

# An Elementary Brain Hat Activity

## Activity 1G: “Atop Your Head”

Grades 4 & 5

### Activity Description

In this elementary level activity, students will discover the external anatomy of their brain as they create a “brain hat”. Students will cut out the sections of the brain hat and color in major sections of the brain such as the cerebellum, brain stem, and cerebrum. They will also apply math concepts as they measure the circumference of their heads to create a custom fitting brain hat. The hat can also be used in future lessons as an outward reminder for students to use their brain power!



### Objectives

The student will be able to:

- ✓ identify the major lobes and sensory-motor portions of the brain to include the cerebellum, brain stem, and cerebrum.
- ✓ describe the function of the identified parts of the brain.
- ✓ use gross motor skills to construct a model of the brain to form a “brain hat”.

### Materials

To complete the activity, students will need the following materials:

#### Class Discussion

- ✓ Copy of the Student Activity for each student

#### Assembling the Brain Hat

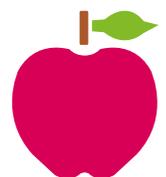
- ✓ Copy of the brain hat pattern for each student
- ✓ Colored pencils, markers, or crayons (8 colors)
- ✓ Scissors
- ✓ Tape or glue stick

#### Processing Out

- ✓ Processing Out handout for each student

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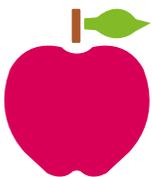
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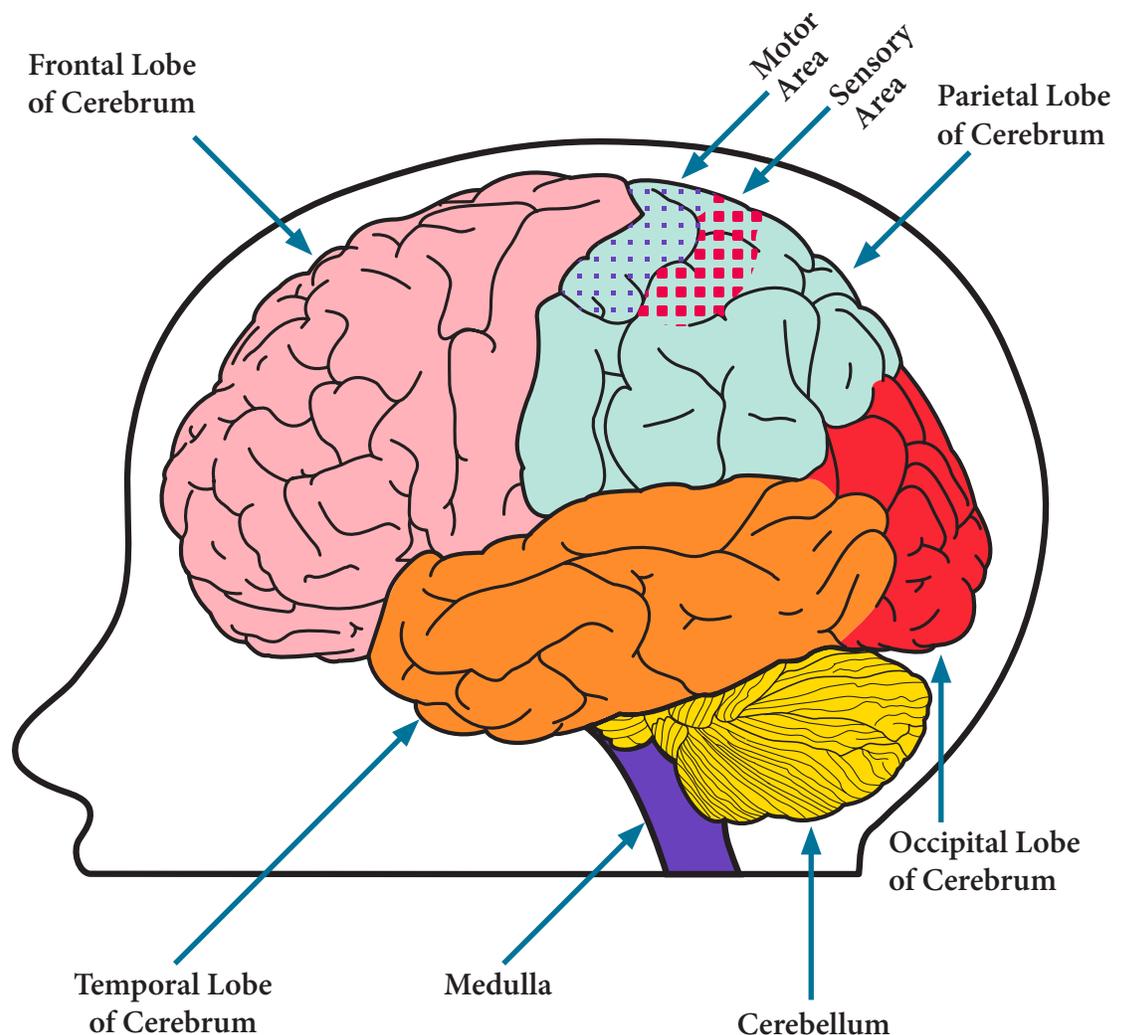
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## Background:

