

Helmet Up!

Lessons & Activity
Manual

Kindergarten to Grade 12

RESPECT the
UNEXPECTED!



www.brainlove.ca

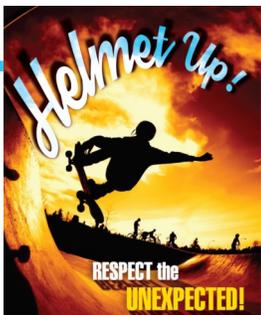
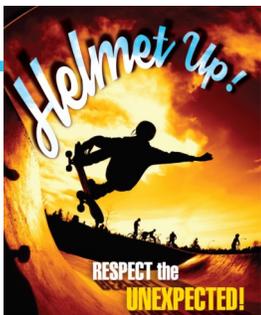


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Learning About Brain Injury:

An Activity Manual for Elementary and High School Students

What are the different types of Traumatic Brain Injuries?

Concussions are the most minor and most common type of Traumatic Brain Injury. Technically, a concussion is a short loss of consciousness in response to a head injury, but in common language the term has come to mean any minor injury to the head or brain.

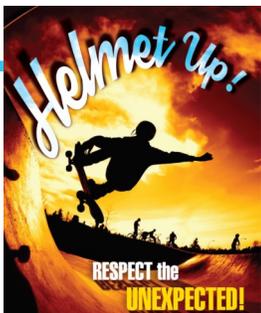
Other injuries are more severe. As the first line of defense, the skull is particularly vulnerable to injury. Skull fractures occur when the bone of the skull cracks or breaks. A *depressed skull fracture* occurs when pieces of the broken skull press into the tissue of the brain. A *penetrating skull fracture* occurs when something pierces the skull, such as a bullet, leaving a distinct and localized injury to brain tissue.

Skull fractures can cause bruising of brain tissue called a *contusion*. A contusion is a distinct area of swollen brain tissue mixed with blood released from broken blood vessels. A contusion can also occur in response to shaking of the brain back and forth within the confines of the skull, an injury called *contrecoup*. This injury often occurs in car accidents after high-speed stops and in *shaken baby syndrome*, a severe form of head injury that occurs when a baby is shaken forcibly enough to cause the brain to bounce against the skull. In addition, contrecoup can cause *diffuse axonal injury*, also called *shearing*, which involves damage to individual nerve cells (*neurons*) and loss of connections among neurons. This can lead to a breakdown of overall communication among neurons in the brain.

Damage to a major blood vessel in the head can cause a *hematoma*, or heavy bleeding into or around the brain. Three types of hematomas can cause brain damage. An *epidural hematoma* involves bleeding into the area between the skull and the *dura*. With a *subdural hematoma*, bleeding is confined to the area between the *dura* and the *arachnoid membrane*. Bleeding within the brain itself is called *intracerebral hematoma*.

Another insult to the brain that can cause injury is *anoxia*. Anoxia is a condition in which there is an absence of oxygen supply to an organ's tissues, even if there is adequate blood flow to the tissue. *Hypoxia* refers to a decrease in oxygen supply rather than a complete absence of oxygen. Without oxygen, the cells of the brain die within several minutes. This type of injury is often seen in near drowning victims, in heart attack patients, or in people who suffer significant blood loss from other injuries that decrease blood flow to the brain.





Learning About Brain Injury:

An Activity Manual for Elementary and High School Students

What are the symptoms of a concussion?

- Loss of consciousness
- Headache
- Confusion
- Blurred Vision
- Light sensitivity
- Loss of coordination and balance
- Mood swings
- Nausea or vomiting
- Slowed reaction times
- Short-term memory loss
- Fatigue

How do you treat a concussion?

The brain is very complex and therefore no two-brain injuries are alike. Some people may experience symptoms right away where as others may not notice for days or weeks after the trauma. In some instances the individual who has the concussion may be in denial of their symptoms. This is why it is important as educators, coaches, parents/ guardians, and caregivers to be able to recognize the symptoms of a concussion.

