

## The Brain & Skull: “*Clay Brains*”

### GOAL

The goal of this lesson is to introduce the students to basic brain anatomy. They will hear and say the terms associated with basic brain anatomy, and create reasonably accurate clay models featuring all the major structures.



### Set-up:

- How to Build a Brain Worksheet
- Plastic Brain Models
- Paper (to protect desks)
- Set of clay in 4 or 5 colors for each student



### PROCEDURE

#### *Engage (10 minutes)*

- Display several small brain models to the class.
- Tell students that they will be making brain models out of clay.
- Also tell students they will be learning what the different structures of the brain are called, and what the names mean in Greek and Latin. Explain that scientists use Greek and Latin words to describe different shapes and structures. These are very old languages that scientists use to name things.

#### *Explore (10 minutes)*

- Pass out the following to each student:
  - a small resealable plastic bags containing four or five different colored cubes of modeling clay;
  - a blank sheet of paper to use as a work surface; and
  - a ‘How to Build a Brain’ worksheet.
- Briefly explain how to work with the clay, i.e. how it must be handled to make it more malleable.
- Have a student read the first paragraph of the worksheet aloud to the class. This paragraph introduces the term ‘*hemisphere*’, and discusses why scientists use Greek and Latin terms. Have all the students create two hemispheres.



## PROCEDURE

### *Explain (15 minutes)*

- Have another student read the next paragraph of the worksheet. This paragraph introduces the terms ‘*cortex*’ and ‘*corpus callosum*’. Encourage students to examine the small model brains to become familiar with where the structures are located in an actual brain
- As the students finish each step of the directions, go around the room and make sure that the hemispheres are reasonably well shaped, and that the corpus callosum is in the proper position before the hemispheres are placed together.
- When all the hemispheres are connected, ask a student to read the next paragraph of the worksheet. This paragraph introduces the terms ‘*gyrus* (pl. gyri)’ and ‘*sulcus* (pl. sulci)’. Students can reproduce these structures either by rolling up gyri or drawing grooves (sulci) on their cortices with a pencil point.
- Go around the room again and check the students’ progress.
- If students have a question, make sure they use the proper terminology when posing it. “Is this good?” is not an acceptable question.
- Encourage students to refer to the model brains for guidance.

### *Expand (15 minutes)*

- Ask a student to read the next paragraph of the worksheet. This introduces the term ‘*cerebellum*’, then instructs the students to make a cerebellum and attach it to their models.
- Make sure the cerebellums are attached to the proper point on the clay models. Refer to the plastic models for proper placement.
- Have the next paragraph read. This deals with the ‘*brain stem*’, the structure that connects the brain with the spinal cord. The students should make a brain stem and attach it to the proper location on their clay brains.
- Go around the room and answer questions from the students. Again, encourage use of proper vocabulary when the students ask questions.

### *Evaluate (10 minutes)*

- After the clay brain models are completed, have the students use the checklist on the last page of the worksheet to make sure their models are correct.
- Each student should show a classmate their model, naming all the parts on the checklist.
- Go around the room and have various students name the parts of their models.



## PROCEDURE

### *Evaluate (continued)*

- Collect the plastic brain models, and instruct the students to put their clay brains in the resealable plastic bag.
- Ask the students to take their models home and show the different parts to a family member.
- Encourage the students to use the new Greek and Latin terms when showing off their clay brains.
- Discourage disassembly of the clay brains for the creation of less scientific models.
- Pass out the Brain Explorer folders and ask the students to file their worksheets for later review.
- Collect the Brain Explorer folders.





- **Key Cognitive Skills:**  
Observing, Comparing, Recording, Labeling
- **Vocabulary Terms:**  
Right Hemisphere  
Left Hemisphere  
Corpus Callosum  
Cortex  
Gyrus (Gyri)  
Sulcus (Sulci)  
Cerebellum  
Brain Stem  
Spinal Cord
- **Specific Outcomes:**
  - Students will create a model of the brain.
  - Students will learn to pronounce the names of several brain structures.
  - Students will be exposed to Greek and Latin words.

