

Lesson Plan

NEUROHEADWAY

Neuroscience Into Education

Lesson plan outlines **BRAIN, SPINAL CORD, MOVEMENT BASICS**

Here is the Lesson Plan:

How is brain organized? LO: What are the main brain regions and how they control behaviour	Explain to children the different regions of brain. They should understand the implication of each region in the everyday behaviour. The children should comprehend the effect of neuromodulators on our emotions.	Go over power point, completing set activities. Children to train with brain puzzles and relate positive emotions to different neuromodulators.	Children should distinguish different brain regions (forebrain, midbrain and hindbrain). They should be able to assemble brain sections and to propose which brain function they are linked to.	I can identify different brain regions. I can relate brain structures to brain function. I can explain how neuromodulators affect our behaviour.
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Power point Example

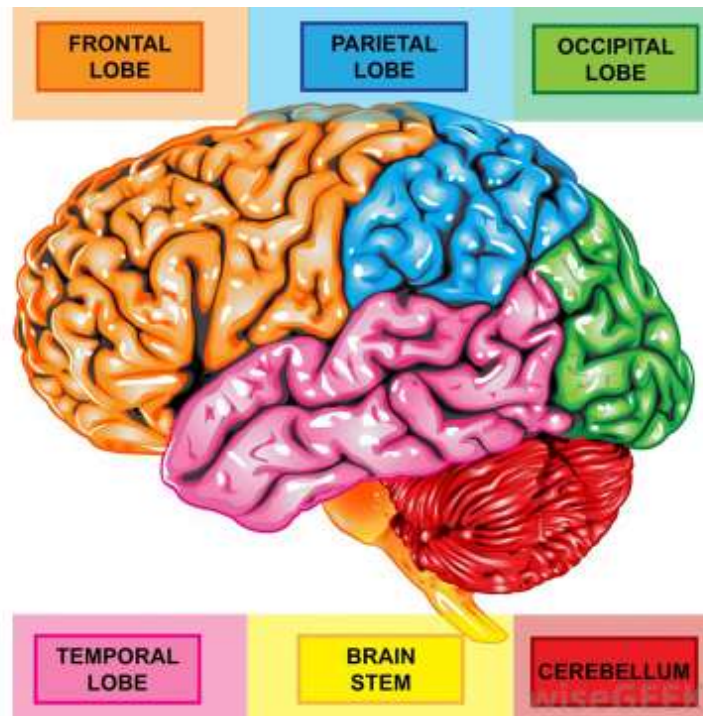
Systems Neuroscience



Many regions of your brain work together to mediate your behaviour



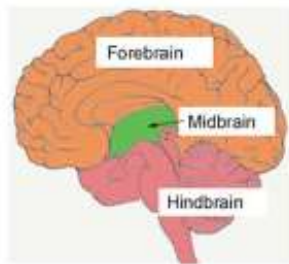
- Receives information - within a fraction of a second, too minuscule to measure
- Acts on the external universe - allows you to cry, walk, play a musical instrument
- Utilizes language - one of your most advanced functions
- Possesses emotions - creates your affective universe



Many regions of your brain work together to mediate your behaviour

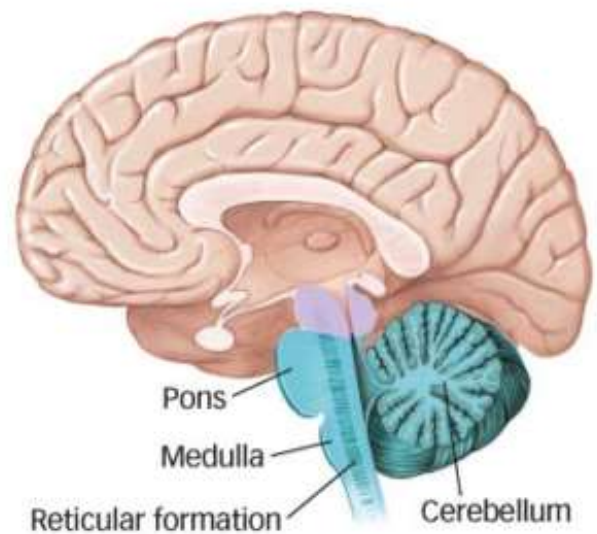
- ✓ Thinks -is responsible for your memory, intelligence, your thoughts
- ✓ Controls your autonomic functions - heart rate, breathing, homeostasis
- ✓ Controls your immune system - protects you from viruses





