eventually your finger is as good as new. Though sometimes these cuts are beyond repair, have you even seen someone with only 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. Some people have permanently injured their brains with by hitting their heads on the ground, no blood. In fact, any injury to the brain is very, very difficult to repair.

What does brain injury mean? It could mean a lot of things because your brain controls so much. It could mean you lose your memory. Maybe you lose your ability to speak or walk. How would you feel if you couldn't play basketball anymore, not because your body wasn't good but because your brain couldn't figure out how to walk?

This is why people wear helmets. As you know, not only bicyclists wear helmets but many sports and professions require helmets. Can anyone name some? Sports include: biking, boarding, bledging, football, baseball, hockey, rock climbing, bungee jumping, skiing, luging, motor cycle and car racing, and some boxing. Professions that use helmets include: construction, jet pilot, astronaut, motorcycle police officers, and firefighters.

Helmets are commonly used by many people for good reason. In Oregon, it is the law for people under 16 to wear a helmet when they ride a bike. In this course everyone will wear a helmet.

Research shows that up to 90 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 "g forces". Things that hit hard have a high g force and high potential for damage. 300 g's is enough to cause permanent brain damage. 500 g's can fracture the skull and cause death. The head of someone who falls from bicycle height to a concrete surface can receive a force of more than 1800 g's. CPSC approved helmets can reduce the 1800 g's of bicycle falls to less than 200 g's, which is not enough to fracture a skull. Many doctors agree that if all bicyclists wore helmets, 75 percent or more of bicycle-related deaths would be eliminated.

(Florida, Traffic Safety Curriculum)

Helmets, bike gear and parts

BACKGROUND

WHAT: An activity where the teacher drops a melon to simulate impacts of bicycle crashes on the head and brain.

PURPOSE: This activity demonstrates the importance of wearing a bicycle helmet to reduce the severity of head injuries.

Vocabulary

G-forces: a measurement scientists use to indicate how hard one object hits another.

Bicycle helmet: equipment used to protect a person's head. Reliable helmets should have the CPSC sticker of certification inside. Properly fitting helmets should be snug and cannot slide about.

Crushable liner: the inner portion of a helmet that absorbs and reduces g force to the head.

LESSON



MELON DROP

Optional

MATERIALS

- Waterproof barrier (plastic bag) and napkins for cleaning up
- One head-sized honeydew melon (ripe)
- Chair to stand on
- ASTM, ANSI and/or SNELL approved bicycle helmet

The first drop is with a helmet (and the melon shouldn't break) and the second without the helmet, when the melon should break.

- 1 Teacher gathers materials.
- 2 Explain that the melon simulates the human head, the fruit and seeds inside are the brain. Yes, heads are fragile. If they hit a hard surface they could crack and your brain could get injured. Discuss the concept of force, that your head receives force upon impact and how a helmet can reduce that force.
- 3 Cover the hard floor surface with the cut trash bag. The teacher (or student standing on a chair) will strap the melon in a helmet and drop it six feet onto a hard surface. The class will observe the results. The melon should not break, and this will demonstrate the fact that the head was saved because the helmet absorbed the force of the fall. If the melon gets injured, the teacher should note that even with a helmet, heads can get injured — but watch to see what happens when we drop it without any helmet.
- 4 The melon is then dropped six feet without a helmet. It should break and 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.



HELMET FIT

MATERIALS

- 40 CPSC-certified helmets of various sizes (for 5th and 6th graders, we recommend the majority of helmets to fit 22" – 23 1/4" head circumference)
- Copies of the ODOT helmet fitting brochure (see page 94)

WHAT: Read the essential components of helmet fit and have the students properly adjust their helmets.

PURPOSE: Students will learn to fit a helmet properly.

1 When going to test helmet fit use the following checklist to ensure that the helmets fit right (see page 94 for the helmet-fitting brochure information).

- The helmet must be level on students' heads so that it covers their foreheads.
- The helmet should be snug and not wobble excessively side to side.
- Students should not be able to put more than one or two fingers through the chinstrap.
- Students should not be able to push the helmet more than two inches straight back.

Properly fitting a helmet

1 To properly instruct the students how to put on a helmet, the teacher should demonstrate on themselves. See below for a sample dialogue. See the helmet brochure for more detailed information.

2 Students will pair off with one other person near them.

3 Students can normally identify the size of their head in relation to the class (often correlates to height and weight). Ask students what size head they think have? Most students will be a medium except for large or smaller students. Have students retrieve their respective size.

