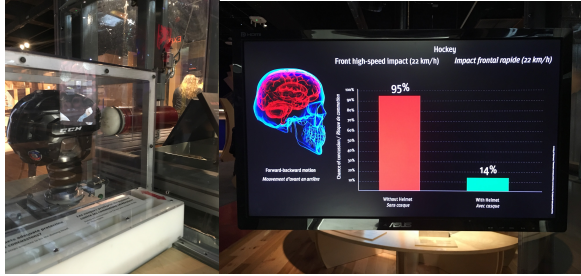


WORLID Neuroscience

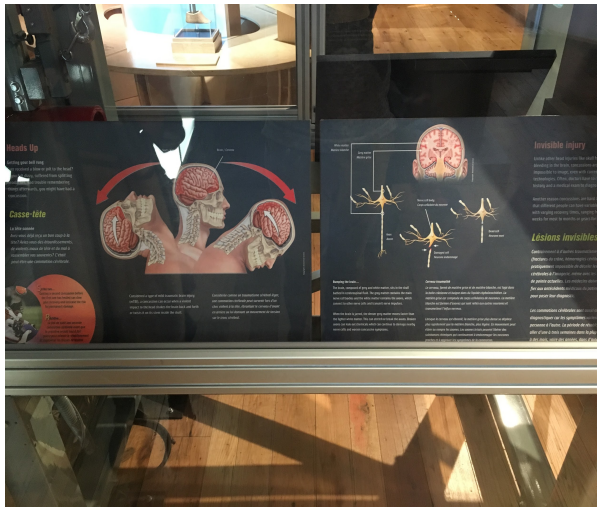
Helmet section and notice the signs of each helmet. What is between the helmets? What is



Next, try the helmet impact section of the science centre, was there a significant difference when someone had the helmet on?

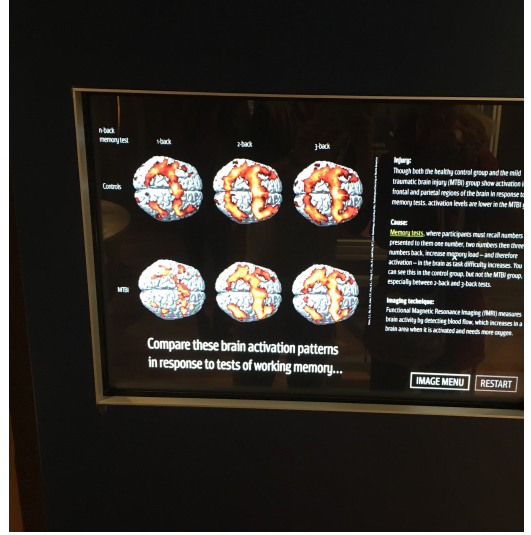


Why do you think this happened? Research and make some brief notes on what could have prevented the person's brain from being damaged. Does the brain have a built in protection?



Next we'll speak about brain injury, some protective measures aren't enough and go wrong. Let's explore:

Use a brain imaging technique and see what you can spot the difference between a healthy brain and an injured brain. What went wrong to cause the injury? Could it have been prevented?



Ontario Science Centre

**ONTARIO
SCIENCE
CENTRE**

**CENTRE DES
SCIENCES
DE L'ONTARIO**

Agency of the
Government of Ontario

Un organisme du
gouvernement de l'Ontario

For a bioWorld assignment, we went to the Ontario science centre located at:

100 Mills Road (at the corner of Eglinton Avenue East)
Toronto,
Ontario, M3C 1T3,
Canada.

Operation:

Monday → 10 am – 4 pm

Weekend Holidays → 10 am – 5 pm

1.000

School Prices:

