

Brain Power: Literature-based Lesson Plan for Grades 6-8

Length of lesson: two class periods

Primary Source: Betsy Hedberg, Discovery Education, at <http://www.discoveryeducation.com/teachers/free-lesson-plans/brain-power.cfm>.

Adapted By: Laura Sanders, Environmental Science Institute (July 2011)

TEKS POTENTIALLY ADDRESSED THROUGH THIS LESSON:

§112.18. Science, Grade 6: 2B, 2E, 3D
§112.19. Science, Grade 7: 2B, 2E, 3D, 12B, 13A, 13B
§112.20. Science, Grade 8: 2B, 2E, 3D
§126.12. Technology Applications, Grades 6-8

PERFORMANCE OBJECTIVES:

Students will be able to: (1) explain that the brain is the organ of the body that performs the function of memory; and (2) compare and contrast short-term memory with long-term memory.

CONCEPTS

The brain is the organ of the body that performs the function of memory. Short-term memory retains data recently learned, while long-term memory retains data from the past. People who have excellent short-term memory are not necessarily more intelligent than others; they have trained their brains to be able to retain a lot of information, which is something that almost anyone can do. A variety of strategies can be used to train the brain to hold more data in its short-term memory.

MATERIALS

This activity requires materials that can be used to test students' abilities to retain series of numbers or words in their short-term memories. The materials listed here are examples of materials you might distribute to each group.

- Deck of cards
- Dictionary
- Phone book
- Book of short poems

TEACHER PREPARATION:

Depending on computer access at schools, teachers may need to reserve computers in advance for this lesson, or print off copies of the article for student use.

ENGAGE

1. Ask the class: What is your earliest memory? Students can share a few entertaining memories. Did they have strong emotional or sensory experiences related to that memory?
2. Speculate about why humans usually can't remember anything from the first moments—let alone the first few months and years—of their lives.
3. Speculate on why humans remember the same situations differently, such as a similar vacation experience that might be remembered in a different way by two siblings.

EXPLORE

1. Divide students into small groups, each with one of the materials listed above.
2. Ask each group to use the tool provided to create a 10-item quiz that will test their fellow students' short-term memories. Suggest a series of items such as playing cards, numbers, words or simple facts. The quizzes should be challenging, yet not impossible for the average student.
3. Each group should quiz a group next to them and record the results.
4. The highest scorer from each group should share their memory strategies with the whole class. Encourage them to explain what they might use as a memory aid. Students may come up with other possible strategies to aid short-term memory.
5. Have groups take a different quiz from a different group and try to use memory strategies discussed.
6. What memorization techniques did students find most effective? Why were they effective? Where else might they be effective? Would they be useful for everyone? What implications might be discovered concerning the ways different individuals memorize and learn? Perhaps students might write a paragraph evaluating the results and analyzing the significance of the activity in which they have just participated.

EXPLAIN AND ELABORATE

Have students research and write brief reports on formal experiments with short-term memory or the brain that have been conducted by scientists. This would be a great project opportunity with potential for class presentations.

Additional questions that might be addressed through these reports:

1. What are possible daily activities that humans do that are controlled by the cerebellum? Which routine activities do we “memorize” so well that we can perform them on autopilot? Why is it important that we can do these things easily and without thinking? Is this related to what is called “short-term” memory, or “long-term” memory, or is it something else?
2. Modern medical technology allows us to see which parts of the brain are working as we do different activities. How do you think this technology can help scientists research the brain? How can it help people with brain damage or disease?

3. Why do you think that one-fourth of our brain is devoted to vision and to processing the things that we see? How would our lives be different if the same percentage of our brainpower was devoted to hearing? To touch? To smell? To taste?

RESOURCES

The Science Times Book of the Brain - Edited by Nicholas Wade. Lyons Press, 1998. For all its seeming structural simplicity, the brain is a mysterious and complicated organ. This fascinating collection of 45 articles from the *New York Times* highlights the newest research into everything from the nature of dreams and consciousness to the making of memories in the brain. It contains superb chapters on senses, emotions, mood, language, medicine, and much more.

Creating Mind: How the Brain Works - John E. Dowling. W.W. Norton & Co., 1998. What's going on inside your head? This is one of the fundamental questions in science and one of the toughest to answer. This compelling book is a lucid introduction to the study of the brain, describing the mechanisms underlying memory, vision, language, and many other more-or-less well-understood phenomena. We learn that the cells and chemicals that make up our brains have been studied extensively, yet we are still mystified by the simplest fact of all: We are conscious.

Neuroscience for Kids <http://faculty.washington.edu/chudler/neurok.html>. This home page has been created for all students and teachers who would like to learn more about the nervous system. Enjoy the activities and experiments on your way to learning more about the brain and spinal cord.

The Whole Brain Atlas <http://www.med.harvard.edu/AANLIB/>. Designed as a learning tool for medical school students, this fascinating atlas offers images of healthy and diseased human brains.

Brain Backgrounders <http://brainconnection.positscience.com>. These two pages from the Society for Neuroscience provide an on-line series of articles that answer basic neuroscience questions and explains how basic neuroscience discoveries have led to clinical applications.

Serendip: Brain and Behavior <http://serendip.brynmawr.edu/bb/>. Serendip examines some of the latest research related to Brain and Behavior. This site contains interactive exhibits, articles, and links to other resources.

The Joy of Visual Perception: A Web Book at <http://www.yorku.ca/eye/>. This web book uses graphics supplemented with text to stimulate interest in the sense of vision.

Exploratorium: The Memory Exhibition <http://www.exploratorium.edu/memory/>. This site has information and fun online experiments to test and improve your memory.