

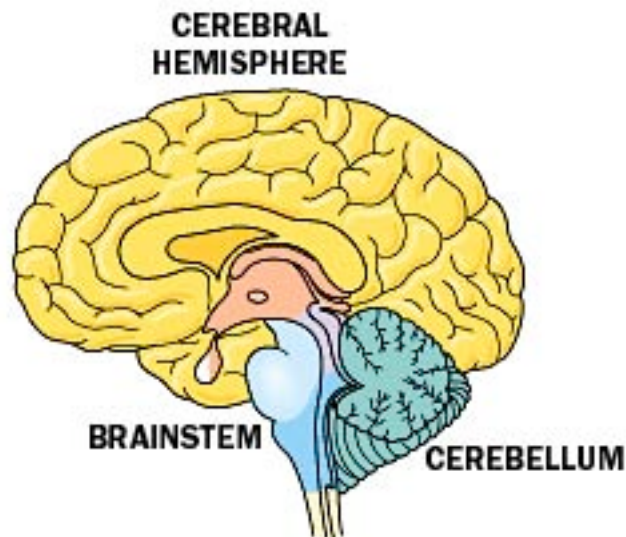
LAB 8. ANATOMY OF THE HUMAN BRAIN

In this exercise you each will map the human brain—both anatomy and function—so that you can develop a more accurate picture of what’s going on in your head :-)

EXTERNAL FEATURES OF THE BRAIN

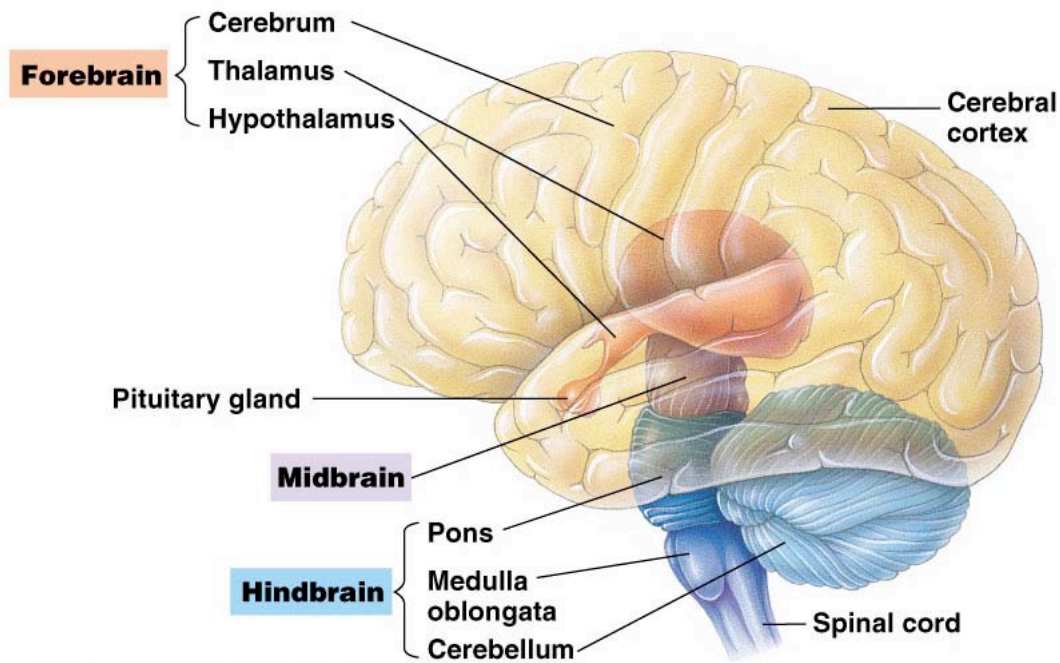
Study the diagram below and on the next page and note the following features:

1. The **cerebral hemispheres**: large, paired structures; divided (left and right) by the longitudinal fissure. The outer part of the cerebral hemispheres is the cortex.
2. The **cerebellum** ("little brain"): smaller structure under the base at the back of the brain.
3. The **brainstem**: extending from the base of the brain; this continues into the spinal cord.



Complete the chart with information from your textbook and other resources (e.g., the Web).