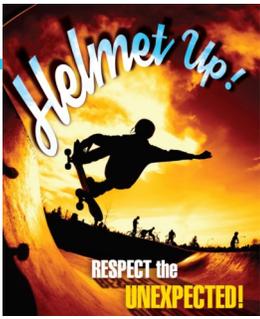
People with a concussion need to seek medical help from a doctor for further examinations. Whether test show damage or not you still could have a minor concussion. In this case your doctor will likely give your caregiver instructions to follow. For example, your doctor may ask your caregiver to wake you up every few hours during the first couple nights after an injury has taken place.

The most important part of the healing process is to get rest. Avoid activities such as sports, video games, and television. After a concussion it is suggested to return to your daily routine gradually. If you do not take the recommended time to heal your brain you could put yourself at risk for Second Impact Syndrome. Second Impact Syndrome occurs when you receive another concussion before the initial trauma to the brain has had time to heal. This type of injury can be fatal.

How can we protect our brains?

When playing sports or participating in activities that puts you at risk for an injury it is important to wear the appropriate protective equipment.





GRADES: K-2
Subject: Science or Health

OUTCOMES
Students will be able to identify and locate where their brain is located Students will understand some basic functions of the brain Students will know the basic needs to protect their brain from injury

Materials Needed by Teacher:

- Screen projector
- Screen

Set (2 minutes):

- Together as a group sing head shoulders, knees, and toes

Development (15 minutes):

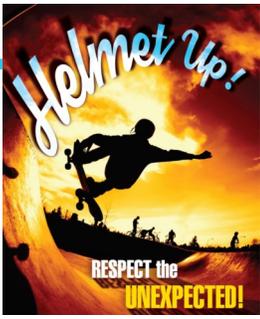
- Show the students an illustration of the body. Using a diagram of the body, have a student place the brain where they think it is on the body.
 - **Check for understanding:** Have all students point to where they think their brain is.
- Have students gently feel their heads and ask the following:
 - What does it feel like? Hard or soft?
 - Are you touching your brain? Or bone (skull)?
- Explain that the hard part of the head is called the skull. The brain is inside of the skull.
 - What do you think the skull's job is?
- Explain that the skull's job is to protect the brain from getting hurt. The brain is soft and wrinkly and feels a bit like Jell-O. The brain makes it possible to think, walk, talk, play, remember, and feel happy and sad. It helps us sing and move just like when we sang head, shoulders, knees, and toes. Our brain is very important and it needs to be kept safe.
- Ask the kids if they know the rhyme about *Humpty Dumpty*?

Together as a group recite the rhyme:

Humpty Dumpty sat on a wall
Humpty Dumpty had a great fall
All the king's horses and all the king's men
Couldn't put Humpty together again.

- Show the kids how Humpty Dumpty (egg) is like their heads. The white shell is hard and protects the soft part inside the egg just like their bone (skull) protects their brains. Explain that if they got hurt or scraped on their arms or knees, they would put a band-aid over the scrape to keep it clean and help it heal. If you break your arm or leg you need to go to the doctor.
 - What would the doctor put on your broken arm or leg? Cast, takes longer to heal
- Explain that when you hurt your brain it cannot be fixed like broken arms/legs and scrapes are fixed.
- Ask children if they know of any animals that also have protection. (show images of animals)
 - Turtle (shell)
 - Porcupine (needles)
 - Deer (antlers)
 - Armadillo (armor)





GRADES: K-2
Subject: Science or Health

- Just like animals protect themselves from getting hurt, we too need to protect ourselves. List off some situations where they need protection:
 - When we ride a bike we need to wear a...(helmet)
 - When we ride in a vehicle we need to wear a...(seatbelt)
 - When we rollerblade/skateboard we need to wear... (helmet, pads)
 - When playing baseball it is important that the batter, catcher, ump wear a...(helmet/pads)
 - When playing on the monkey bars it is important to go slow and be careful. Be aware of your surroundings.