### THE BRAIN AND ITS PARTS

Weighing about three pounds – roughly the size of a coconut fruit – the brain fills most of the top half of your head. The brain is a complex organ, made up of millions of cells. These cells include nerve cells called **neurons** (nur-rons). The neurons communicate with each other to help us breath, talk, think, and walk. All of these millions of neurons form the brain.

The brain can be studied in three main sections: the **cerebrum** (suh-ree-brum), the **cerebellum** (sara-bell-lum), and the brain stem. The cerebrum helps us make thoughtful choices that need thought, touch, and voluntary movement. The cerebellum controls balance and coordination. The brain stem takes care of involuntary actions. An involuntary action is something that does not need to be thought about. The brain stem takes care of breathing and heartbeats. Imagine if you had to think about taking every breath! It would make it harder to focus on doing anything else!



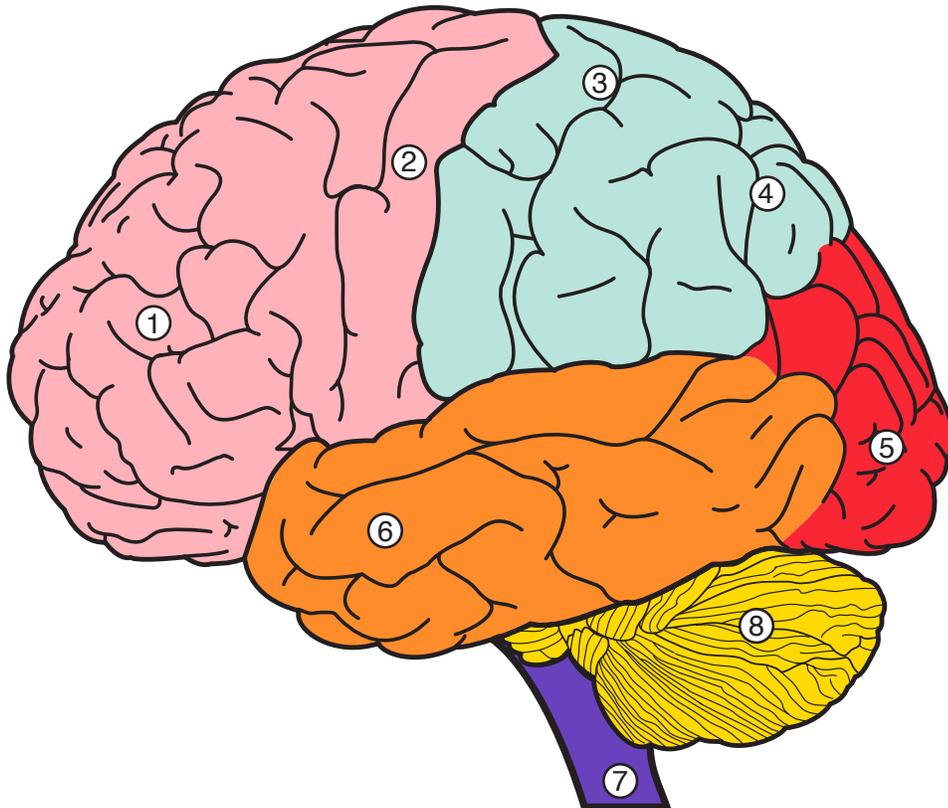
## THE CEREBRUM

Scientists call the “upper” brain the **cerebrum**. The cerebrum is the biggest part of the brain. It is so big that it makes up two-thirds of our brain. The cerebrum has two halves called **hemispheres** (hem-ah-sfeers). The hemispheres are separated by a deep split known as a **fissure** (fish-er). The fissure does not go all the way through the cerebrum. Both hemispheres are connected by bundles of neurons, similar to the cables that connect a computer to a printer.

Just like a cable between the computer and the printer, the bundles of neurons allow both hemispheres to communicate with each other. This is very important since *each hemisphere controls the opposite side of the body*. The left hemisphere controls the right side of the body and the right hemisphere controls the left side of the body.

The cerebrum has a surface that looks like a crumpled piece of paper. These “crumples” form small, shallow fissures. These shallow fissures make more surface area, which means more brain cells can fit into a small space. The cerebrum has so many fissures, that if it could be unfolded and flattened out, it would be about half a square yard (half a square meter) – about the size of a newspaper folded in half.

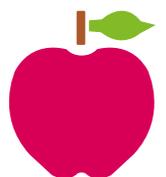
The outside of the cerebrum is covered by the **cerebral cortex** (suh-reeb-ral kor-tex). The cerebral cortex is like the bark covering the tree. This is known as our “thinking cap” because it helps our brain to interpret information, respond to problems, access memories, experience sensations, and control movements. The cortex is very thin. It is less than one-fourth of an inch thick which is about the thickness of two nickels stacked on top of each other.



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Looking more closely at the cortex, some of the fissures are bigger than others. These larger fissures divide the cortex into smaller lobes. Each of these smaller lobes has a specific job to help the body and brain communicate. The **frontal lobes** think and create (#1). The **parietal lobes** (#4) help us with directions and to recognize objects and their uses. At the back of the head are the **occipital lobes** (#5) where messages from the eyes are received and interpreted. The **temporal lobes** (#6) control our hearing, speech, and memory. The **brain stem** (#7) takes care of involuntary body functions like breathing and digestion. And the **cerebellum** (#8) controls your balance and coordination. Imagine what life would be like if we did not have a cerebellum!

At the back of the frontal lobe lies the **motor area** (#2) which is responsible for controlling the body's movement. Located in the front part of the parietal lobes lies most of the **sensory area** (#3) where the body sends sensory stimuli like touch and pain, for processing.

### Preparing for the Activity

1. Photocopy individual student brain cap patterns. This pattern may need to be adjusted to fit securely to the heads of some students.  
**Suggestion:** There is enough white space in the pattern to 'pleat' or cut and tape/glue the head band together. For the top of the brain, there is enough white space to increase the length of the glue/tape tabs so that the top will fit onto the band if band size is adjusted.  
**Suggestion:** Another way to adjust the pattern, is to reduce the pattern size by 10% or more when photocopying. Prepare several different brain hat sizes when photocopying the pattern (10% or 15%) so students may select the size that will fit them best.
2. It may be beneficial for students to measure their head circumference as an extension to this activity. This should be done after the class discussion and would require either a tape measure if working on measurement skills or a piece of yarn.
3. Photocopy sufficient copies of the *Student Activity* and *Processing Out* handouts
4. Assemble sufficient numbers of scissors, glue sticks/tape rolls, and colored markers/crayons/pencils prior to beginning the activity. Students will need these materials for assembling the brain hat. They will also need the colored markers/crayons/pencils to complete the color code and processing out portions of the activity.  
**Suggestion:** Organize scissors, glue, tape, crayons, and markers into 'supply kits' for easy distribution to individual or small groups of students.

### Conducting the Activity/Management Suggestions

Depending on time, the discussion and the construction of the brain hat may need to be done a different days. It will be important to review the discussion materials with the students before constructing the brain hat.

**Suggestion:** Depending on the students’ abilities, it may be beneficial to complete the “Processing Out” portion of the activity prior to making the brain hat. If this is the case, allow the students to access the discussion narrative to complete the “Processing Out”.