Structure	Function (& other notes)
Cerebrum / Cerebral cortex	
Cerebellum	
Brainstem	



HILLS AND VALLEYS

Note that the cerebral hemispheres of the brain are highly wrinkled. These structures are named:

- sulcus** (plural: sulci) = "valley"
- gyrus** (plural: gyn) = "hill"

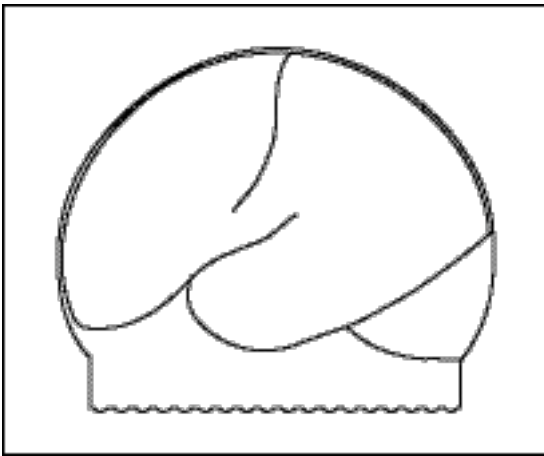
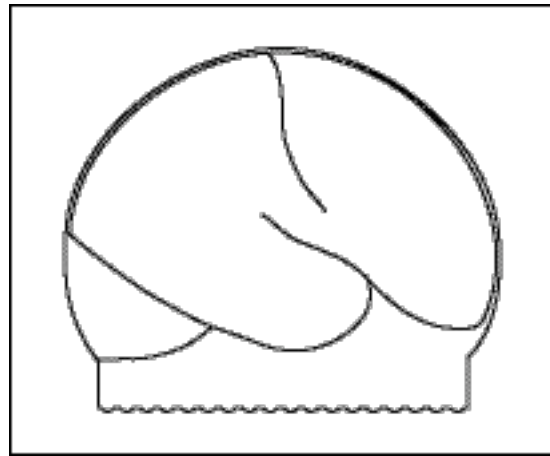
The general pattern of sulci and gyri are similar (or conserved) among most individuals and these features are all named, but there is a lot of individual variation.

Find the two major sulci:

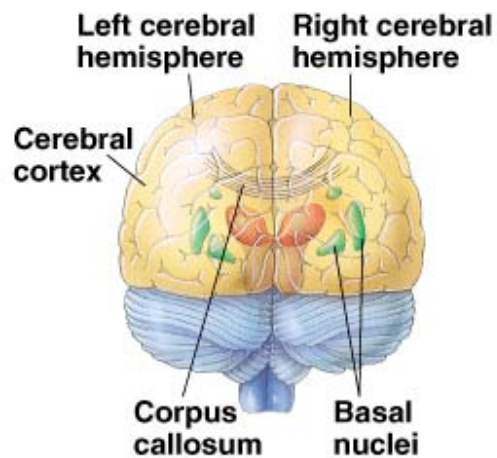
- Central sulcus:** large deep groove or indentation running downward from the midpoint at the top of the brain; it separates the parietal and frontal lobes (also called the Fissure of Rolando).
- Lateral sulcus:** large deep groove or indentation running horizontally from front of brain back midway that separates forebrain from midbrain or that separates the parietal and temporal lobes (also called the Fissure of Sylvius).

BRAIN CAP ACTIVITY: STEP 1

1. Using a Sharpie, mark the major external features that you have identified on the white swimming cap.
 - a. Outline the cerebral hemispheres
 - b. Cerebellum
 - c. Central sulci
 - d. Lateral sulci

**LEFT****RIGHT**

REMEMBER: Mark BOTH sides. Make sure to REVERSE the orientation for the other side.