#### PROJECT 2061 BENCHMARKS FOR SCIENTIFIC LITERACY

##### 1 A The Nature of Science:

For students in the early grades, the emphasis should overwhelmingly be on gaining experience with the natural and social phenomena and on enjoying sciences.

##### 4 D Structure of Matter:

Students should design and build objects that require different properties of material.

##### 6 C Basic Functions:

Models help children to see and touch the internal organs and to know where they are located in the body. Questions about familiar body systems can be useful in getting students to start thinking about systems generally. They can then begin to understand that each organ affects and is affected by others.

##### 9 C Shapes:

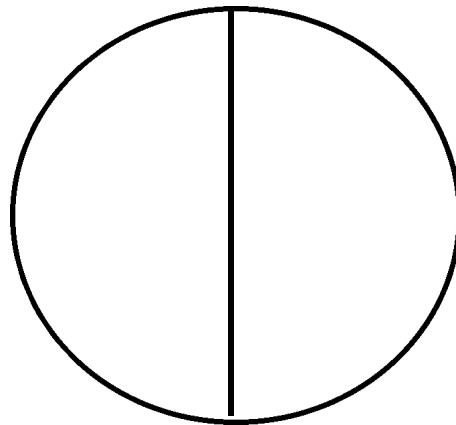
The geometric description of objects includes size, orientation, symmetry, and proportions, as well as shape.

##### 11 B Models:

Physical, mathematical, and conceptual models are tools for learning about things they are meant to resemble. Physical models are by far the most obvious to young children, so they should be used to introduce the idea of models.

## How To Build A Brain

Today we are going to build a brain out of clay. To do this, we will need to make the different parts of a brain. The first part we need to make is a half of the biggest part of the brain, called a **hemisphere**. **Hemisphere** is a Greek word that means half (hemi) of a round shape (sphere). Scientists use Greek and Latin words to describe different shapes and structures. These are very old languages that scientists like to use to describe things they discover or observe.



Two Hemispheres

After you make one hemisphere, make another one the same size. The outside of the hemisphere is called the **cortex**. This is Latin word that means “bark”, like the bark of a tree. The cortex protects the inside of the brain the way the bark protects the inside of a tree. The two hemispheres are connected by a bridge called the **corpus callosum**. These strange sounding words mean “hard body” in Latin. Put a small piece of clay in the middle of one of your hemispheres before you mold them together.

The outside of the cortex is covered by shapes that look like wads of gum. One of these wads is called a **gyrus**. Two or more are called **gyri**. **Gyrus** is a Latin word that means 'roll' or 'fold'. Between the gyri are lines or grooves. One of these lines is called a **sulcus**. This is another Latin word that means 'furrow', like the line a farmer cuts in the ground to plant seeds. Two or more of these are called **sulci** (sul-sigh). You can make gyri by rolling up thin piece of clay and sticking them onto the cortex.

Now we need to make the **cerebellum**. The cerebellum is made up of the two rounded shapes that look like a little brain at the back of the cortex. **Cerebellum** means 'little brain' in Latin. Roll up two smaller balls of clay and stick them where you see the cerebellum on the model. Squish them together a little, because unlike the hemispheres, the cerebellum is not made up of two separate pieces. Our brains are starting to look like real brains!

Next we need to make a **brain stem**. The brain stem is what connects the brain to the **spinal cord**. The brain stem looks like the stem of a flower or an apple. You should stick your brain stem between the two round shapes that make up the cerebellum. Look at the model if you are not sure where to put your brain stem. Unlike the model, the brain stem is really made out of one piece, like the cerebellum.

Congratulations! You have built a brain! Can you name the different parts of your brain? Show someone your brain and point out the different parts.

Here is a checklist of the parts your brain should have:

- \*Right hemisphere
- \*Left hemisphere
- \*Corpus callosum (did you remember to put one between the hemispheres?)
- \*What is the cortex? How is the cortex like a Roman dog? (One is 'bark' in Latin, the other barks in Latin.) Extra credit if you laughed.
- \*Gyri
- \*Sulci
- \*Cerebellum
- \*Brain stem

Take your brains home and show the different parts to someone. How many of the parts did they know? Try and use the Greek and Latin words you have learned today. Everyone in your family will think they have a scientist living with them!

# Notes

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