After participating in the class discussion or completing a review of the brain discussion, students are to complete the color code chart before making the brain hat. They will need 8 different colors to complete the color code chart. **Suggestion:** Decide before completing the activity if students may choose their own array of colors. Depending on anticipated future use of the brain hats, it may be useful to have all students use the same colors for corresponding brain parts. Perhaps in connection to Physical Education, Art/Music, or future science activities the brain hat can be used as a tool to help students connect their movement, creativity, or thought processes to a specific part of their own brain. However, it may also be equally beneficial for students to create their own color palette for their brain hat.

After they have completed the color charts, students are to use their color code to shade in the eight identified brain parts. They may refer to the diagrams in the discussion section. Only after they have colored in all parts can they begin the process of cutting out and assembling the brain hat. **Suggestion:** As a formative assessment to determine their level of understanding, have students share with the teacher or a partner how their color code compares to their colored brains to check for correct identification of of brain parts before they start cutting and assembling the brain hat.

## Making the Brain Hat

Provide students with the supplies needed to assemble the brain hat. The instructions are included with the Student Activity handout. Each step should be read aloud before the class begins each step.

### STEP 1

#### Color Coding:

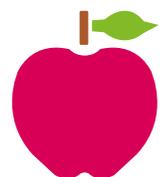
Use the information from the class discussion to color in the different parts of your brain hat. Complete the color code below for the different parts of the brain. Use the figures for the discussion section for help if needed.

BRAIN PART	COLOR CODE
1. <b>FRONTAL LOBES</b>	
2. <b>MOTOR AREA</b>	
3. <b>SENSORY AREA</b>	
4. <b>PARIETAL LOBES</b>	
5. <b>OCCIPITAL LOBES</b>	
6. <b>TEMPORAL LOBES</b>	
7. <b>BRAIN STEM</b>	
8. <b>CEREBELLUM</b>	



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## STEP 2

### Coloring the Brain Hat:

- a. Before cutting out the brain hat, use your color code to label and color the parts of the brain.

