**Title and Focus of Activity:** Brain Safety Fair *Prevention, Health Promotion, Fitness and Wellness*

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**Course Information**: Cognitive Neuroscience; 2 credits; Year 2 Summer. Occurs after PT709 Neuroscience.

**Learning Experience Description:** Context: This project was originally initiated with the Brain Injury Association of Pennsylvania (BIAPA). Students are divided into groups which will provide brain safety education and helmets to local community partners. These partners are usually elementary schools, day care providers, or events in which a large number of children are expected. Funding for the helmets has been provided by varying sources including the BIAPA, Widener University civic engagement grants, internal grants from the Institute for Physical Therapy Education, and the community partners themselves. The number of educational stations can be adjusted according to the venue of the community partner, the number of students who are participating, and the number and age of expected children at the community partner’s facility.

Purpose: The purpose of this learning experience is to have students apply concepts of neuroscience in a community service learning project with an aim to prevent traumatic brain injuries in children.

Instructions for students:

Brain Safety Fairs

We will be providing bike helmets and brain safety education at the following locations and times: Location A, B, C

1. The events will include family-focused presentations and activities demonstrating how the brain works and the best ways to protect the brain from injury.  It is not required that all stations are completed by all participants. A highlight will be the fitting and distribution of free bicycle helmets for children and adults.
2. Students will be participating in this event as a service learning project. Students will be assigned various roles depending on need. Instructions and a sign up will be provided prior to each event.
3. A short two page reflection paper will be completed concerning the event. The grading rubric for the paper is below.

**Video demonstrations for the brain safety fair activities can be found at** <https://youtu.be/JzpMUZK0gHM>

The 12 individual station instructions are listed below:

1. Station Instructions: Egg Drop

Materials: Eggs (approximately 1 per every 2 minutes of event time), plastic bags, large trash bags/drop cloths, tape for the bags, “Styrofoam egg helmets” , rubber bands, trash can for materials, hand sanitizer, Skull poster/skull model (if available).

To create a Styrofoam egg helmet, complete the following steps;

1. Using two pieces of Styrofoam which are approximately two inches thick each and at least six inches long, create an egg sized and shaped space in the center of each piece of Styrofoam using a spoon or scissors. The two egg shaped spaces should line up together.
2. Place an egg in one piece of the Styrofoam. Place the second piece on top of the first space. The pieces should fit together with no space in between the two pieces along its entire perimeter.
3. Place rubber bands on the two pieces to hold the Styrofoam egg helmet together.
4. Shake the Styrofoam egg helmet and there should be no movement of the egg in the helmet.

Number of Volunteers: 2 or 3

Location: Someplace highly visible and close to the helmet line so it can serve as a distractor

Instructions:

1. Prepare area for activity. Tape drop cloths or trash bags to floor for possible spillage. Have trashcans nearby for broken eggs. If possible, have a tub as a target for the drop which could limit splashing,
2. As children approach the station, ask them about why you wear a helmet.
3. Place egg in two plastic bags without helmet & have child drop the egg. Try to stop them from throwing the egg since the bag could break. Throw away the egg with the inside bag. Reuse the outside bag.
4. Place egg in Styrofoam helmet with rubber bands securing the pieces together and drop the egg. Discuss what would happen if they don’t have a helmet on and they get in an accident. If the egg happens to break, mention what happens when your helmet is not on correctly.

Talking Points:

1. Why do we wear a helmet?
2. What happens if we don’t wear a helmet?
3. What do you think will happen to the egg when you drop it?
4. What do you think will happen to the egg if it has its helmet on?
	1. If the egg happens to break, mention what happens when your helmet is not on correctly.

2. Station Instructions: Brain Bar

Materials: Brain models, table

Number of Volunteers: 1 or 2

Location: Close to the front in a very visible location

Instructions:

1. As children approach the station, show them the various models/brain slices.
	1. Explain to them what the sample is (spinal cord, cerebellum, etc) and what its function is.
	2. With models, have the children pick up the models so that they can appreciate the brain in three dimensions

3. Station Instructions: Balance

Materials: cones, glasses/prisms ([http://www.amazon.com/Reizen-Prism-Bed-Spectacles/dp/B003I7HOF6/ref=sr\_1\_1?ie=UTF8&qid=1299513655&sr=8-1](http://www.amazon.com/Reizen-Prism-Bed-Spectacles/dp/B003I7HOF6/ref%3Dsr_1_1?ie=UTF8&qid=1299513655&sr=8-1))

Number of Volunteers: 1 or 2

Location: Near the helmet line so it can serve as a distractor; need enough space in case there is a loss of balance

Instructions:

1. Instruct the child to walk between cones.
	1. Ask them how brain maintains balance
2. Alter visual information using the glasses/prisms and note the difference in performance. If too easy, spin them around a few times but make sure they don’t fall!
	1. Discuss how TBI affects your vision, proprioception, and vestibular systems