Visit Combinations	Price		Minimum Charges
	per student	per adult	
Exhibit Hall Visit (self-guided) only	\$6	FREE	\$60
Exhibit Hall Visit + 45-minute Program	\$10	FREE	\$150
Exhibit Hall Visit + 90-minute or Space Mission Program	\$15	FREE	\$225
Exhibit Hall Visit + 6-hour DNA program	\$25	FREE	\$500
IMAX Film only			
IMAX Film only	\$6	\$6	\$96
IMAX Film + Exhibit Hall Visit	\$11	\$6	\$171
IMAX Film + Exhibit Hall Visit + 45-minute Program	\$16	\$6	\$246
IMAX Film + Exhibit Hall Visit + 90-minute or Space Mission program	\$21	\$6	\$321
Add another 45-minute Program	Add \$5	FREE	Add \$75
Add another 90-minute or Space Mission Program	Add \$10	FREE	Add \$150
Add another IMAX Film	Add \$6	Add \$6	Add \$96
Locker, coin-operated (holds up to 10 coats)			
Locker, coin-operated (holds up to 10 coats)	\$1 / locker		
Lockers for lunches			
Lockers for lunches	FREE		
School bus parking			
School bus parking	FREE		

*Only valid if the group is 20 or more (20+ people)

Programs grade 11 and 12

The science centre offers 90 minute programs for students. This allows teachers to take their students to the science centre for workshops that relate to the curriculum.

**GRADES 11-12
90 MINUTE PROGRAMS**

ENVIRONMENTAL WATER TESTING
GRADES 11-12 AT A TIME!
11:30 TO 12:30 PM
This program is designed to help students understand the importance of water testing in their communities. It includes a hands-on activity where students will test water samples from various sources and compare the results. This program is suitable for all grade levels and is a great way to learn about water quality in your area.

WAY TO GLOW! BACTERIAL TRANSFORMATION
GRADES 11-12 AT A TIME!
11:30 TO 12:30 PM
This program is designed to help students understand the process of bacterial transformation. It includes a hands-on activity where students will transform bacteria and observe the results. This program is suitable for all grade levels and is a great way to learn about genetics and molecular biology.

<http://www.ontariosciencecentre.ca/Uploads/TeachersAndStudents/documents/2015-16.SchoolBrochure.EN.pdf>

Review



The overall BioWorld experience was good. The neuroscience exhibition provided many visual demonstrations for students to explore and learn from. We really enjoyed the sequence of the exhibit with exploring the different helmets that are used in different types of sports. This display was organized really well since there are multiple different types of helmets that allows for students to make connections. For example, not all students would necessarily be interested in the same type of sport, so showing each allows the students to be more engaged in it to their own interest. The exhibit then shows an impact demonstration, which we tried out. This was sequenced very well since it provides you with a low impact vs high impact. This would allow you to see the difference by reading the data on the display. This type of demonstration can enhance student thinking since students will think further and make connections to their own personal experience. In conclusion, the students can explore the impact between a healthy brain vs a damaged brain by exploring the touch screen, students become more engaged into reading the new information, this was done since it is important to include technology so that the exhibit is more interactive.

One thing that was not included in the exhibit has been practical real life examples such as Phineas Gage. We find it very useful and interesting when we learn about real life examples and that students would be just as interested.

General Neuroscience Activity
Fill in the Blanks

Brain's Protection

The brain has a _____ outer shell and a _____ inner shell, much like the _____ we use when we bike from place to place. The layers or casings of the brain are collectively called the _____. The brain is _____ in a fluid that helps cushion it from the skull. This fluid is called the _____.

Accidents

At _____ km/h without a helmet, a hockey player will receive _____ percent more damage than someone with a helmet who would receive _____ percent damage. Thus, it is important to ensure we always wear helmets when doing any dangerous activity, even when walking across the street.

When the brain is damaged, the damaged area is called a _____ and could effect the functioning of the individual. Using _____, you discovered that damage to the _____ caused symptoms such as _____. If the person had worn a helmet, these injuries could have been avoided. Of course, even helmets are not full proof, and you can still get hurt with a helmet. Wearing a helmet helps _____ the chances of you getting hurt.

Concussions

Because your brain is floating around in _____, when you move your head forward quickly, the _____ side of your brain is more likely to be hurt. Likewise, if you move your head back quickly, the _____ side of your brain is more likely to be hurt. These types of injuries are called _____ injuries (research link <https://www.youtube.com/watch?v=B4NqQsaWZJM> until the end).

The overall rating of the Ontario Science Centre Neuroscience portion is _____ star (out of 5 stars)

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