



"El saber de mis hijos
hará mi grandeza"

BUILD-A-BRAIN



LESSON PLAN

Title: Build-A-Brain

Setting: In Classroom

Subject: Biology-Neuroscience

Grade Level: 3rd-6th grade

Time Frame: 1 hour

STUDENT OBJECTIVES

- Explore the structure and function of various parts of the human brain.
- Understand the differences between the brains of comparative animal models.
- Utilize knowledge to create the brain of an imaginary animal.
- Refine oral communication skills by presenting work to peers.

BACKGROUND

The "Build-A-Brain" exercise integrates a fun sensory and motor activity with a basic neuroanatomy lesson. The instructor first provides a short explanation of brain structures and the functions they subserve. Students are then asked to utilize this information to create the brain of an imaginary animal using Play-Doh.

Students are asked to present and describe their imaginary animal's brain and functions to the rest of the class. This exercise facilitates a broad range of learning styles, and the difficulty level can be adapted to suit a variety of grade levels and educational backgrounds.

MATERIALS

- Video "Be a Mad Scientist and Build your own Brain!"
- Audio and visual capacities for the video.
- 4-6 different colors of Play-Doh (enough for a class divided into groups of 3).



BUILD-A-BRAIN



TEACHER BACKGROUND INFO

WHAT TO KNOW BEFORE YOU TEACH

Note: This content is primarily for the instructor's reference; the accompanying video presentation will be for the students.

The Human Brain

The cerebral cortex is the wrinkly outer layer of the brain that is responsible for higher cognitive thought and for processing sensory information. The wrinkles maximize the surface area of the brain, allowing for more neurons and increased connections between them.

The cortex is divided into distinct areas called "lobes" that sub-serve different functions:

- **The frontal lobe** - planning, reasoning, speech, movement, and problem-solving.
- **The temporal lobe** - important for memory and learning, hearing, and language.
- **The occipital lobe** - visual processing center of the brain.
- **The parietal lobe** - processes sensory information like touch, pressure, temperature, and pain; integrates this with motor information.

Other very important regions of the brain include the cerebellum and brain stem.

- **Cerebellum** - structure at the base of the brain that regulates balance and coordination. This area receives information from the eyes and muscles to detect where the body is relative to space (proprioception).
- **Brain stem** - also known as "the reptilian brain," it is the most primitive part of our brain. Regulates basic functions such as breathing, heart rate, and blood pressure.

Comparative Animal Brains

One method to understanding the relationship between brain anatomy and function is to compare the neuroanatomy of different species. By assessing the differences and similarities in brain structure and their adaptive functions across animals, it's easier to understand the relative significance of each area within an organism.

The trophy for the largest animal brain goes to the sperm whale, weighing in at 17 lbs!

←..... **DID YOU KNOW?**

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PROCEDURE

*Note: This content is primarily for the instructor's reference; the accompanying video presentation will be for the students.

- 1 Play the video "Be a Mad Scientist and Build your own Brain!" (5-7 minutes) about the brain structure and function.
- 2 Have class split up into groups of three and distribute at least 4-5 different colors of Play-Doh to each group (5 minutes).
- 3 Instructions for students in groups:
 - a. Use your knowledge about brain structure and function to design an imaginary animal brain together (15 minutes).
 - b. Your animal brain can have superpower senses; just make sure the brain regions that regulate those senses are enhanced in your design.
 - c. Present your imaginary animal brain to the rest of the class as a group and address these questions (20 minutes):
 - i. What is your animal?
 - ii. What does your animal do?
 - iii. How is its brain adapted to perform these various tasks?

*The "Build-A-Brain" activity was originally developed by Melissa Demetrikopoulos, Ph.D., Institute for Biomedical Philosophy, and was adapted by Elizabeth Weaver, M.S. and Linda Qi Beach, Ph.D. for the Dana Foundation.



BUILD-A-BRAIN

MAKE YOUR OWN PLAY-DOH

BONUS

MATERIALS

- 2 cups all-purpose flour
- 3/4 cup salt
- 4 teaspoons cream of tartar
- 2 cups lukewarm water
- 2 Tablespoons of vegetable oil
(coconut oil works too)
- Food coloring, optional
- Quart sized bags

EQUIPMENT

- Large pot
- Spoon for stirring
- Gallon size bag or wax paper for cooling

PREPTIME

- 5 minutes



Original Recipe from Jamielyn Nye



BUILD-A-BRAIN

MAKE YOUR OWN PLAY-DOH

BONUS

INSTRUCTIONS

1 Stir together the flour, salt, and cream of tartar in a large pot. Next, add the water and oil. If you're only making one color, stir in the color now.



2 Cook over medium-heat, stirring constantly. Continue stirring until the dough has thickened and begins to form into a ball. Remove from heat and then place inside a bowl, gallon sized bag or onto wax paper.



BUILD-A-BRAIN

MAKE YOUR OWN PLAY-DOH

BONUS

INSTRUCTIONS

3

Allow to cool slightly and then knead until smooth. If you're adding colors after, divide the dough into balls (for how many colors you want) and then add the dough into the quart sized bags. Start with about 5 drops of color and add more to brighten it. Knead the dough, while inside the bag so it doesn't stain your hands.



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Once it's all mixed together, you're ready to PLAY. Store the play dough inside the bags to keep soft. If stored properly it will keep soft for up to 3 months.

