

# Lesson Plan

**NEUROHEADWAY**

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Neuroscience Into Education

## LESSON PLAN

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| <p>How are neurons connected?</p> <p>LO: To understand the process of neuronal communication</p> | <p>Explain to the structure of individual neurons and the connection between neuronal pairs. They should understand the mechanisms of synaptic communication and connectivity in a network.</p> | <p>Go over power point, completing set activities. Children to train with connectivity sets between two or more neurons.</p> | <p>Children should be able to identify distinct sections of a neuron (soma, dendrites, axon).</p> <p>They should self-evaluate the functional significance of each neuronal part for the communication between neurons.</p> | <p>I can create a scheme of how the neuron is organized and how it conveys a signal to the next neuron.</p> <p>I can explain how neurons in the brain communicate with each other.</p> |
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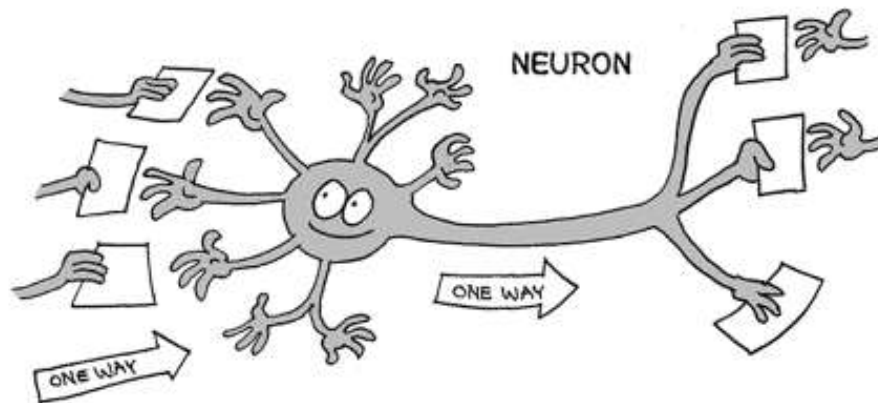
# Power point Example

**NEUROHEADWAY**

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## Neural Networks



The brain networks contain different types of neurons:



- Sensory neurons - bring information from outside world to your brain
- Motor neurons - transmit responses from brain to muscles and glands
- Interneurons
  - Connect neurons to other neurons
  - Join sensory and motor neurons in spinal cord
- sensory neuron
  - A neuron that detects changes in the external or internal environment and sends information about these changes to the central nervous system.
- motor neuron
  - A neuron located within the central nervous system that controls the contraction of a muscle or the secretion of a gland.
- interneuron
  - A neuron located entirely within the central nervous system.

## The Structure of the Neuron

### 1- Dendrites

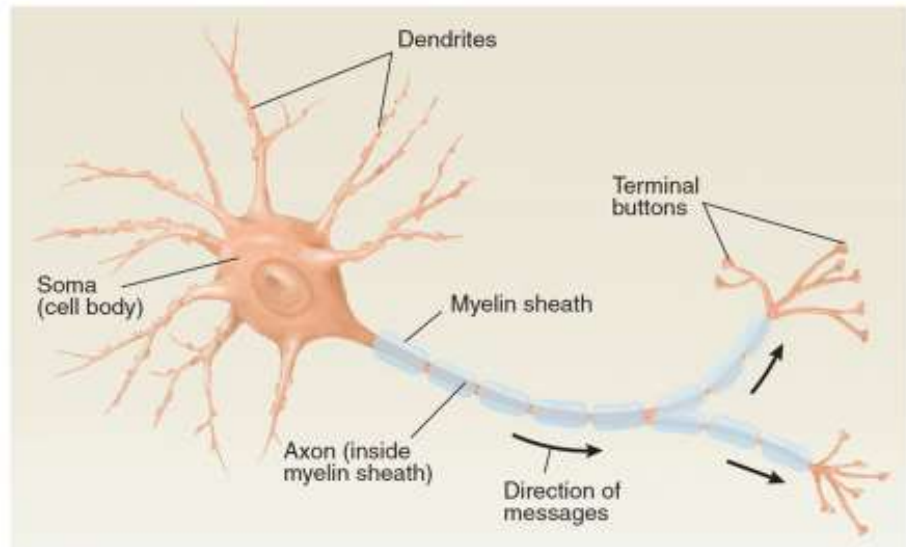
Act like antennas receiving messages

### 2- The Cell Body

Contains the biochemical machinery to keep the neuron alive

### 3- The Axon

Transmits messages away from the cell body to other neurons



## How a Neuron Fires

It is an electrochemical process

- Electrical inside the neuron
- Chemical outside the neuron (in the synapse in the form of a neurotransmitter).
- The firing is called Action Potential.

The action potential is delivered to the synapse:

- site of communication between two cells
- formed when an axon of a presynaptic cell "connects" with the dendrites of a postsynaptic cell



## Neuronal components

### soma

The cell body of a neuron, which contains the nucleus. Its shape varies considerably in different kinds of neurons.