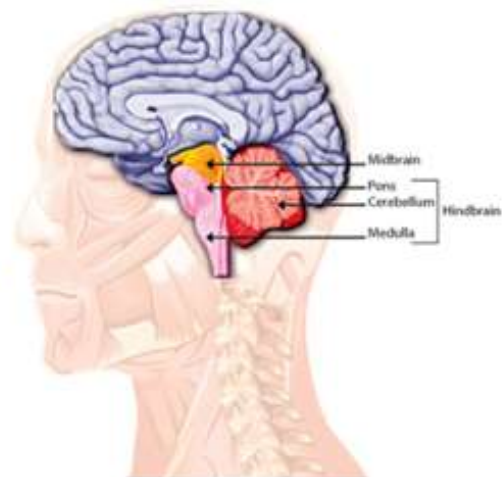
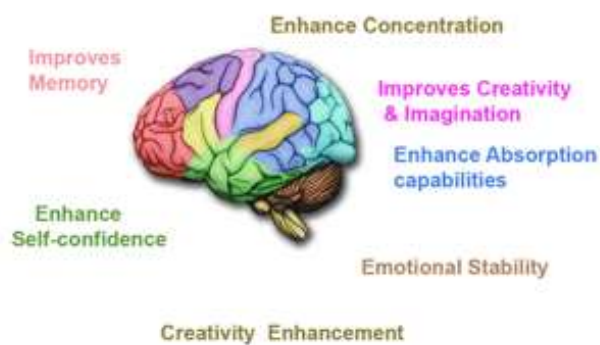
The Hindbrain

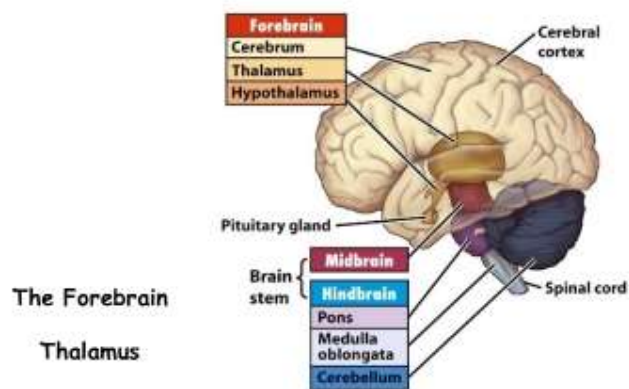
- Medulla - breathing, heart rate
- Pons - sleeping, walking, dreaming
- Reticular Activating System - alertness, attention
- Cerebellum - balance, coordination for the muscles



Midbrain

The Midbrain





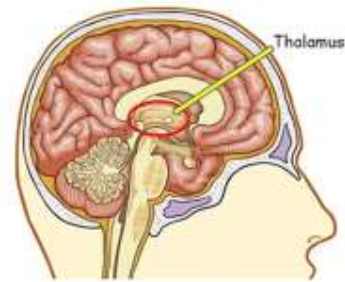
The Forebrain

Thalamus

- Thalamus provides sensory and motor information to and from the cortex.

