

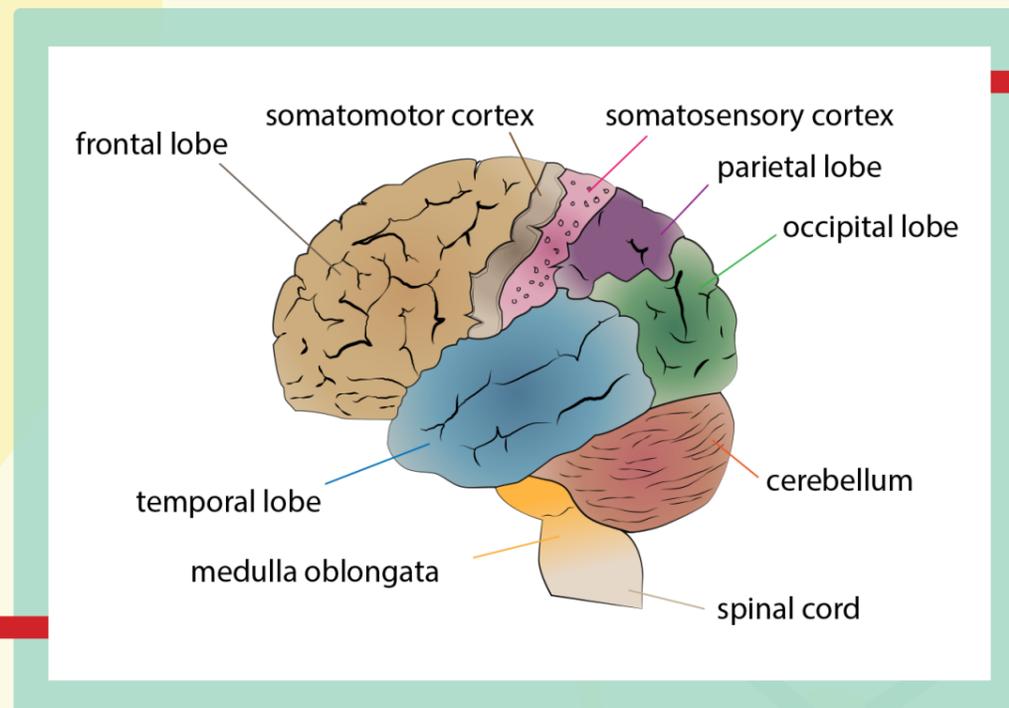
# Unit 4: A Level Biology

## Option C: Brain 2

The **cerebrum** consists of two hemispheres linked by the **corpus callosum**.

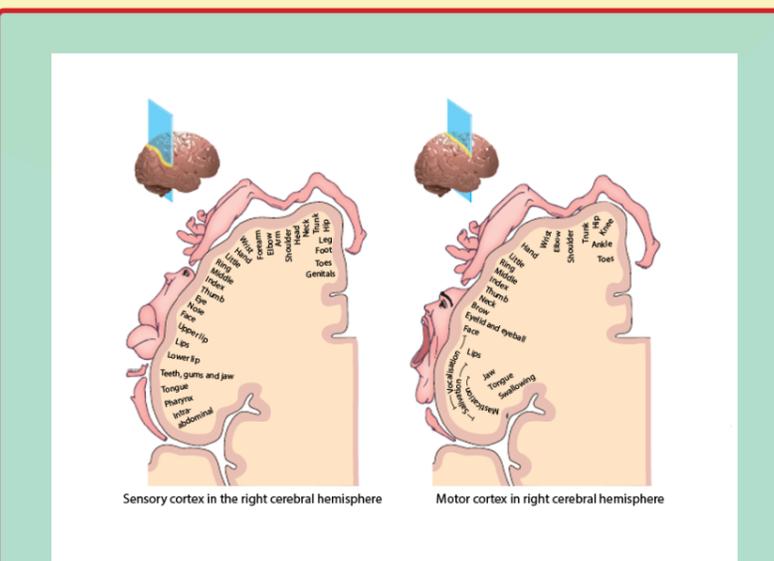
The cerebral cortex is the outer layer of the cerebrum (2-3mm deep) and is highly folded increasing the surface area for processing.

It is composed of millions of neurones and is grey matter with many cell bodies. The inner part of the cerebrum is myelinated white matter.



### Functions

Frontal lobe	Reasoning, planning, part of speech and movement, emotions and problem solving.
Parietal lobe	Sensory functions and taste.
Temporal lobe	Language, learning and memory.
Occipital lobe	Vision.
Somatosensory cortex	Receive nerve impulses from receptors.
Somatomotor cortex	Send nerve impulses to effectors.
Association areas	Form most of the cerebral cortex. They receive impulses from sensory areas and associate it with previously stored information from memory so it can be interpreted and given meaning to initiate appropriate responses.



The sensory and motor **homunculi** show the relative proportions of the sensory and motor areas of the body. Sensitive areas with many sensory neurones are large like tongue, lips and fingertips. Areas with many motor neurones can perform intricate movements, like hands and face.

### Speech and language

Broca's area is in the frontal lobe just above the temporal lobe, in the left hemisphere only. Motor neurones from here innervate the muscles involved with producing speech (larynx, mouth and intercostals). If this area is damaged, speech can be understood but speaking is in short sentences, lacking fluency.

Wernicke's area spans the upper part of the temporal lobe and the lower part of the parietal in the left hemisphere. It is responsible for interpreting written and spoken language. Damage to this area means that speech cannot be understood but fluency is unaffected.

Broca's area and Wernicke's area are connected by a bundle of nerve fibres, known as the **arcuate fasciculus**.

### Left brain/right brain

Nerve fibres from the motor area cross in the medulla oblongata, so the left hemisphere controls the right side of the body and vice versa.