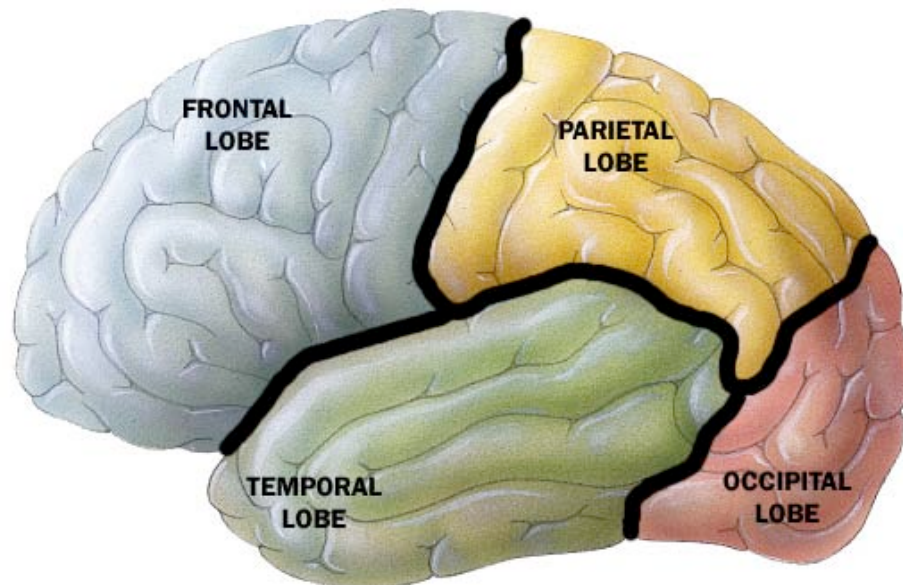


LOBES OF THE CORTEX

The cerebral hemispheres are divided into six lobes; four of these are on the external surface and are named for the bones of the skull that overlie them.

Identify the following lobes:

1. Frontal lobe: in front of the central sulcus and above the lateral sulcus
2. Temporal lobe: below the lateral sulcus
3. Parietal lobe: behind the central sulcus
4. Occipital lobe: the extreme back of the brain



Higher Functions

Most of the cortex is concerned with functions that go beyond the primary perception of sensation or primary control of motor movement.

1. **Frontal lobe:** cognition, behavior, emotion
2. **Prefrontal association cortex:** sides of frontal lobe
3. **Parietal lobe:** integration of sensory information from primary sensory areas → body image
4. **Temporal lobe:** memory and emotions

You may add notes about these to your brain cap if you wish.

Name _____

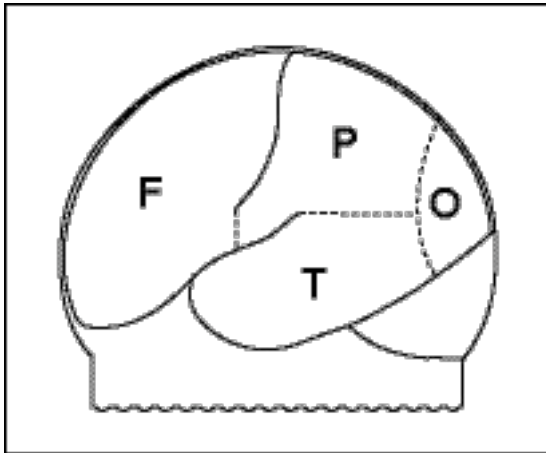
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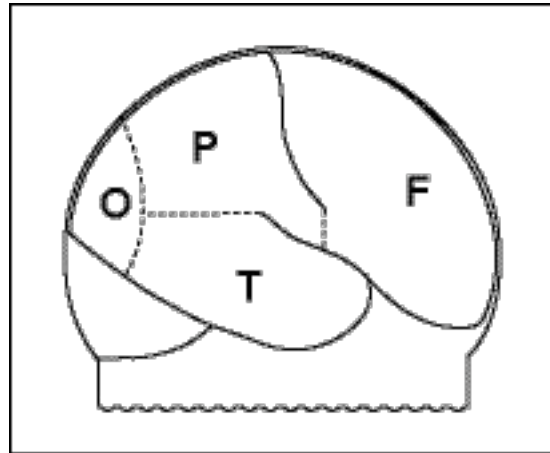
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BRAIN CAP ACTIVITY: STEP 2