Major relay station to higher centers in the brain

The only sense that completely bypasses the thalamus is the sense of smell, which has its private switching station, the olfactory bulb



The Forebrain

Limbic system

The Amygdala

Responsible for evaluating sensory information

It determines its emotional importance

It makes the decision to approach or to withdraw

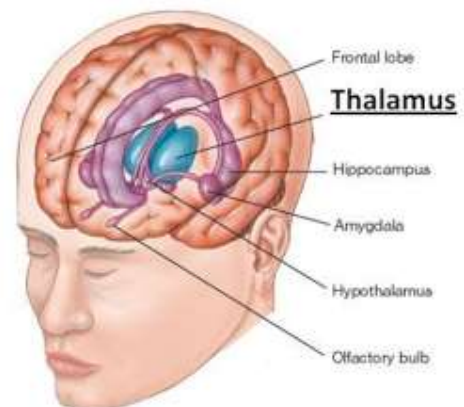
Its initial response may be overridden by the appraisal of the cerebral cortex

The Hippocampus

The gate way to memory

The Hypothalamus

It is involved with drives associated with survival such as hunger, thirst, emotion, sex, and reproduction



The Forebrain

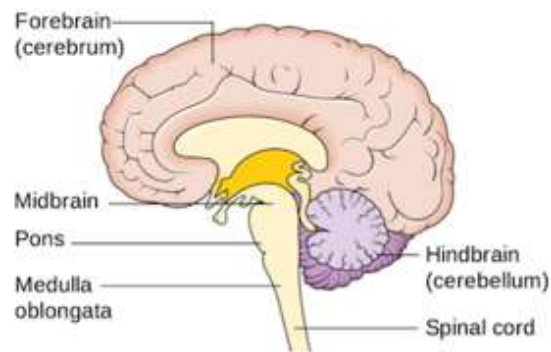
The Cerebrum



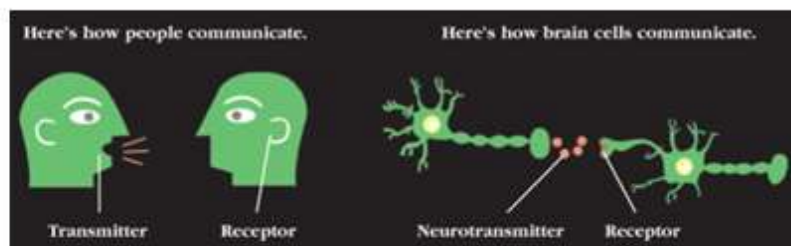
- **The Cerebrum**

Higher forms of thinking take place in it - decision making, planning and abstract thinking

It is divided into two halves called the cerebral hemispheres that are connected by a large band of fibers



The communication between different parts of the brain happens through neurotransmitters and neuromodulators



- Neurotransmitters travel from one neuron to another
Changes occur in the receiving neuron (brain region)
- The ultimate effect is either:
 - Excitatory: increase the communication
 - Inhibitory: decrease the communication
 - Modulatory: change the communication

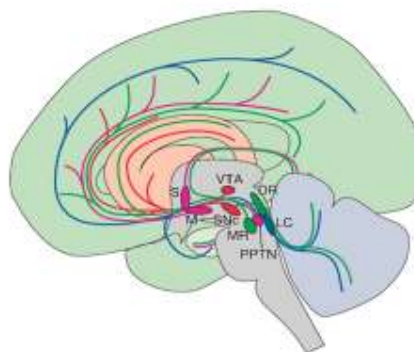
Neuromodulators are molecules that regulate the neuronal activity

- Catecholamines are neurotransmitters of pleasure. They include dopamine, adrenaline and noradrenaline - increase pleasure, therefore they are important for reinforcement behavior. The dopamine system is activated by rewarding stimuli such as nice food.
- Serotonin is neurotransmitter of happiness
- Endorphins and oxytocin are another neuromodulators that make you feel good and think positive.



The brain regions responsible for positive feelings are located in the hindbrain and the midbrain

Neuromodulators are small groups of neurons in the brain



- Dopamine (DA)
- Serotonin (5-HT)
- Acetylcholine (ACh)
- Norepinephrine (NE)

Your brain has several chemical routes to making you feel happy. The neurotransmitters dopamine, serotonin, oxytocin and endorphins can all be released by good experiences.