4 Follow the brochure: they select a helmet that fits and put it on—try to move it from side to side. If it moves A LOT it is too loose. Try putting in thicker head pads. If the helmet does not go on, it is too small (*Note: Helmets have adjustable pads. New helmets in the box are always equipped with the smallest size pads*).

5 Helmets should cover the forehead and should rest only be about an inch above the eyes. When looking upwards, wearers should be able to see the front of the helmet clearly.

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 the head. Helmets should have a slick surface so they will slide, not stick, when they hit the ground. Protecting the front of the head is most important when using bicycle helmets. 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 cover the forehead and can not be easily pushed back on the head.

To assist with smooth implementation, teachers should organize helmets by sizes so students can easily find the size they need.

Helmets, bike gear and parts

BACKGROUND

For helmet statistics, see *Background* to “Melon Drop”.

Transmission of lice from helmets can be a concern. Since helmets are generally stored in large bags between class periods, teachers might require each student to have a separate bag that they store their helmet in and tie or rubber band it shut. In this case students should write their name on masking tape and attach it to the bag. After the bike safety class is complete, helmets should be stored in an air-tight bag for two weeks in a dark location. This will kill all lice and their eggs. Lice spray that can be purchased at most drug stores can also be used to disinfect helmets.

LESSON

- ⑥ Start with the hollow buckle, put the buckle under the chin and adjust the slide adjuster buckle so the ear is between the two straps and slide adjuster is near the point of the cheek bone (will vary among students).
- ⑦ Do the same with the pronged buckle.
- ⑧ The chin strap should be snug, you should only be able to put one or two fingers between strap and chin. Tighten the chin strap.
- ⑨ You should not be able to move the helmet more than an inch back on your head. If you can, the buckles of the helmet strap should be moved forward on the face.

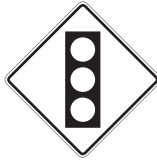
Have each student put their name on tape and place it on borrowed helmets so it can be used in future lessons. Place helmets in a class bag or some other easily retrievable location.



SIGNS

- 1 Allow students to come to the board and draw any street sign that they know.
- 2 After a couple of minutes, have them sit down and discuss each sign.

Make sure to discuss: stop signs, yield signs, one way signs, traffic lights, speed limit signs, school crossing signs, no right/left turn signs, and signs indicating that multiple lanes must turn a specific direction. Some of these are pictured below.



WHAT: A brief activity to introduce a variety of traffic signs.

PURPOSE: Understanding street signs is essential to following traffic rules.

Helmets, bike gear and parts

BACKGROUND

WHAT: A discussion and worksheet activity to teach bicycle parts.

PURPOSE: Understanding the parts of the bicycle will allow you to maintain your bicycle in order to keep it safe and help you know what to get it fixed.

LESSON



BIKE PARTS AND COMPONENTS

MATERIALS:

- Handout: Bike Parts (see page 99)
- Pencils
- A bicycle: to show what you are talking about for this lesson
- A frame without parts and wheels; the separated components (example: the braking system — a connected brake lever, wire/housing, and brake shoes) (*Optional*)

1 Discuss the following topics: *What is the Frame? What are Parts/Components?*

The bike frame is the section of your bike that is completely fused together, the body of the bike. Bike parts and components include all other pieces that hold the bike together (example — forks, tires, pedals, crank arms) and those adjustable parts (example — brake levers, shifters, derailleurs).

2 Distribute the handout to students. Instruct students to identify 20 bicycle parts and put each corresponding letter next to the part. If need be they can draw a line to the part and write the corresponding letter next to the line.

3 Students should be told to work on the sheet by themselves at first. Allow students to look at and touch the real bikes and bike parts. After a few minutes, allow students to work together.

4 Present the list. After about five minutes (or when students are done), have about five kids, or one per table, go to the bike and point out each part/component of the bike.

5 Teacher reiterates the parts.

6 Have a short break to allow kids to hand in their lists of parts.

7 Quickly, the teacher should then reiterate the bicycle parts, having students call out the correct answer for each part.



BIKE GEAR

MATERIALS:

- Lighting — headlight, taillight, reflectors, reflective vests and pant straps
- Commuting — bike rack, panniers, back pack, horn
- Rain — fenders, rain pants, jacket, gloves
- Repair — patch kit, tire levers, pump (see *Lesson 3, Repair*)
- 1 bicycle — should be equipped with many of the above items

WHAT: A brief discussion about the gear used by bicyclists including tools, rain gear and nighttime gear.