Mark the lobes described above on the brain caps



LEFT



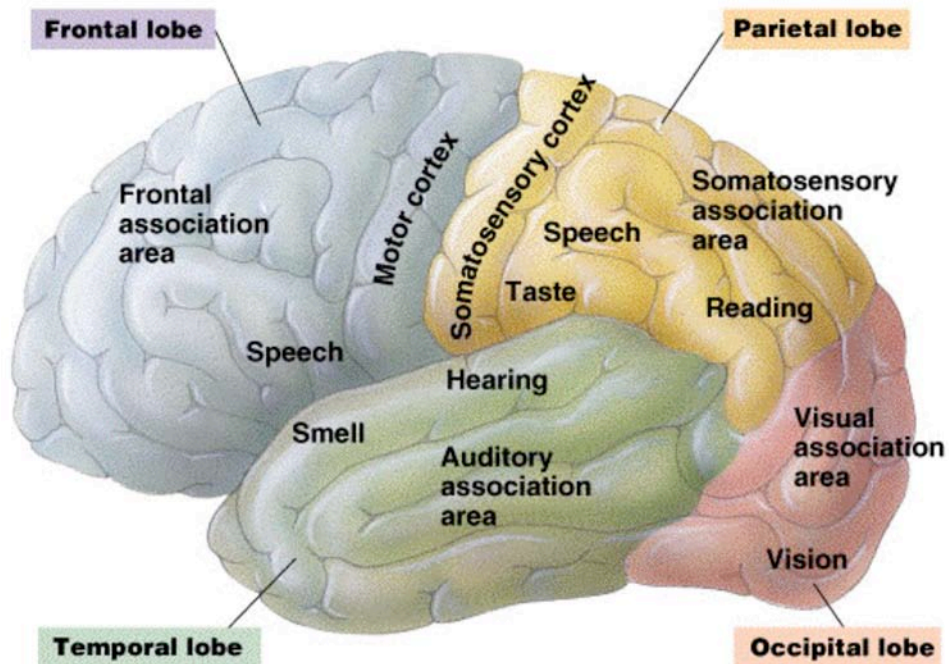
RIGHT

Complete the chart with information from your textbook and other resources (e.g., the Web).

Structure	Function (& other notes)
Frontal lobe	
Parietal lobe	
Temporal lobe	
Occipital lobe	

BRAIN CAP ACTIVITY: STEP 3**MAPPING FUNCTIONAL AREAS OF CORTEX**

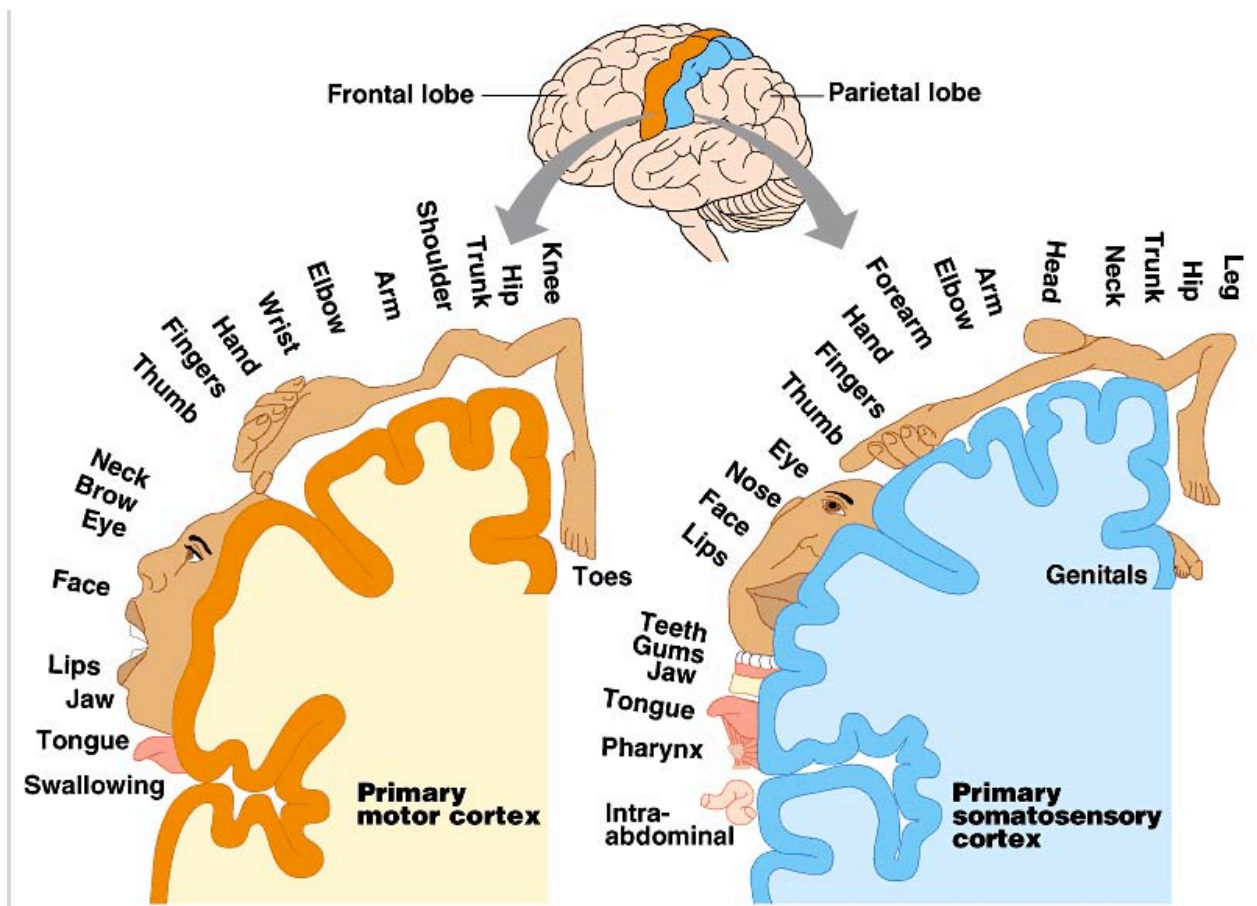
The brain is both anatomically and functionally segregated. Different functions are located in particular regions of cortex. Study the diagram below before you map the brain further on your brain cap.