## STEP 3

### Assembling the Sides of the Brain Hat:

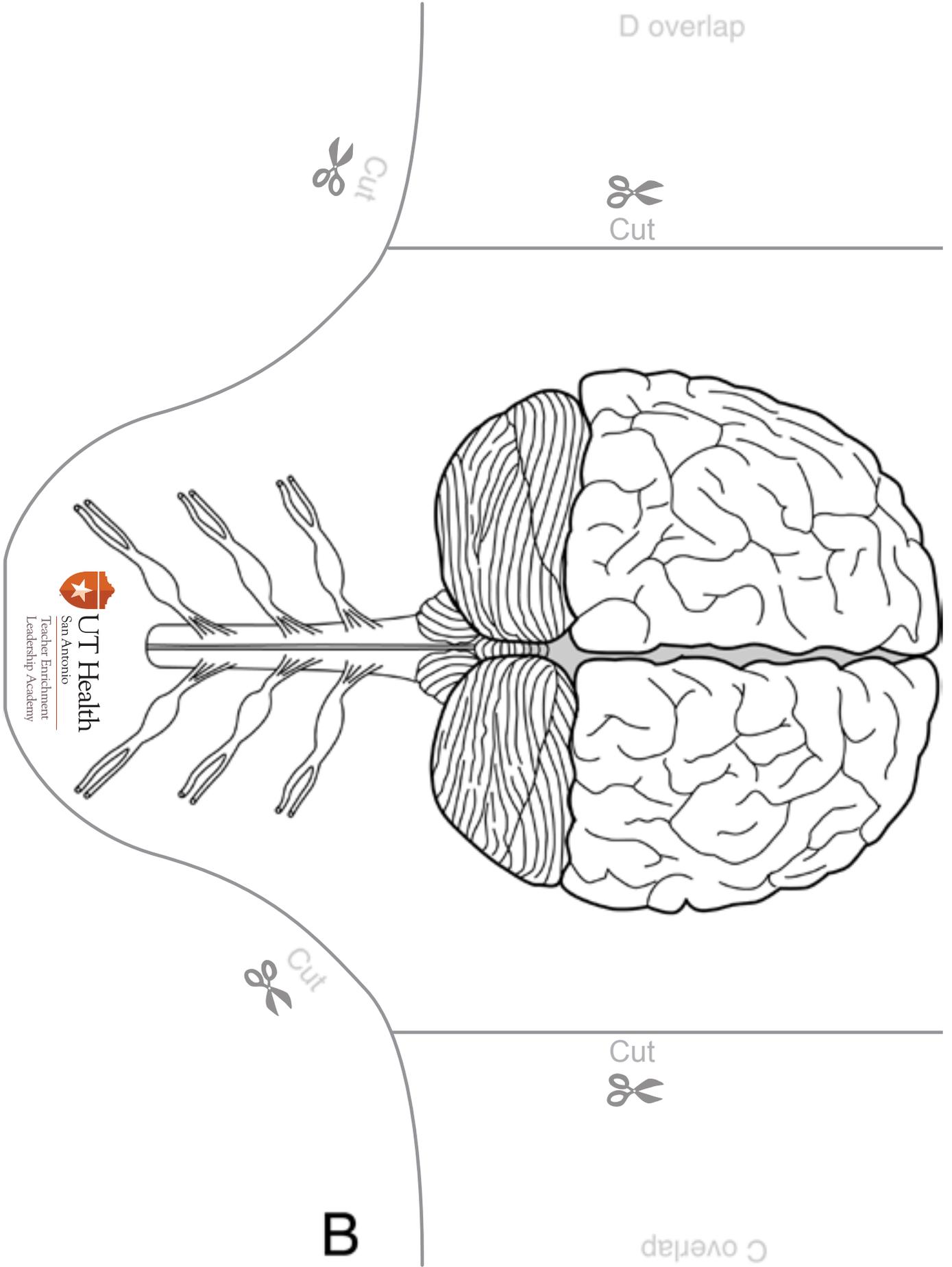
- a. Carefully, cut out the brain model pieces, and note the 'orientation' of the top of the brain – that is, which end of the brain should point toward the nose; which should point towards the back of the head. Note the orientation of the back of the brain – one part connects to the side of the left hemisphere, one to the side of the right hemisphere. Also notice the point at which the back of the brain connects.
- a. When all of these pieces are cut out, use tape or glue to attach the side parts of the brain hat together.
- a. To make the hat fit better, the size of the band can be adjusted by either overlapping sections of the white spaces or by cutting and overlapping the band in the white spaces. Tape or glue the overlapping sections.

## STEP 4

### Putting on the Top of the Brain Hat:

- a. Place the top of the hat on the newly formed 'head band.' Make sure the larger end of the brain on the top is pointing to the back of the head. Fold tabs and tape the top to the inside of the headband. If adjustments were made for the size, the top of the brain hat may also need adjusting.