Closure:

Save Your Melon-PPT

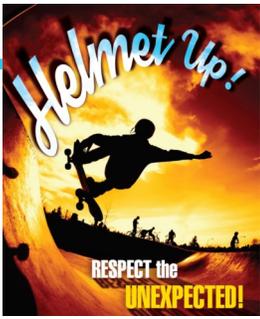
- Discuss the helmet basics:
 - Helmets should be worn for all wheeled activities such as: skateboards, inline skates, scooters, and bicycles.
 - Helmets with face protection should be worn for contact sports like hockey and football.
- Discuss the recommendations for buying a helmet:
 - Not recommended to buy a used helmet
 - Helmets are only meant to absorb one severe impact.
- Discuss the helmet fitting rules:
 - Should fit snugly
 - It should be worn level on the head
 - The chinstrap should form a V directly under the earlobe
 - The straps should be tight enough to allow one finger between the straps and the chin.

EYES: with helmet on your head when you look up, you should see the bottom of the rim of the helmet. The rim should be one or two finger widths above the eyebrows.

EARS: when buckled, straps should form a V under the ears.

MOUTH: open your mouth as wide as possible. The chinstrap should feel snug against the chin and the helmet secure on the head. Tighten if necessary to be sure the buckle lays flat against the skin.





GRADES: 3-5
Subject: Science or Health

OUTCOMES
Students will be able to identify and locate where their brain is located Students will understand some basic functions of the brain Students will know the basic needs to protect their brain from injury
OBJECTIVES
To learn the importance of brain injury prevention To obtain a general awareness of the causes of brain injury

Materials Needed by Teacher:

- Screen projector
- Screen
- Table

Material Provided by BRAINLOVE Presenter:

- Hard-boiled eggs
- Cardboard
- Bubble wrap
- Tissue paper
- Scraps of Material
- Tape
- Glue
- Plastic Table Cloth

Set (10 min):

Don't Use Your Brain for Brakes

<http://www.youtube.com/watch?v=PcKFdZSwwrk>

Development (15 minutes):

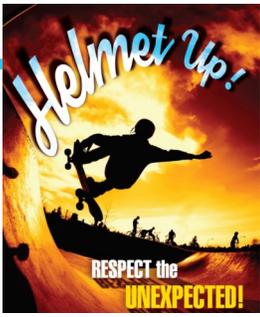
Where is the brain?

- Show the students an illustration of the body. Using a diagram of the body, have a student place the brain where they think it is on the body.
 - Asks the students what surrounds our brain to help protect it?

What protects the brain?

- Explain that the skull's job is to protect the brain from getting hurt. The brain is soft and wrinkles and feels a bit like Jell-O. The brain makes it possible to think, walk, talk, play, remember, and feel happy and sad. Our heads are a little bit like an egg. The egg has a shell, which protects the soft yolk of the egg. The shell is like our skull and the yolk is like our brain. When we fall we could hit our head and cause damage to our brain. This damage is cannot be fixed like a scrape or cut. When we drop the egg the shell breaks and it too cannot be fixed. This is why proper protection and safety when playing is important.





GRADES: K-2

Subject: Science or Health

Take Brain Injury Out of Play PPT (Slide 1-3)- Introduction

What is a concussion? (Slide 4)

- When you hit your head you are at risk of getting a concussion. A concussion is a violent jarring or shaking that results in a disturbance of brain function. If you suffer from a concussion you are four times more likely to suffer a second concussion after having one.

Why should we protect our brain? (Slide 6)

Pause on "Why should we protect our brain?" slide

- Explain to students that injury to our brain can affect many of our abilities such as sight, smell, taste, touch, movement, speech, and even our personality. Protection of our heads, whether playing sports or participating in other activities is very important. You should always wear the appropriate protective equipment and make sure it fits properly.

Activity 1

Students will get into groups of 2 or 3 and grab one egg per group. Have the students drop the one egg without any protection. Inspect the crushed shell. Students should drop the unprotected eggs from varying heights and compare cracks. The students will be in charge of creating protective equipment for their egg using the supplies provided. The students will be given 10 minutes to create their helmets. In front of the class the students will explain why they used that particular material to protect their egg. They will then get to drop their egg and see if it survives the fall. Have students rate each other's protective equipment on a scale of 1-10. A rating of 1 means that it did not offer any protection (egg smashed) and a rating of 10 means that there was no visible damage. * Explain that just because there is no visible damage to the shell does not mean that the inside of the egg was protected from injury. Just like our brains we can damage our brain without cracking our skull bone or having physical/visible damage.