### dendrite

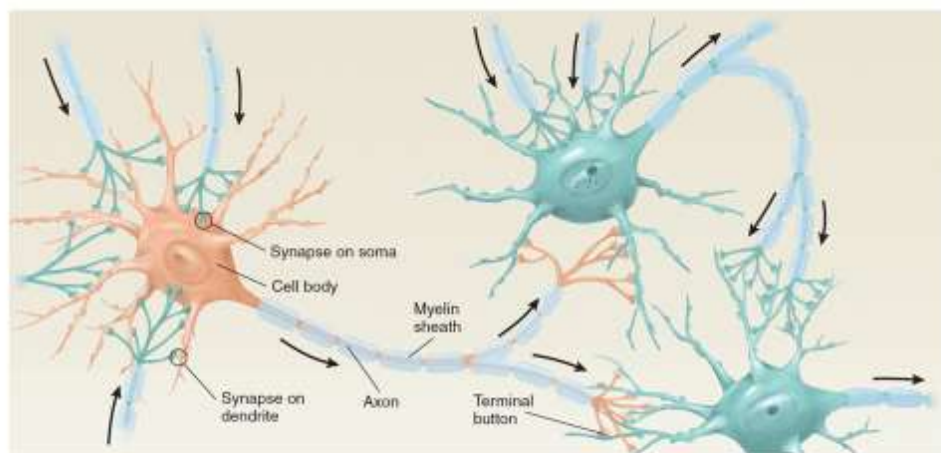
A branched, treelike structure attached to the soma of a neuron; receives information from the terminal buttons of other neurons. Neurons "converse" with one another, and dendrites serve as important recipients of these messages.

### axon

The long, thin, cylindrical structure that conveys information from the soma of a neuron to its terminal buttons. The axon carries information from the cell body to the terminal buttons. The basic message it carries is called an *action potential*.

### synapse

A junction between the terminal button of an axon and the membrane of another neuron



- Synapse is tiny gap between one neuron and the next
- At synapse, the impulse changes from electrical to chemical
- Neurotransmitters are these chemical messengers across synapse
- Chemicals from adjacent neurons may either excite or inhibit cell firing
- The connections between the neurons can change with experience - increase or decrease.

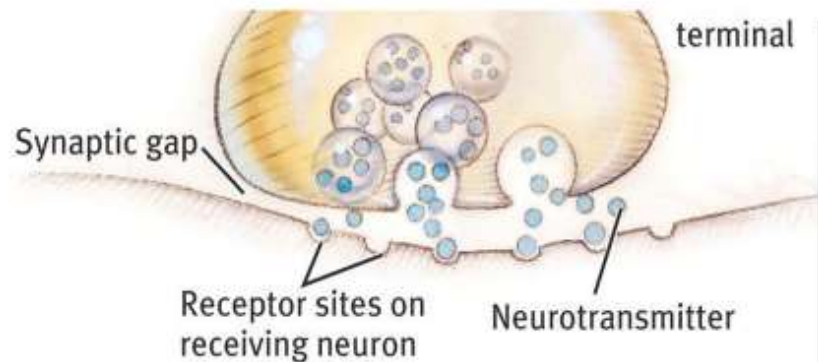
## Neurons communicate with the synapse

The synapse is a junction between the axon tip of the sending neuron and the dendrite or cell body of the receiving neuron.

The synapse is also known as the "synaptic junction" or "synaptic gap."

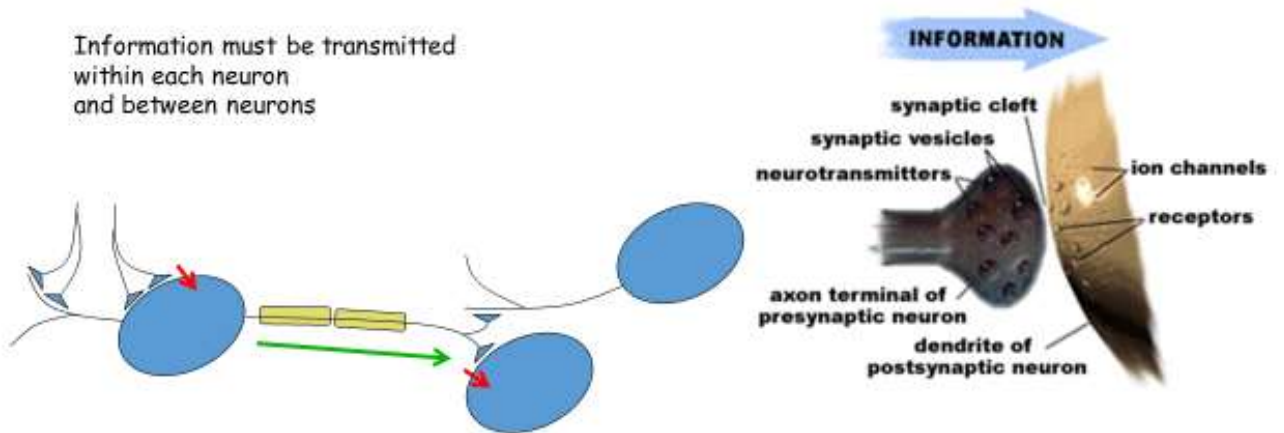


Neurotransmitters are chemicals used to send a signal across the synaptic gap.



## Neuronal connectivity

Information must be transmitted  
within each neuron  
and between neurons



## Neuronal connectivity

Many neurons can be  
connected to one neuron  
called pacemaker, who  
coordinates their activity

The neurons can be connected  
in layers where each layer of  
neurons communicates with  
another layer