PURPOSE: Students become familiar with the gear that is important for riding at night and in rain, and gear that improves safety.

Nighttime Wear and Lighting

Students should avoid riding at nighttime because it can be dangerous. If they do need to ride at night, it is very important to have equipment that will help make them visible to other cars, etc.

Demonstrate nighttime equipment. Nightwear must include lighting and reflection, and riders should wear retro-reflective clothing. It is the law to use lighting at night including: a front white headlight that is visible from 500 feet and a rear red taillight or reflector that is visible from 600 feet when shone upon from an automobile's low beams. Generally, lights are better, and reflectors should be used in addition to lights.

Riding in the Rain

In many areas of Oregon, it rains all winter so we should be prepared so our clothing is not wet all day.

A good jacket and fenders are probably the most important way to stay dry. Rubber jackets are on sale for about \$25 in many sporting goods stores. Other equipment includes rain pants, boots and gloves to protect from the rain. Parking your bike underneath a covered area is always helpful.

Commuting — Riding to School

Riding to school is definitely fun and a really good way to get a workout. (Teachers, do you ride to work? Tell the story). It is good to get proper gear for carrying your lunch, gym clothes, etc.

You can buy a bike rack and special bags that clip on called panniers. They can be normal or waterproof and often very expensive. A book bag also works really well, either a back pack or shoulder briefcase style, as long as you have both hands free to ride the bike. Don't forget your jacket and helmet.

Repair Tools

You should carry repair tools, especially if travelling long distances. We will go over this when fixing a flat.

Quickly show repair tools — pump, repair kit, tire levers.

SMALL TOOL BAG:

- patch kit (patches, glue and sandpaper)
- y-wrench
- rag
- tire irons
- small flat-head screw driver
- Band-aids
- duct tape
- important hex-keys
- pump (normally on bike)

Helmets, bike gear and parts

BACKGROUND

LESSON



JOURNAL ASSIGNMENT

Have students write about a bicycle crash they had. Include how and when it happened, whether they got hurt, whether they wearing a helmet, and what parts got messed up. Ask them how it made them feel. Were they afraid to ride a bike afterwards? Etc.



BICYCLE INVESTIGATION

Optional discussion

Advertisers believe that promotion will influence the behaviors of individuals. If we promote bicycling, more students might ride to school. Of course there are other factors. These might include permission from our parents, the quality of the bicycle lockers, weather, and the bicycle friendliness our streets. For the next two weeks (or longer), we will keep track of bicycle ridership and observe changes because of promotion or other reasons (i.e., weather, secure bicycle parking, contest).

Measuring Our Class' Ridership

- 1 Ask the class: who biked yesterday?
- 2 Who biked today? (use the results from the above survey or ask class)
- 3 The class should keep a daily count of bicycle ridership among the class and by counting the number of bikes parked at the bike racks, chart and graph the information (see *Handouts*, page 99).
- 4 The teacher should actively promote cycling to school and the class should keep track of their ridership. Teachers can run a contest to see who rides the most or if the class can reach a certain percentage of students riding to school.

Promoting and Measuring School Ridership

Our next step is to promote bicycling throughout the entire school. There are many things we can do, some are simple and some are time intensive. During any of these activities, the class should count the bicycles parked at the school each day.

- ➊ Promote bicycling via flyers around school and student-made posters that discuss bicycle laws and safety rules (minimal amount of work). Talk with the principal and other teachers about promoting cycling and increasing student ridership. Set up a Trauma Nurses Talk Tough assembly (the teacher may have already done this).
- ➋ Have a Bike to School Day (medium amount of work). First discuss the concept with the school administration and let them know your class wants more students to ride because it is healthy and environmentally friendly. Post flyers around the school promoting a one-time event which students are invited to bike to school a half hour early (helmets required). Offering bagels or other treats, raffles (water bottles, helmets, patch kits, etc.) and a speaker who talks about cycling can be effective promotion. If parking security is a problem, offer a secure parking alternative. Get other teachers promoting the event to their students. A student announcing the event to each classroom helps too. Lastly, consider putting on a bike rodeo after school with the help of teachers, the local bike shop and community volunteers.
- ➌ Conduct a survey (a lot of work) of schoolmates. Ask why they do or don't ride to school. Analyze the information with charts and graphs. Make recommendations and write a letter and make presentations to school administration, city officers, city planner, or a local safety police officers. See page 92 and *Handouts*, page 99, for more information on developing a survey. Consider then conducting a school-wide promotion campaign (see numbers ➊ and ➋ above).