Talking Points:

1. Ask them how brain maintains balance
	* 1. Vision: “Is it easier to walk with your eyes open or closed”
		2. Proprioception: “what happens if you foot falls asleep and you try and walk?”
		3. Vestibular system: you can cue them with the question “What happens if you spin in a circle and do the beam?
		4. Explain how wearing a helmet protects their skull from injury during sports, bike riding, skate boarding, etc

4. Station Instructions: ADL

Materials: XL shirts/scrub pants for the kids to put on AND/OR dressing monkey ([http://www.amazon.com/Alex-Toys-Learn-Dress-Monkey/dp/B00168CPQM/ref=sr\_1\_1?ie=UTF8&s=toys-and-games&qid=1299513757&sr=8-1-catcorr](http://www.amazon.com/Alex-Toys-Learn-Dress-Monkey/dp/B00168CPQM/ref%3Dsr_1_1?ie=UTF8&s=toys-and-games&qid=1299513757&sr=8-1-catcorr)) , table

Number of Volunteers: 1 or 2

Location: Does not matter

Instructions:

1. Instruct the child to complete the task (getting dressed or the dressing monkey) using one arm only. The task will depend on the materials available and the age of the child
2. If there are two children, make it a race to have it be more fun.

Talking Points:

1. Ask them what makes their muscles work (brain)
2. Discuss how weakness is common after an injury
3. Discuss how occupational/physical therapy can help people regain function after a brain injury

5. Station Instructions: Helmet Fitting

Materials: Helmets, tape measures, knee guards, chairs for children

Number of Volunteers: 5+

Location: Need room for helmet boxes, should be towards the back of the venue so that children participate in educational activities before getting their helmet

Jobs: Fitter, line manager, helmet runner for sizes

Instructions:

1. Introduce yourself and chat it up while you are fitting. Discuss what sports the person does so you can reinforce the need for a helmet.
2. Measure head circumference with provided tape measure.
3. Helmet sizes will vary by manufacturer. <http://www.prorider.com/cns/> provides certified helmets at a bulk discount.
4. Remove plastic from helmet and give guardian bag and all contents
5. Face the person (parents need helmets too!) who is sitting in the chair
6. Put helmet on, note word front in the helmet. Make sure straps are straight not twisted.
7. Place 2 fingers above the child’s eyebrows to make sure that the helmet is level and that the front and back of the head are properly covered
8. Adjust the straps
	1. Straps should not be twisted
	2. Clip underneath chin
	3. Strap on each side of the head should form a “V” over the ear
	4. Tighten straps so the helmet won’t fall off the head, with room only for 1 finger between the chin and chin strap
	5. Repeat the 2 fingers above the eyebrows test.
9. Have the person shake his/her head left/right/down, trying to jiggle the helmet
	1. If it jiggles, repeat above strap adjustment until there is no movement.
10. Be sure to tell people about proper care of the helmet
	1. If they crash, need a new helmet even if it doesn’t appear damaged-the integrity of the helmet is disrupted when the foam is impacted.
	2. Store in a clean dry place and avoid having it knocked around. If knocked around a new helmet will be needed.

7. Station Instructions: Fine Motor

Materials: Games, different size mittens to impair coordination

Number of Volunteers: 1 or 2

Location: Does not matter

Instructions:

1. Check the games to see if they are complete & not missing any pieces before the station opens.
2. Have the child complete the games while wearing a glove/mitten to impair touch/coordination.
3. Have the child complete the games (legos, Perfection) in a typical manner.

Talking Points:

* 1. What happens to your brain after an injury?
	2. Besides games, what else would you have problems doing if you could not use your hands well?

8. Station Instructions: Ball Catch

Materials: Ball (have extras available), prism glasses

Number of Volunteers: 1 or 2

Location: Place with room to catch/drop ball without interfering with crowd flow

Instructions:

1. Play catch with the ball without the prisms.
2. Have the child play catch wearing the prisms.
3. You can have older children bounce the ball to make it harder.

Talking Points:

Areas of discussion will vary widely depending on the age of the audience. Students will need to use age appropriate language to describe concepts. Some concepts will not be discussed with younger children.

1. How does your brain work to let you play catch? Vision, sensation, proprioception.
2. What happens to your brain after an injury?
3. Discuss how the prisms alter your visual field.
4. Discuss how your body adapts to the change by using proprioceptive input to complete the throw accurately.
5. Discuss how your brain will eventually adapt due to plasticity to correct for the change if given enough time and practice.
6. Discuss how rehabilitation is used to help people recover from brain injuries.