Activity 2

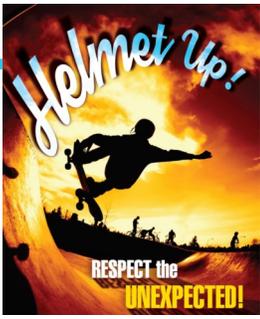
Following the above activity, soak the eggs (especially those that did not crack) in food coloring to determine if any hidden damage occurred (small hairline fractures in the egg shell). Discuss how the hidden damage is similar to certain types of brain injuries such as when a bruise or blood clot occurs.

Closure (15 minutes):

What are the symptoms of a concussion? (Slide 9)

- Confusion
- Dizziness
- Headache
- Ringing in ears
- Slurred speech
- Vomiting
- Fatigue
- Mood change
- Sensitivity to light and to sound





GRADES: 3-5
Subject: Science or Health

What are the risks of a concussion? (Slide 11)

What can you do to treat a concussion? (Slide 15)

What should you do if you think you have a concussion? (Slide 17)

- Explain to students that it is important to immediately stop playing and talk to an adult about your symptoms. Rest and get medical attention if necessary. Do not return back to activities until all symptoms are gone.

Preventing Brain Injuries in Sports (Slide 17-27)

Save Your Melon PPT

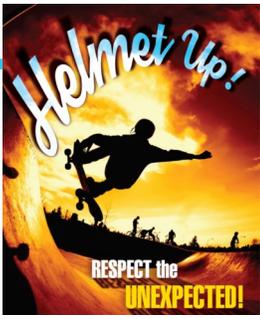
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EYES: with helmet on your head when you look up, you should see the bottom of the rim of the helmet. The rim should be one or two finger widths above the eyebrows.

EARS: when buckled, straps should form a V under the ears.

MOUTH: open your mouth as wide as possible. The chinstrap should feel snug against the chin and the helmet secure on the head. Tighten if necessary to be sure the buckle lays flat against the skin.





Jell-O Brain Activity

Grades: K-8

Subject: Science or Health

Materials:

- Clear plastic jars
- Jell-O to fill all jars
- Construction paper, glue, yarn, markers

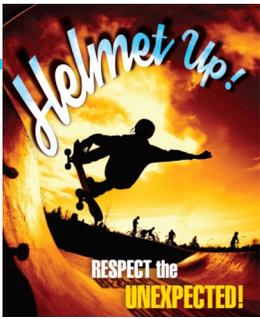
Procedure:

1. Make enough Jell-O to fill each plastic jar and place in refrigerator to set overnight.
2. Using the models of the Jell-O brains, explain that our brains are soft, like Jell-O and rests inside our hard skull, like the plastic jars.
3. Drop one of the jars onto the floor; shake another jar back and forth.
4. Discuss the effect the above actions have on the Jell-O brains.
5. Have the kids design a face for their Jell-O brain using the markers, construction paper, and glue.
6. Challenge the students to keep their Jell-O brain safe on the way home. Ask kids for suggestions on how they might keep their real brain safe from injury.

Discussion:

- Discuss how injuries may affect our brain (injuries from falls, whiplash, sports related injuries, etc.)
- Discuss brain injury prevention concepts in relation to keeping our brain safe (the use of helmets, seat belts, etc.)





Melon Drop Activity

Grades: 6-12

Subjects: Science, Health, or Math

Objectives:

- To develop an understanding of the different sections of the brain.
- To learn the importance of brain injury prevention.