D overlap



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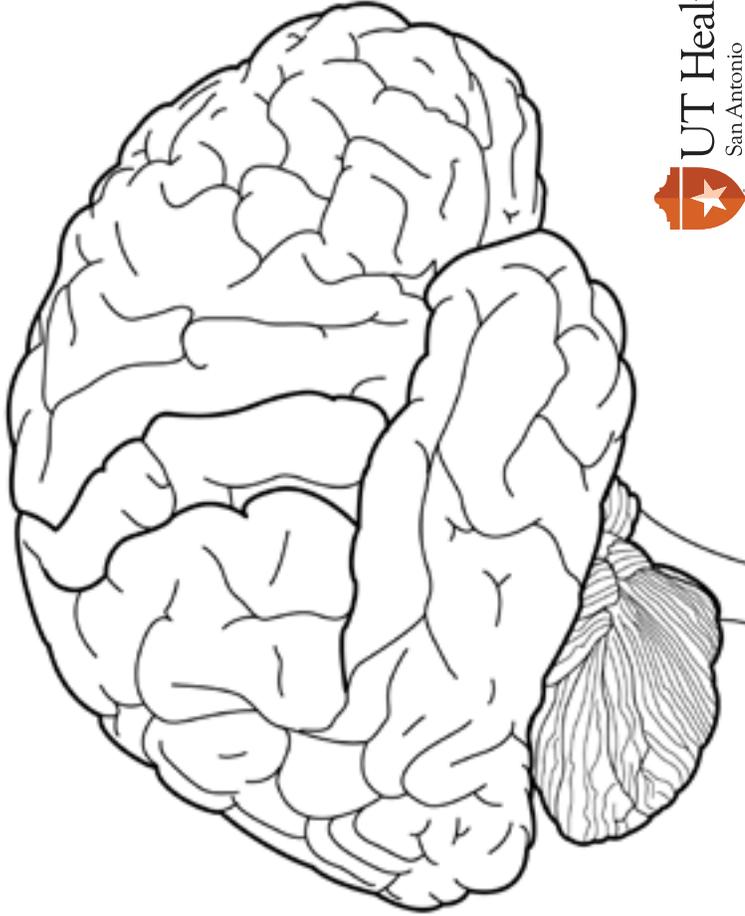
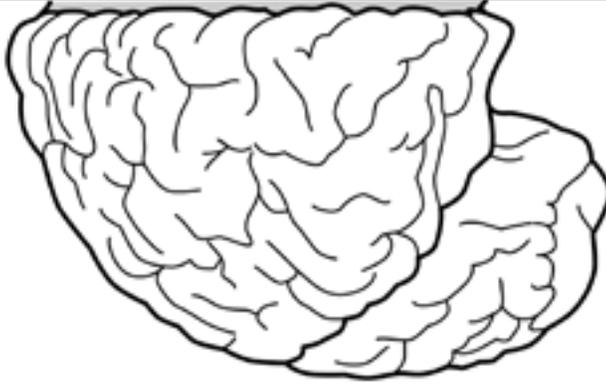


