

How is the Cortex Organized?

Module 4
The Brain

The Cerebral Cortex

Where does complex thought and behavior come from?

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Why are they different?

☞ In humans, the cortex makes _____ of the brain's weight

- compared with just _____ in most other mammals.

☞ The larger cortex of mammals offers increased capacities for _____

- Making them more adaptable.

3

When it comes to brains, does bigger mean smarter?



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Did you know?...



- ☞ The brain of an elephant weighs about 10.5 lbs and an adult human brain weighs about 3 lbs.
- ☞ Einstein's brain was similar in size to other humans except in the region that is responsible for math and spatial perception. In that region, his brain was 35% wider than average.
- ☞ The total surface area of the cerebral cortex is about 2500 sq. cm (~2.5 sq. ft).
- ☞ Your brain consists of about 100 billion neurons.

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Cerebral Cortex



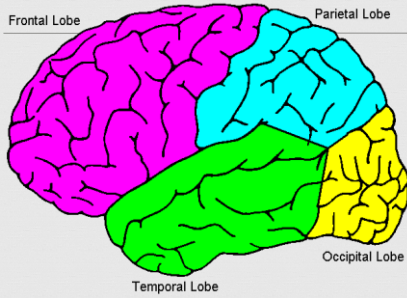
☞ The cerebral cortex is responsible for the most

☞ This area is made up of four lobes:

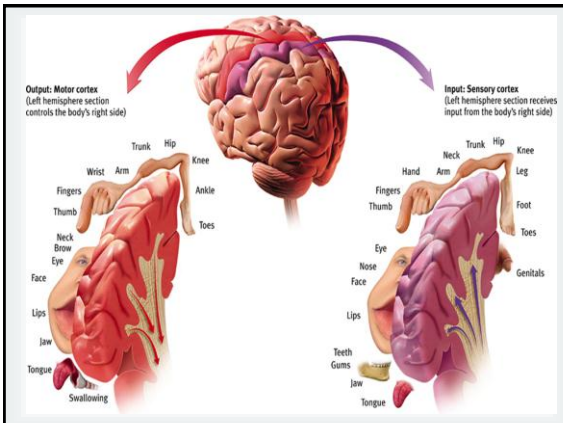
- Occipital Lobe
- Parietal Lobe
- Temporal Lobe
- Frontal Lobe



Four Lobes of the Brain



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Motor Cortex



☞ The Motor Cortex is the area at the rear of the frontal lobes that control _____

☞ Each area of the motor cortex controls _____

- Larger areas are devoted to _____ of the tongue and fingers

- Smaller areas are devoted to _____ of the shoulders and elbows

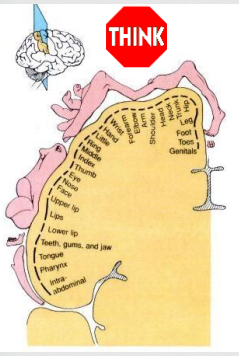
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The Sensory Cortex, is a band of tissue on the front of the parietal lobe



Each area of the sensory cortex receives

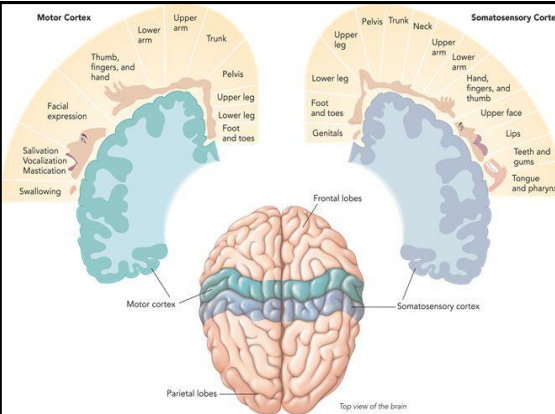
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The diagram shows a lateral view of the brain with the somatosensory cortex highlighted in yellow. A red octagonal sign with the word "THINK" is placed above the cortex. Labels on the cortex include: Genitals, Foot and toes, Hand, fingers, and thumb, Upper arm, Lower arm, Trunk, Pelvis, Upper leg, Lower leg, Foot and toes, Lips, Lower lip, Teeth, gums, and jaw, Tongue, Mouth, Eye, Nose, Ear, and Forearm.

The more sensitive the body region,

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The diagram shows a top view of the brain with the Motor Cortex and Somatosensory Cortex highlighted. The Motor Cortex is on the left and the Somatosensory Cortex is on the right. Labels for the Motor Cortex include: Swallowing, Mastication, Vocalization, Salivation, Facial expression, Thumb, fingers, and hand, Lower arm, Upper arm, Trunk, Pelvis, Upper leg, Lower leg, Foot and toes. Labels for the Somatosensory Cortex include: Genitals, Foot and toes, Lower leg, Upper leg, Pelvis, Trunk, Neck, Upper arm, Lower arm, Hand, fingers, and thumb, Upper face, Lips, Teeth and gums, Tongue and pharynx. Other labels include: Frontal lobes, Parietal lobes, Motor cortex, and Somatosensory cortex. The caption "Top view of the brain" is at the bottom.

• Larger areas are devoted to touch in the most

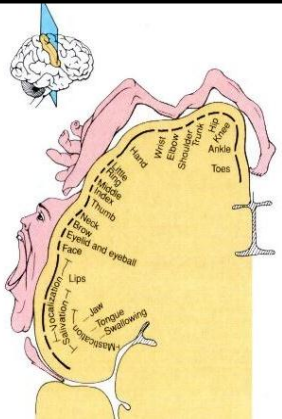
• Smaller areas are devoted to touch in



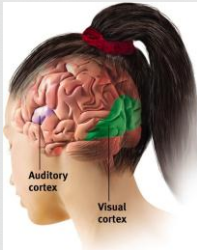


Once again, notice the areas of the body that have more motor cortex devoted

Motor Homunculus




Sensory Cortex



☞ Visual information is received in the _____

☞ Sound is processed in the auditory cortex by the temporal lobe



The brain controls the sensation and the movements of the body

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Association Areas

— *Ω* —

These areas (found in all four lobes) interpret, integrate, and act on information processed by sensory areas.


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Association Areas


— *Ω* —

They link sensory inputs with stored memories, which is very important _____


- More intelligent animals have increased _____




Rat



Cat



Chimpanzee



Human

■ Motor areas

■ Sensory areas

■ Association areas

Association Areas



☞ These areas in the frontal lobes are involved in higher cognitive functions such as planning, reasoning,

☞ Math and spatial reasoning skills are associated with the

☞ The right temporal lobe enables us to

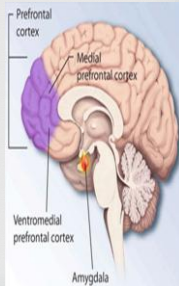
The Frontal Lobe



☞ The frontal lobe is involved in

☞ The *prefrontal cortex* is part of the executive control system because of its role in

- The prefrontal cortex is involved in higher cognitive functions such as planning, reasoning, and self-control



Why did it get harder at the end?



☞

- The conflicting word information arrives at the decision process stage earlier than the color information and results in confusion