Materials:

- Melons
- Garbage bags
- Paints or markers
- Spoons or other tools to examine the inside of the melon
- Yard stick or measuring tape
- Bubble wrap or foam

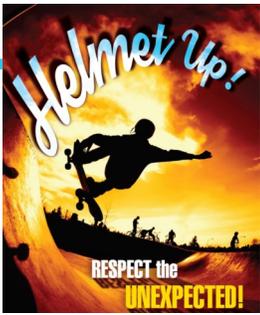
Procedure:

1. Use a melon to represent a person's head. Examine how fragile it is, how it might break, what it looks like inside and what happens to it under certain conditions (as in a fall or under impact).
2. Have each student select a melon.
3. Ask the students to paint faces on the melons. Also, you may have the students map and label the different sections of the brain on the melon.
4. Instruct some of the students to drop their melons from various heights. Note when the melons break, and have the students chart the distance.
5. Instruct the remaining students to drop their melons on soft surfaces and note what happens.
6. Instruct the students to design a protective covering for their melon to keep it from breaking and compare their solutions to the design of a helmet. Note similarities and differences.

Discussion:

- Discuss how the melon has layers, is hard on the outside and soft on the inside, and is similar to the skull and the brain.
- Discuss how soft the brain is and how it may be injured even if the skull is not hurt.





Math Challenge

Grades: 5-12

Subject: Math, Science, or Health

Objective:

- To develop and understanding and awareness of brain injury (specifically, the cognitive overload that some individuals experience following a brain injury).

Materials:

- Bucket filled with ice and half cold water
- Radio playing static
- Page with age-appropriate math problems
- Pencil

Procedure:

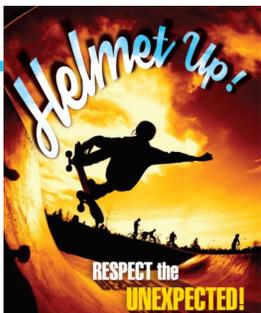
1. Have students listen to the radio static
2. Next have student submerge their dominant hand in a bucket of ice.
3. While listening to the radio and dominant hand in ice students are to complete the math problems.

Discussion:

- What did you think of this activity?
- How many math problems were you able to complete in the allotted time?
- How many problems did you answer correctly?
- Was it difficult to concentrate? Did you find yourself thinking about the noise or how the cold water felt?

* The cold ice, static radio noise, and writing with your non-dominant hand are all competing for your brains attention. As a result these activities are interrupting with the brains ability to concentrate on one task. This activity demonstrates cognitive overload, which some individuals experience following a brain injury. Can you image what life would be like constantly feeling overwhelmed? What if you had constant headaches or other physical pains?





Identify It

Grades: K-12

Subject: Science or Health

Objective:

- To develop a basic understanding and awareness of brain injury (specifically how some individuals experience sensory loss following a brain injury).

Materials:

- Bucket of rice
- 1 pair of rubber gloves
- Various items to "hide" in the rice: paper clip, quarter, comb, safety pin, and a key

Procedure:

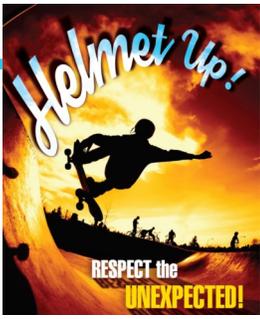
1. Tell the students that several objects have been hidden in the rice. Instruct the students to put a glove on their dominant hand and feel around in the rice bucket (without looking) for the various items.
2. Ask the students if they can identify what items are in the rice bucket without taking the items out of the rice.
3. Have the students record their guesses on a piece of paper.

Discussion:

- "What items do you think were in the bucket of rice?"
- "How many of the items did you guess correctly?"
- "Was it difficult to feel the items?"
- "How did this activity make you feel? Were you frustrated?"
- "This problem is called sensory loss. Some individuals experience sensory loss following a brain injury."

* Imagine what life would be like if you couldn't feel things in your hands or in your feet? It would be difficult manipulating object. You might burn yourself with hot tap water or while using the stove, etc. If you cut yourself, you wouldn't feel it.





Mr. &/or Mrs. Dress Up

Grades: 6-12

Subject: Science or Health

Objective:

- To develop an understanding and awareness of brain injury (specifically the condition known as “Unilateral Weakness or Hemiparesis” – (affecting only one side) that some individuals experience following a brain injury).