Helmets, bike gear and parts

BACKGROUND

LESSON

WHAT: Conduct a survey about bicycle ridership and discuss bicycle behavior among students. Discuss surveys, discuss problems with surveys.

PURPOSE: This activity increases the awareness of bicycle behavior for students and teachers alike. The questions here will be used to generate discussion around bicycle use throughout the curriculum. The lesson also teaches about the uses and weaknesses of surveys.

This background information can be used in a discussion period after the surveys are conducted.

Surveys have strong and weak points. Below are listed the strengths and weaknesses.

STRENGTHS: the benefits of surveys as opposed to other methods of collecting information.

Ease of implementation: It is easy to administer surveys and they do not cost a lot of money; therefore we can ask a lot of people a lot of questions. Other methods of collecting information are not so easy. Interviews take a long time so you can't ask as many people the for the same information. An interview is another way to get information, but you ask one person questions and they can respond in depth.

Analysis: It is usually easy to interpret the information. So, if we ask, "who biked today," it is easy to count the responses and develop conclusions.

(continued next page)



SURVEY OVERVIEW

Optional

Surveys are a tool used to study and gather information about people, their behaviors, animals, materials, etc. When conducting personal surveys you use your survey questions and ask people for information about themselves. Our class will read survey questions and the students will respond. We will then learn information about our bicycles and our riding habits.

What will we do with the information? Results of surveys can have many uses for many people. If we find that many students would ride bikes if we had better parking we might give the results to the principal and ask for good bike racks. If we find that it is too dangerous to ride, we might contact city planners and discuss making the streets safer.



SURVEY

Optional

MATERIALS:

- Survey questions (page 26) cut into eight rectangles

- 1 Select a student who will record the results of the survey (provide them with a scoring sheet to save a minute or two, page 99). That student must make three columns: a) “question numbers,” b) “yes,” and c) “no” column. Next to each question number they should record the number of “yes” and “no” answers.
- 2 Count the number of students in the class. Tell the number to the class and have them remember it.
- 3 Distribute the survey questions to the class. Try to give one per table. Students should not look at the questions until their number has been called.
- 4 In numerical order, a student from each table will read a question out loud to the class. Students answer by raising their hands for either “yes” or “no” (students should not answer both yes and no).
- 5 As you are going through the survey, tally to make sure the “yes” and “no” add up to the total number of students in the class.
- 6 Briefly discuss the intricacies and inaccuracies of administering a survey (example: students want to look cool and don’t answer truthfully). See *Background* column for details.
- 7 Discuss results. Who rides to school and who would like to ride if they could? If any students have crashed their bikes, how did this make them feel? What would have to change for them to ride to school?

(continued from previous page)

WEAKNESSES: problems, including things that lead to inaccurate data collection

Participation: did everyone answer the questions? Did anyone answer twice? It is important that everyone answers or we may have inaccurate information. Example: If people who don’t own bikes are afraid to answer, we will think everyone owns a bike

Accuracy: was everyone honest? Sometimes people don’t really mean to, but answer inaccurately. Example: How often do you eat french fries? Because we know fries are unhealthy we might answer twice per month when it is really twice per week. Inaccuracy can also occur because we don’t remember, or because we answer based on our ideals instead of our actions and influences (see below).

Influence: another aspect of accuracy – did you answer improperly because you didn’t want others to know that you eat fries for every meal?

Helmets, bike gear and parts

BACKGROUND

LESSON



STUDENT SURVEY QUESTIONS

MATERIALS

- Scissors

- 1 Photocopy this set of questions.
- 2 Cut them apart.
- 3 Place the appropriate number on the front of each piece of paper.
- 4 Have one student read out each question and the class will respond to each question by raising their hands for either “yes” or “no”.
- 5 The teacher should select a student to record the class’ answers on a separate sheet of paper.

SURVEY QUESTIONS

- 1) Who owns a working bike that they can ride?
- 2) Who rode their bike or someone else’s bike during the summer?
- 3) Who has ever crashed on their bike?
- 4) Who has ridden their bike to school this year?
- 5) Who rode their bike today?
- 6) Who wears a bike helmet?
- 7) Who would ride to school if they could?
- 8) Who would like to ride bikes as an after school activity?