C overlap

nose



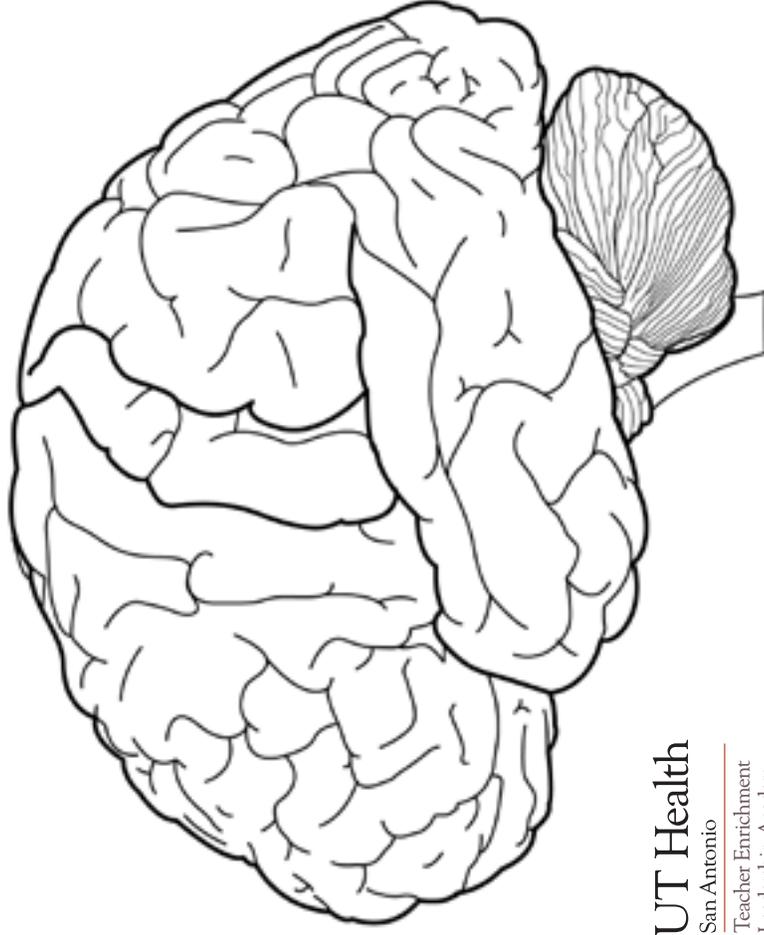
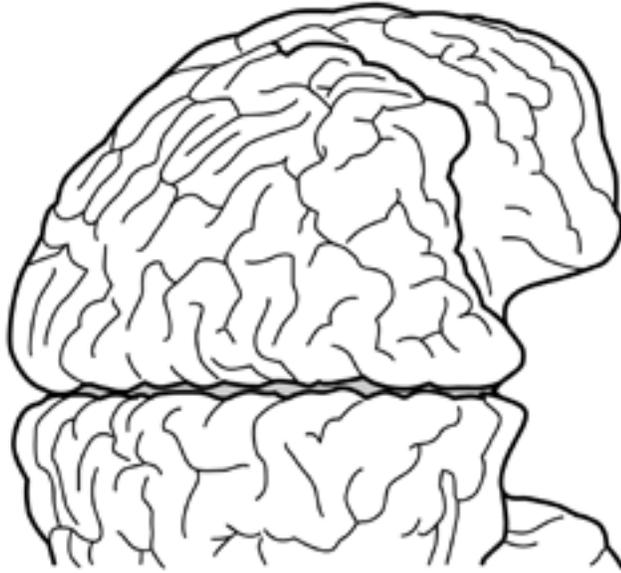
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