9. Station Instructions: Coloring

Materials: Crayons, coloring pages (<https://faculty.washington.edu/chudler/colorbook.html>)

Number of volunteers: 1 or 2

Location: Does not matter

Instructions:

1. Have children color in the coloring pages
2. Explain what the children are coloring and what its function is
3. Use the brain models to explain areas of the brain to the kids & their parents

10. Station Name: Brain Function Word Search

Materials: Word search worksheets (https://faculty.washington.edu/chudler/works.html), key/answer guide to word search worksheet, pencils/crayons

Number of Volunteers: 1 or 2

Location: At a table with chairs available for the children to sit and work

Instructions:

1. Set up area - have worksheets, pencils/crayons, and a model/poster of brain available on table.
2. As children approach the station, ask them what their brain helps them to do.
3. Give children word search worksheet and ask them to find and circle the words from the “word list” within the puzzle.
4. As children find last words within the puzzle, mention that different parts of the brain control all of the different words listed within the word list.
5. Double check to see that the kids found all of the words correctly (reference key/answer guide to word search), and provide assistance if they are having difficulty.

Talking Points:

1. What are our brains used for (in terms of function)?
2. How can our brains get injured?
3. What can we do to protect our brains?

11. Station Instructions: Bike Quiz

Materials: Two sets of pictures of bad bike safety; images can be found by googling terms such as “bike helmet on wrong”, “riding bike while on a cell phone,” etc.

Number of Volunteers: 1

Location: anywhere

Instructions:

1. Have the children identify what is wrong with each picture & why it is important
2. Listen for answers such as:
* Helmet is not on right
* You should not ride in the middle of the street
* Always wear a bike helmet
* Never bike between cars or trucks.
* Don’t talk on a cell phone while biking.

12. Station Instructions*:* Learning about memory

Materials: Memory pictures

Number of volunteers: 2

Location: anywhere

Materials: Memory game pictures

Instructions:

1. Play the memory game with the cards by having the cards face down and have them go through a few turns until they start making matches.
2. After making a few matches, have the child close their eyes and then shuffle the cards.
	1. Another option would be to have two games being played simultaneously but have the second game have no matches
3. Play the game & discuss how brain injury affects your memory

Time for student to complete the activity: 1. preparation for activity outside of/before class: Approximately 1 hour. 2.class time completion of the activity: 2 hours of class time are reserved for the activity which occurs at various times due to the community partner’s needs. Travel time to the community partner will vary also.

Readings/other preparatory materials: Students are expected to review the instructions for their assigned stations. The following reading is also provided:

Pierce SR, Palombaro KM, Black JB. Barriers to bicycle helmet use in young children

in an urban elementary school. *Health Promotion Practice*. 2014;15:406-12.

Learning Objectives: 1. Participate and show leadership in community organizations and volunteer service. 2. Participate in organizations and efforts that support the role of the physical therapist in furthering the health and wellness of the public. 3. Discuss and implement strategies for the prevention of traumatic brain injury for at risk populations. 4. Reflect on the challenges of providing information on the prevention of traumatic brain injury to a lay and/or pediatric population.

Methods of evaluation of student learning: Two-page reflective paper, see rubric below.

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| Brain Safety Fair Rubric for Written Reflection |
| The student described the station that they worked at the helmet event. | Station clearly stated and described. 2 pts | Station stated but not well described. 1 pt | Station is not stated or described. 0 pts |
| The student reflected on the children and/or their parent’s reaction to their station. | Concept is addressed with significant clarity, depth and reflection. 4-5 pts | Concept is addressed with some clarity, depth and reflection. 2-3 pts | Concept is not addressed or minimally addressed without clarity, depth or reflection. 0-1 pts |
| The student described some of the challenges of educating children and/or their parents about the brain. | Concept is addressed with significant clarity, depth and reflection. 4-5 pts | Concept is addressed with some clarity, depth and reflection. 2-3 pts | Concept is not addressed or minimally addressed without clarity, depth or reflection. 0-1 pts |
| The student described some strategies that they would use the next time they have to explain to a lay person/child a concept regarding neuroscience which would improve the understanding of the lay person/child. | Concept is addressed with significant clarity, depth and reflection. 4-5 pts | Concept is addressed with some clarity, depth and reflection. 2-3 pts | Concept is not addressed or minimally addressed without clarity, depth or reflection. 0-1 pts |
| The student described one aspect of their station that they thought worked well and one aspect of their station which could be improved and how to improve it. | Concept is addressed with significant clarity, depth and reflection. 4-5 pts | Concept is addressed with some clarity, depth and reflection. 2-3 pts | Concept is not addressed or minimally addressed without clarity, depth or reflection. 0-1 pts |
| Writing | Paper is coherently organized and the logic is easy to follow. There is no spelling or grammatical errors and terminology is clearly defined. Writing is clear and concise and persuasive. 3 pts | Paper is generally well organized and most of the reflection is easy to follow. There is only a few minor spelling or grammatical errors, or terms are not clearly defined. Writing is mostly clear but may lack conciseness. 1-2 pts | Paper is poorly organized and difficult to read – does not flow logically from one part to another. There are several spelling and/or grammatical errors; technical terms may not be defined or are poorly defined. Writing lacks clarity and conciseness. 0 pts |