

# Brain Lesson Plan

## Resources Provided

- "Introducing the Brain" video can be viewed using the following link: <https://youtu.be/gw3oGsXfQEU>
- Brain PowerPoint Presentation
- Brain Lesson Plan
- Brain Logic Puzzle
- Extra video: "Draw My Parkinson's"-An 8 minute stop motion animation made by CÚRAM researcher, Joelle Bizeau, explaining the cause of Parkinson's disease and treatments being developed by CÚRAM using biomaterials. The film can be viewed using the following link:  
<https://www.youtube.com/watch?v=aNND-ORY4tl>.

## Keywords and Definitions

	Keyword	Definition
1.	<b>Neuron</b>	A specialised cell that can send and receive messages using neurotransmitters.
2.	<b>Synapse</b>	A gap between two neurons that a message must jump across.
3.	<b>Neurotransmitter</b>	Chemicals made by neurons that carry messages across synapses.

4.	<b>Dopamine</b>	A type of neurotransmitter made by neurons in the brain.
5.	<b>Vesicle</b>	In a neuron, a vesicle releases neurotransmitters at the synapse.
6.	<b>Receptor</b>	In a neuron, a receptor receives neurotransmitters at the synapse.
7.	<b>Symptom</b>	A sign indicating the presence of an illness.
8.	<b>Tremor</b>	Involuntary, rhythmic shaking of the muscles.
9.	<b>Diagnose</b>	Identify the nature of an illness or other problem by examining the symptoms.
10.	<b>Treat</b>	Give medical care or attention to.
11.	<b>Substantia Nigra</b>	Area located in the midbrain that plays an important role in movement.
12.	<b>Biomaterial</b>	A material that can be engineered to help the body heal itself.
13.	<b>Minimally Invasive</b>	Can be inserted into the body without causing damage.
14.	<b>Biomedical Engineering</b>	The combination of engineering and medicine to help improve people's health.

15.	<b>Deep Brain Stimulation</b>	Use of electrical activity to stimulate neurons.
16.	<b>Medical Device</b>	Any material, apparatus, software or other article that is used to: Diagnose, prevent, monitor or treat a disease or injury; Investigate, replace or modify a part or process of the body.

## Extra Info / Files

	Web Address	Brief Description
	<a href="http://www.webmd.com/parkinsons-disease/ss/slideshow-index">www.webmd.com/parkinsons-disease/ss/slideshow-index</a>	"Slideshow: A Visual Guide to Parkinson's"

## Materials Needed

- In advance of the lesson to make jelly "brains":
  - Blocks of 135g jelly depending on how many "brains" you are making (1 block makes 200mL)
  - Muffin liners
  - Muffin tin
  - Black marker (**Note:** Must be permanent)
  - Liquid measuring cup (up to 100mL)
  - Water
  - Microwave
  - Microwave safe bowl

- For the activity:
  - Scissors
  - Tape
  - Materials to build the medical device to treat the jelly brain with Deep Brain Stimulation. Some ideas are first straws, pipe cleaners, ice lolly sticks, toothpicks and paper clips.

## Instructions

- In advance of the lesson, prepare the jelly "brains":
  - Place muffin liners into a muffin tin.
  - Using the black marker, make a dot on the bottom of the muffin liner approximately ½cm in diameter.
  - Break up the block of jelly into cubes.
  - Place the jelly cubes in a microwave safe bowl.
  - Add 100mL water and heat for approximately 1 minute or according to the recommendations on the package.
  - Stir until completely dissolved.
  - Make up to 200mL with cold water. **Note:** The jelly needs to be concentrated so make up to 200mL rather than the amount recommended on the package. Therefore, **DO NOT EAT THE JELLY BRAINS!**
  - Pour about 50mL of the mixture into each muffin liner and refrigerate to set.

- For the activity:
  - Using the materials available around the house, create a medical device to treat your jelly brain with Deep Brain Stimulation.
  - Possible materials include straws, pipe cleaners, ice lolly sticks, toothpicks and paper clips. **Note:** The medical device must: 1) Be able to reach deep into the brain, 2) Not cause damage to the brain, and 3) Be easy for the surgeon to use.
  - Once the medical device is built, test it out on your jelly brain. The human brain feels the same as jelly!
  - Try to touch the black dot at the bottom of the muffin liner with your device causing as little damage to the jelly brain as possible.
  - Examine the damage caused to the jelly brain after testing the medical device.

Brain moulds can be used in place of muffin liners and can be purchased from [www.amazon.co.uk](http://www.amazon.co.uk). Just make sure to line the moulds with a little bit of olive oil (must be olive oil, not vegetable oil!) before filling with the jelly mixture. Ones that we have found that work well can be viewed using the following link:

[https://www.amazon.co.uk/dp/B003AQB2XK/ref=pe\\_3187911\\_1857401\\_11\\_TE\\_item](https://www.amazon.co.uk/dp/B003AQB2XK/ref=pe_3187911_1857401_11_TE_item)