Materials:

- Button up shirt
- 3 lb. weight

Procedure:

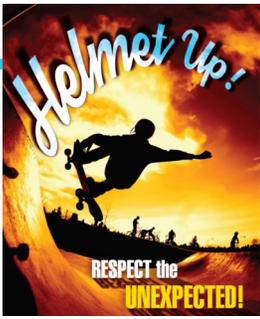
1. Instruct the students to hold the 3 lb. weight in their dominant hand.
2. Tell the students to put on the shirt and button all the buttons using their non-dominant hand (they may not use the muscles in their dominant arm or hand).

Discussion:

- “What did you think of this activity?”
- “Was it difficult to put the shirt on and button it up without your dominant hand/arm?”
- “Did your dominant arm feel sore or heavy?”
- “This activity demonstrates a condition known as hemiparesis, or one-sided muscle weakness. Some individuals experience this following a brain injury because the connection between the brain and the muscles becomes damaged.”

* Imagine what life would be like if you couldn't use the muscles on one side of your body. How would you bathe, dress, or feed yourself? What other activities would be difficult to do?





Neuron Race

Grades: 6-12

Subject: Science, Health, or Physical Education

Objective:

- To develop a basic understanding and awareness of brain injury (specifically how messages passing from the brain to the rest of the body can be interfered with)

Materials:

- Two balls
- Arrange students into two even lines

Procedure:

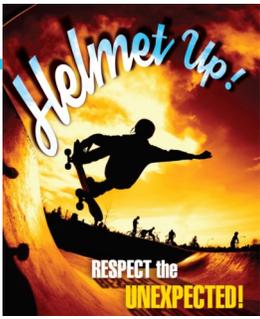
1. Instruct the student in one line to choose two people in their line to pass the ball with their knees.
2. Tell the students at the back of the line to begin with the ball. (The object of the game is to pass the ball as quick as possible to the front).
3. Tell the students to begin at the same time.

Discussion:

- "How did it feel having to complete a more difficult task than the other line?"

* Imagine what life would be like if you cannot perform a task because your brain can not send a message to your body to perform the task. This activity demonstrates how neurons can be passed from the brain to our limbs. If we have a head injury or a spinal injury it is possible that the damage may stop messages from the brain from reaching the limb. Example - If we injure our lower spine we may become paralyzed from the waist down.





“The Wright Family Story”

Grades: 6-12

Subject: Language Arts/Reading or Health

Objective:

- To develop a basic understanding and awareness of brain injury, (specifically how some individuals may experience difficulty with speed of processing following a brain injury).

Materials:

- “The Wright Family Story”
- A small item for each student to hold (i.e., pencil, pen, piece of chalk, etc.)
- Arrange the students in a circle

Procedure:

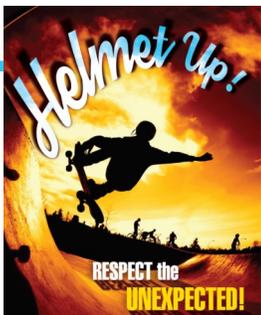
1. Instruct the students to listen carefully to “The Wright Family Story” while you read it to them.
2. Tell the students to pass the object they are holding to the right whenever they hear the word “right/Wright” and to pass the objects to the left when they hear the word “left.”
3. Read the story slowly at first and then increase pace to challenge students.

Discussion:

- “How many children were there in the Wright family?” (4)
- “What were their names?” (Tommy, Susan, Timmy, and Shelly)
- “Who was left at home at the beginning of the story?” (Aunt Linda)
- “Which child ran home to get the money?” (Timmy)
- “Which child got sick at the gas station?” (Susan)
- “How did this activity make you feel?”
- “Did you start to get confused about the direction you should be passing your object?”
- “Was it hard to concentrate or keep up with the story?”
- “Did you find your attention being divided between the story and passing the objects left and right?”

* Imagine what life would be like if you had difficulty keeping up with the information being presented to you? Some individuals experience challenges with ‘speed of processing’ following a brain injury.