***Sensory and Motor Areas***

Find the following and mark the areas on your brain caps:

5. **Somatosensory cortex:** perception of touch from surface of body
 - a. strip behind the central sulcus (post-central gyrus) in parietal lobe
 - b. in the diagram below, the surface of the body is mapped over this strip as a distorted representation (**sensory homunculus**)
 - the lower limb is at the top, followed by trunk, shoulder, arm, hand, neck, face, lips, jaw and tongue.

6. **Primary motor cortex:** final output from brain to spinal cord for voluntary control of muscular movement
 - a. strip in front of central sulcus (pre-central gyrus) in frontal lobe
 - b. in the diagram below, the surface of the body is mapped over this strip as a distorted representation (**motor homunculus**)
7. **Premotor cortex:** planning of movement
 - a. area in front of primary motor cortex in frontal lobe



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BRAIN CAP ACTIVITY: STEP 4

Vision, Hearing, and Language

Find the following areas and mark on your brain cap

1. **Primary visual cortex:** perception of vision, first input from eyes
 - a. hindmost part of occipital lobe
 - b. surrounding areas of occipital lobe are concerned with analysis of vision. .
2. **Primary auditory cortex:** input from ears
 - a. upper surface of temporal lobe
 - b. both ears go to both sides of brain, organized by tone
3. **Motor speech:** Broca's area
 - a. lower region of frontal lobe on left side only
 - b. damage to this area results in the inability to produce meaningful language
4. **Sensory speech:** Wernicke's area
 - a. region of temporal and parietal lobe on left side only
 - b. damage to this area results in the inability to understand language

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Complete the chart with information from your textbook and other resources (e.g., the Web).

Structure	Function (& other notes)
Somatosensory cortex	
Primary motor cortex	
Premotor cortex	
Primary visual cortex	
Primary auditory cortex	
Motor speech	
Sensory speech	

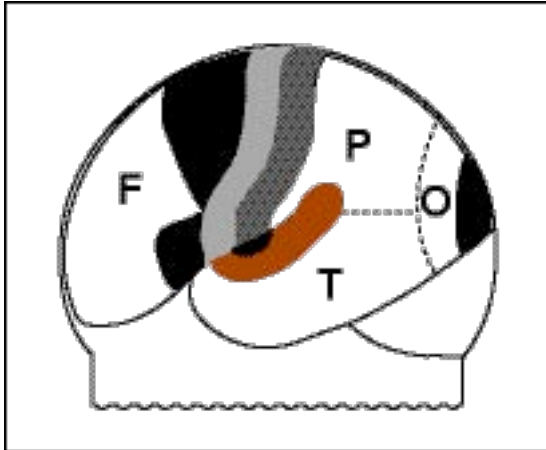
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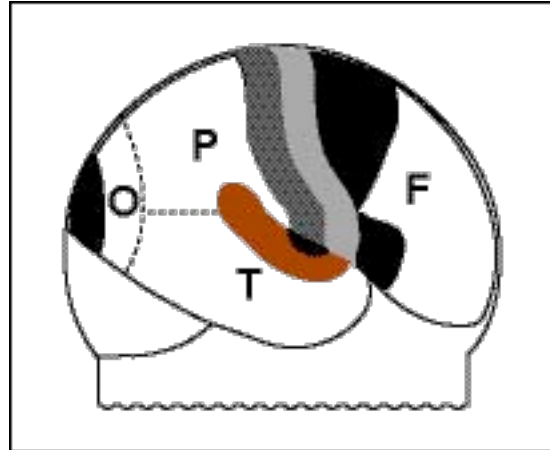
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With the different areas marked, your brain caps should look something like the following:



LEFT



RIGHT

Feel free to wax artistic and decorate your brain cap if you wish!

TIME TO MODEL YOUR NEW BRAINS!

Resources

<http://biology.about.com/library/organs/brain/blbrain.htm>