

BJRP Lesson Plan: Exploring brain anatomy
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Goals:

- Introduce students to basic brain anatomy
- Introduce students to brains from different organisms.

Introduction:

- I will briefly introduce the nervous system to the students and go over the activities for the day.

Activity 1: Build a brain using clay (taken from UNC-CH Brain Explorers- see PDF)

Materials:

- How to Build a Brain Worksheet
- Brain Models
- Clay or Play-Doh
- Toothpicks or any other instrument that could mold clay

Procedure

1. 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.
2. Pass out How to Build a Brain Worksheet (SEE PAGE 3).
3. 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.
4. 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
5. 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.
6. 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.
7. 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.
8. 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.

Discussion:

- Have the students go over the parts of the brain
- Encourage students to take their clay brains home and show different parts to family members

Activity 2: Exploring brains from different organisms

The students will rotate through stations where they will be able to observe brains from different organisms.

Materials:

- Human brain and spinal cord, human brain slices
- Mouse Brain and mouse brain slices
- Xenopus tadpoles
- Microscopes for slides and visualization of xenopus tadpoles
- Blue pads
- Gloves

Procedure:

1. Have the students observe, and touch (when possible) the different brains
 - a. Structures to emphasize to the students: Right Hemisphere, Left Hemisphere, Corpus Callosum, Cortex Gyrus (Gyri), Sulcus (Sulci), Cerebellum Brain, Stem Spinal Cord
2. Have students draw human, mouse and xenopus brains
3. Have the students identify and label in their drawings the main features of the human brain.

These can include:

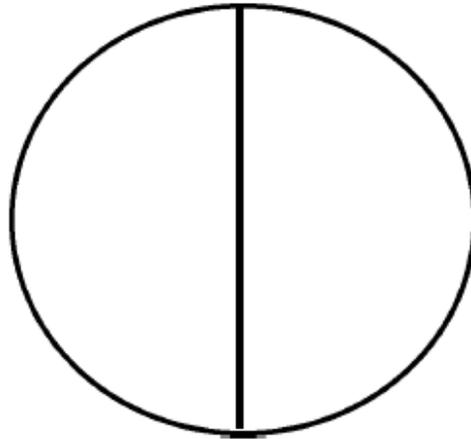
 - a. Right Hemisphere
 - b. Left Hemisphere
 - c. Corpus Callosum
 - d. Cortex Gyrus (Gyri)
 - e. Sulcus (Sulci)
 - f. Cerebellum Brain
 - g. Stem Spinal Cord

Discussion:

- What are the major similarities between human, mouse, and xenopus brains?
- What are the major differences between human, mouse, and xenopus brains?
- Why are the brains of different animals so different?

How To Build A Brain (credit to UNH-CH Brain Explorers)

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.

Pictures:



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More pictures from the activity will be posted in the facebook page