“The Wright Family Story”

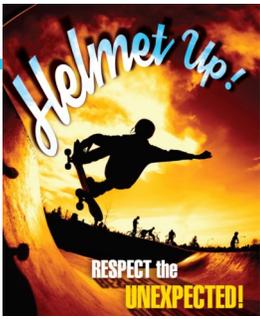
One day the Wright family decided to take a vacation. The first thing they had to decide was who would be left at home since there was not enough room in the Wright family car for all of them. Mr. Wright decided that Aunt Linda Wright would be the one left at home. Of course this made Aunt Linda Wright so mad that she left the house immediately, yelling, “It will be a right cold day before I return!”

The Wright family now bundled up the children Tommy Wright, Susan Wright, Timmy Wright and Shelly Wright and got in the car and left. Unfortunately, as they turned out of the driveway, someone had left a trash bin in the street so they had to turn right around and stop the car. They told Tommy Wright to get out of the car and move the trash can so they could get going. Tommy took so long that they almost left him in the street. Once the Wright family got on the road, Mother Wright wondered if she had left the stove on. Father Wright told her not to worry. He had checked the stove and she had not left it on. As they turned right at the corner, everyone started to think about other things that they might have left undone.

No need to worry now, they were off on a right fine vacation. When they arrived at the gas station, Father Wright put gas in the car and then discovered that he had left his wallet at home. So Timmy Wright ran home to get the money that was left behind. After Timmy left, Susan Wright started to feel sick. She left the car saying that she had to throw up. This of course got Mother Wright’s attention and she left the car in a hurry.

Shelly Wright wanted to watch Susan get sick so she left the car too. Father Wright was left with Tommy Wright who was playing a game in the back seat. With all of this going on Father Wright decided that this was not the right time to take a vacation so he gathered up all of the family and left the gas station as quickly as he could. When he arrived home, he turned left into the driveway and said, “I wish the Wright family had never left the house today!”





Seeing Double

Grades: 6-12

Subject: Science or Health

Objective:

- To develop an understanding and awareness of brain injury (specifically the visual deficits some individuals experience following a brain injury).

Materials:

- Visual impairment goggles (SGI rental)

Procedure:

- If vision impairment glasses are not available, rub Vaseline on the lenses of swim goggles to simulate blurred vision.

Activity 1

1. Create an obstacle course in the classroom with the students' desks, trashcans, etc.
2. Instruct the students to walk the obstacle course while wearing the glasses or goggles.

Activity 2

1. Lay some coins on the floor of the classroom in various places.
2. Instruct students to find the coins and pick them up off the floor.

Activity 3

1. Fill a pitcher with water, and place a few glasses by the pitchers.
2. Instruct a student to fill the glasses with water.

Activity 4

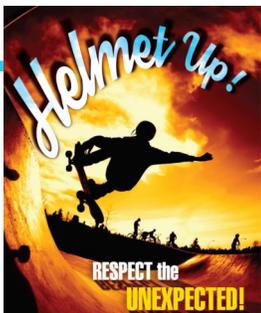
1. Instruct students to pair up with someone who is not wearing vision impairment goggles
2. Provide students with a ball to toss back and forth.

Discussion:

- "What was it like trying to do these activities while you were wearing the glasses/goggles?"
- "Did you find it difficult?"
- "Did you feel insecure/worried about your environment when you were unable to see clearly?"

* Some individuals experience blurred or double vision following a brain injury. Imagine what life would be like if you had blurred or double vision? How would you move around your home? How would you get to school? Would it be difficult to complete your homework assignments? What about trying to watch TV or ride your bike?





ABI FACTS

- Acquired Brain Injury (ABI) is the leading cause of death and disability in children and young adults worldwide.
- Approximately 70% of survivors are between ages 18 and 28. Males are twice as likely as females to acquire a brain injury.
- Acquired Brain Injury is the leading cause of seizure disorders.
- Half of all brain injuries are the result of motor vehicle collisions.
- The remainder are commonly caused by sport injuries (30%), work-related injuries, assault, falls, illness or firearms.

Canadian Statistics:

165,000 **new** cases of ABI each year

36,000 sustain injury severe enough to require hospitalization

2,500 will die

9,000 injured survivors will require long-term rehabilitation

6,000 will live the remainder of their life with disability

“Brain injury is a pervasive epidemic and it’s preventable”

Every year in Canada and the U.S. there are new diagnoses of serious medical conditions:

