

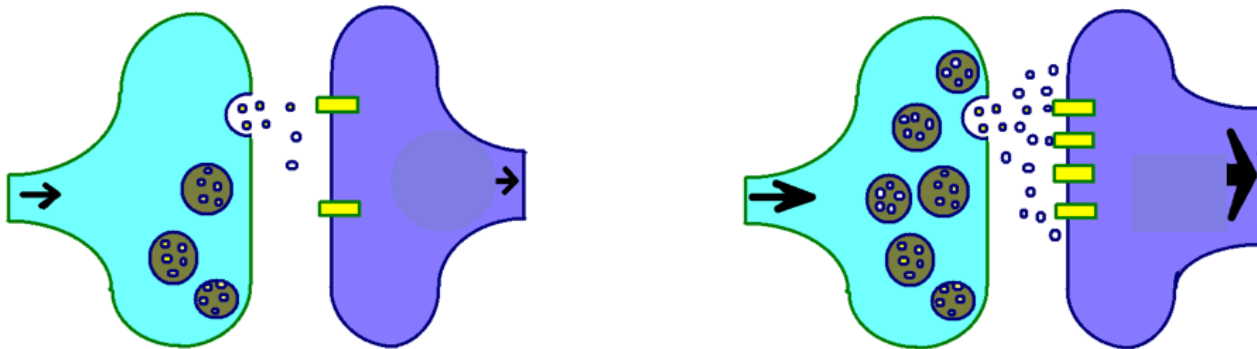
Neuroplasticity

Sources: [Class Presentation](#) | Textbook: Grivas, *Psychology, VCE Units 1 and 2*, 8th ed., pp. 200-204
Blog Page: <http://psychologyrats.edublogs.org/brain/brain-plasticity/>

Neuroplasticity is the ability of the brain to form and reorganize synaptic connections, especially in response to learning or experience or following injury ([Oxford Living Dictionary](#)).

This capacity of our brains means that they continue to adapt and reconfigure themselves all through our lives, depending on what we learn, practise and experience.

1 Label the two diagrams below to illustrate the concept of **long-term potentiation**. Write the definition of long-term potentiation below the diagram (see [Presentation](#), slides 7-10).



Long-Term Potentiation:

2 Give one piece of evidence that suggests that completing mentally stimulating tasks is reflected in the brain's structure (see [Presentation](#), slides 12-14 and 31-33).

3 The Story So Far: Either-Or Quiz 1 ([Presentation](#), slide 15)

- a The brain is _____ according to learning and experience.
 able to adapt unable to adapt
- b Which age group has greater brain plasticity?
 adults children
- c Which parts of the brain show the greatest ability to respond to experience?
 sensory and motor cortices cerebellum
- d The more often a particular neural pathway is activated
 the less efficient it becomes. the more efficient it becomes.
- e The lasting strengthening of synaptic connections, which allows enhanced communication between neurons, is called...
 consolidation long-term potentiation

4 The Story So Far: Either-Or Quiz 2 ([Presentation](#), slide 22)

- a** The creation of new neural connections is called
 - synaptic pruning
 - synaptogenesis
- b** The elimination of unused neural connections is called
 - synaptic pruning
 - synaptogenesis
- c** Which type of plasticity refers to the brain's capacity to recover after trauma or injury?
 - adaptive plasticity
 - developmental plasticity
- d** Synaptic pruning is essential because it makes neural transmission
 - less efficient.
 - more efficient.
- e** When does synaptogenesis occur most rapidly?
 - birth-2 years of age
 - 10-12 years of age
- f** Which factor determines which synapses are retained?
 - age of synapses
 - use of synapses

Brain Plasticity Notes and Questions

1 Although the brain as a whole does not change in shape, there are ongoing changes to the brain's physical structure and function. Explain what these are. (second paragraph, p.200)

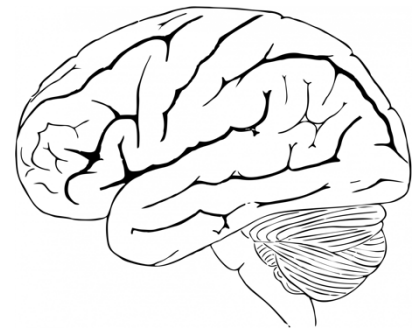
2 Explain the meaning of **adaptive plasticity** with reference to an example (p.200).

3 The two important processes underlying recovery after brain damage are **rerouting** and **sprouting**. (p.201) Explain what these terms mean and how these processes allow the brain to recover lost function.

4 Adaptive plasticity is also evident in a healthy brain in response to experience. Give an example of this from your text book (see pp.202-3).

5 How does brain plasticity contribute to the fact that no two brains are the same?

6 Match the terms and definitions below, using colour-coding or branches (no pun intended).



Term	Definition
plasticity	An undamaged neuron that has lost a connection with an active neuron may connect with a new active neuron instead.
sprouting	The ability of the brain's neural structure or function to be changed by experience throughout the lifespan
re-routing	A specific period of time in development when an organism is more 'sensitive' or responsive to certain environmental stimuli or experiences
long-term potentiation	Evident when the brain recovers from trauma due to brain injury and also when changes in brain structure enable adjustment to experience
adaptive plasticity	The lasting strengthening of synaptic connections of neurons, resulting in their enhanced functioning
sensitive (or critical) period	The process of forming new synapses
synaptogenesis	The growth of new bushier nerve fibres with more branches to make new connections