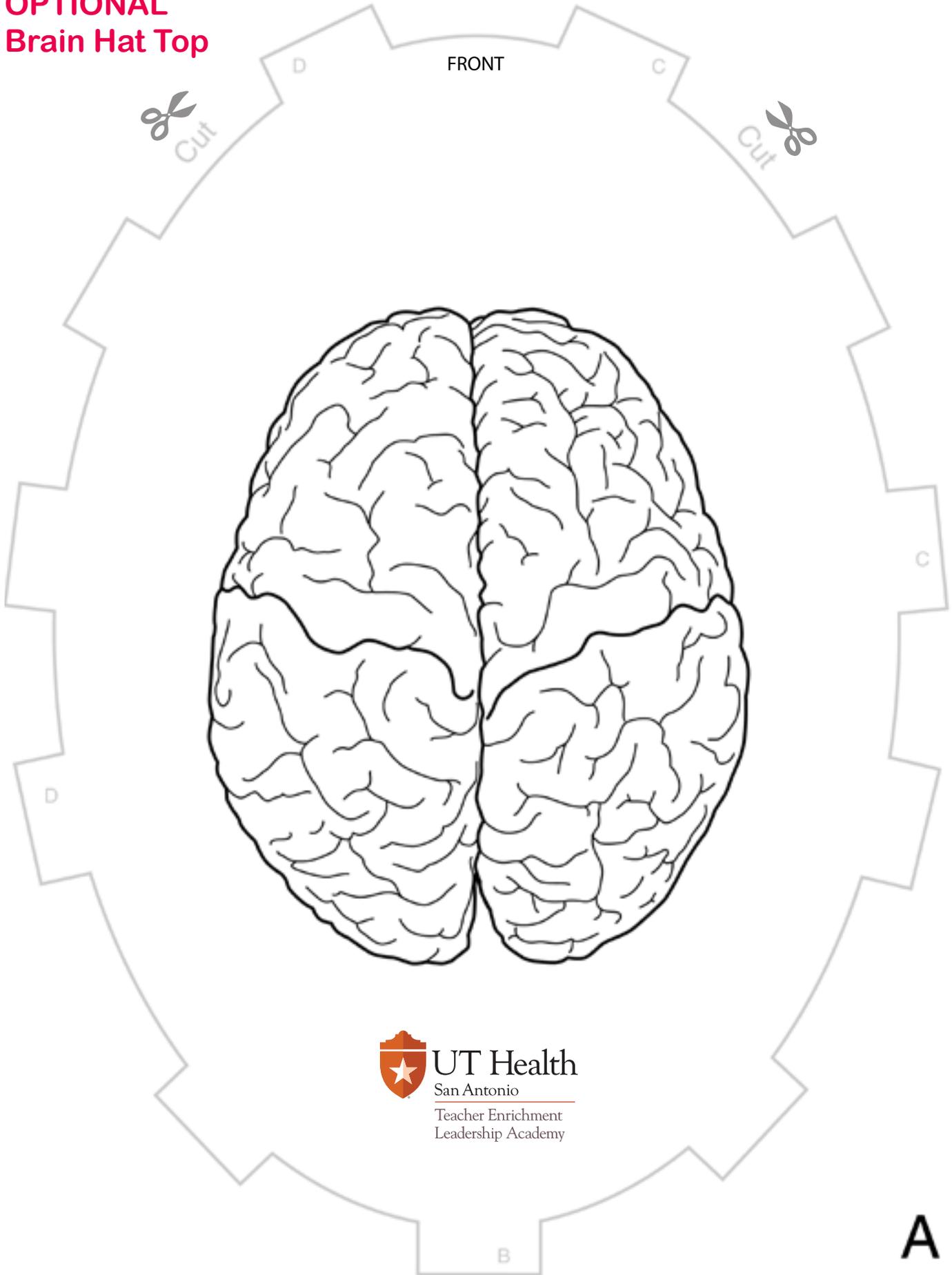
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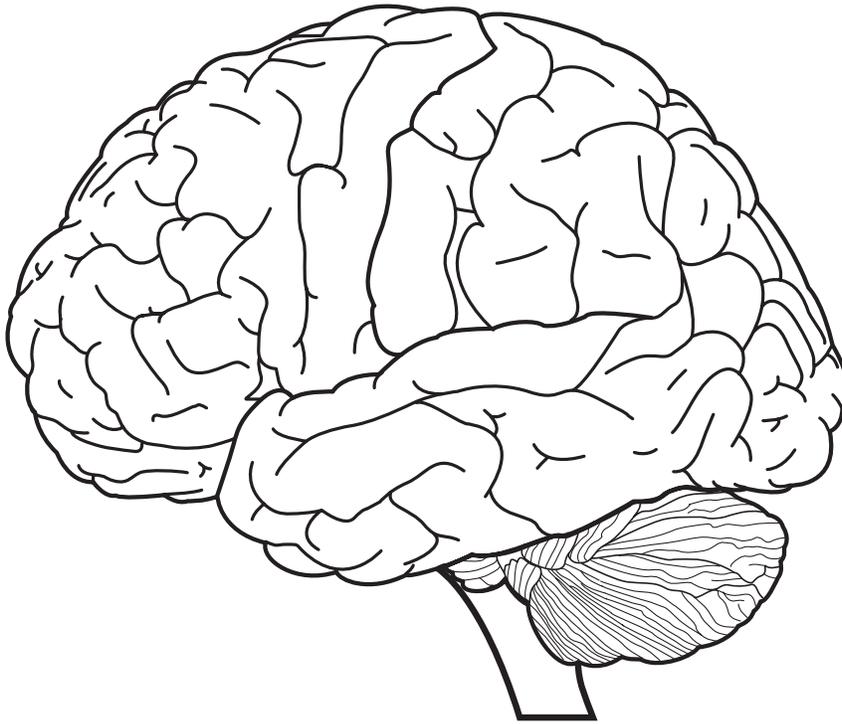


