

Lesson #1 Introduction to the Brain

Subject area / course / grade level: Science Grade 7-10

Summary: Students are introduced to the broad content of the brain.

Time Needed: 1 Period

Materials:

- *Human Brain Poster Series* (Laminated) available from Amazon [Buy them here!](#)
- Teen Brain: Still Under Construction Download Electronic Copy from US Dept of Health & Human Services Publication #11-4929
- “Watch it Grow Brain” 10 pack from Amazon [Buy them here!](#)
- Sticky notes

***ALTERNATIVE or EXTENSION: Bill Nye “The Brain” video with accompanying worksheet.
CUT & PASTE questions below:**

1. What are you and Bill Nye? _____.
2. What animal has the largest brain? _____.
3. What percentage of your brain do you actually use? _____%.
4. What percentage of your brain do you use while you are sleeping? _____%.
5. What do you call the system that sends tiny electrical signals through your body?
6. Why is it easier to catch a ruler when you drop it? _____.
7. What are the four types of memory? 1) _____, 2) _____,
8. 3) _____, 4) _____.
9. What is eidetic memory also called? _____.
10. What part of the brain do you use to keep balance? _____.
11. The brain is _____ to fit in your skull.
12. “_____ Resonance Imaging” is abbreviated MRI.
13. Why can you not bring a video camera into an MRI room? _____.
14. What side of your brain controls the left side of your body? _____.
15. What part of the brain helps with speaking? _____.
16. What is connected to your brain that goes down your spine? _____.

WASS: (Middle School):

6-8 LS1-C Multicellular organisms have specialized cells that perform different functions. These cells join together to form tissues that give organs their structure and enable organs to perform specialized functions within organ systems.

6-8 SYSA Any system may be thought of as containing subsystems and as being a subsystem of a larger system.

WASS: (High School):

9-12 INQA Scientists generate and evaluate questions to investigate the natural world.

9-12 SYSB Systems thinking can be especially useful in analyzing complex situations. To be useful, a system needs to be specified as clearly as possible.

NGSS(Middle School):

MS-LS1-d Design and conduct an investigation to gather evidence to support explanations that the body is a system of interacting subsystems composed of groups of cells working to form tissues and organs specialized for particular body functions, and that scientific advances in understanding of those systems have led to improvements in nutrition, health, and medicine.

NGSS (High School):

HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

CCSS:

WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.



Lesson #1 Introduction to the Brain

What? Introducing the Nervous System.

How? By reviewing text as a group and reporting to the class.

Why? To become more familiar with the brain before we dig deeper.

Differentiation:

Use the “*Knowing Neurons*” poster to support advanced learners.

Use the “*Brain Facts*” & “*Brain Health*” posters to support ELL and SPED needs.

ENGAGEMENT (15 min) CREATE A QUESTION BANK

Use student pre-write to engage future lesson concepts.

Instruct:

INITIAL THOUGHTS: (In your journal)

- How important is the brain compared to other organs?
- List as many functions you are aware of associated with the brain.
- How much does the human brain weigh?
- How big is the human brain?

Turn & talk to discuss answers.

Together write 1 question about the brain on a sticky note & share out with the class.

After students share their questions display them as a “Question Bank.”

Close engagement with a growing brain & tell them you will be growing a class brain. Use a fish bowl.

EXPLORATION (10 min) POSTER JIGSAW

- Number “Human Brain” posters 1-5 & place throughout the room.
- Number students from 1-5

Instruct:

- Using the poster assigned to your group, have each member pick one section of amazing brain facts to review.
- Take 5 minutes to read your assigned section.
- Take notes in your journal about what information would be important to share with your group.
- When complete, each group member will teach the group what they learned.
- As a group, pick 5 key points you think the entire class should know.

EXPLANATION (15 min) REPORT OUT

- Have groups report their 5 most important facts.
- Students should take notes in journals. Use the reported facts for assessments.

ELABORATION (5 min) CHECK YOUR BANK

- Review the class generated questions. Were any answered from the jigsaw activity?
- Have students write new questions in their journals or on sticky notes to be added to the question bank.

EVALUATION

- Use student journals & question bank to assess content awareness & possible misconceptions.



Entry Document: Traumatic Brain Injury Project (Draft)

Dear Production Team,

To compete with the growing demand for trustworthy reporting on television, we here at Paramount Studios are commissioning your team to produce a Special Report for our news show. Our research has found that the television audience is particularly interested in reports that demonstrate how current technology can be applied to help solve medical issues. As such, your Special Report will portray how neural engineers and neuroscientists are working together to treat Traumatic Brain Injuries (TBI).



Your group is a Production Team responsible for scripting and filming a Special Report to present to the Executive Producer (Teacher). Each group will consist of four Experts that will report their findings in the scene. Although there are four roles that must be filled by members of your team, the entire group will need to work together to complete the presentation. To complete this project, you will need to accomplish the following tasks:

1. Investigate several Traumatic Brain Injuries to identify a suitable (and interesting) topic for your Special Report.
2. Produce a script that includes the following:
 - Describes in your Special Report how the human brain functions normally, to include both the brain as a whole as well as the functional unit of the brain. *This element will include a working model of a neuron.*
 - Explains how the TBI affects normal neuron function to include associated signs and symptoms.
 - Analyzes neural network graphs to provide insight into how the TBI might account for the associated signs and symptoms.
 - Explains the possible treatments as well as the risk factors associated with treating the TBI.
 - Describe future directions for the Neural Engineering applications.
3. Film the scene for viewing at the next meeting (Presentation Day).
4. Include a comprehensive list of references (citations) for your work.