**OPTIONAL**  
**Brain Hat Top**

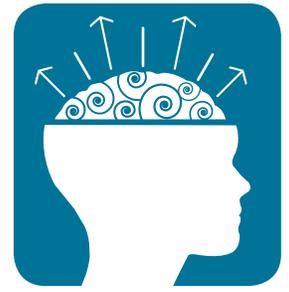


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# PROCESSING OUT “BRAIN ANATOMY”

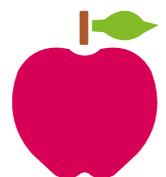


1. This part of the brain is a lobe found at the front of the brain and controls thinking and creating. \_\_\_\_\_ Color this part of the brain blue.
2. The \_\_\_\_\_ lobe helps us find our way and recognize objects and their uses, and experiences sensations (such as pain, pressure, touch, and temperature). Color this part of the brain green.
3. This part of the brain is a lobe found at the back of the head. It is here that messages from the eyes are interpreted. \_\_\_\_\_ Color this part of the brain red.
4. This lobe is found next to our ears. It helps us hear, plan our speech, and remember. \_\_\_\_\_ Color this yellow.
5. This part of the brain coordinates our physical skills and balance. \_\_\_\_\_ Color this part of the brain orange.
6. This part of the brain connects the rest of the brain to the spinal cord. \_\_\_\_\_ Color this part of the brain purple.



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