



# Natural Science Year 6

## Protect That BRAIN!:

### Mr. Egghead

#### Vocabulary

**Cerebrospinal Fluid (CSF):** The entire surface of central nervous system is bathed by a clear, colorless fluid called Cerebrospinal Fluid or CSF.

**Neuroscience:** Neuroscience (or neurobiology) is the scientific study of the nervous system.

**Waterproof:** water-resistant so that it remains relatively unaffected by water or resisting the ingress of water.

**Pia mater:** the inner most layer of the meninges or coverings of the brain.

**Concussion:** also known as minor head trauma or mild traumatic brain injury (mTBI) is the most common type of traumatic brain injury. It is typically defined as a head injury with a temporary loss of brain function.



The cerebrospinal fluid (CSF) has several functions. One of these functions is to protect the brain from concussions. To demonstrate how this works, we need to bring in "Mr. Egghead." Mr. Egghead is a raw egg with drawn-on face. The inside of the egg represents the brain and the egg shell represents the pia mater.

**Aim:** The aim of this investigation is to demonstrate the importance of CSF to protect the brain.

**Question:** Does the CSF protect our brain?

**Materials:** Eggs (at least 2), Markers to draw on a face (waterproof), Plastic container with top, Water (to fill the container).

**Hypothesis:** What do you think? Tell your classmates.

- a. I think the cerebrospinal fluid and skull **protect** the brain from impacts.
- b. I think the cerebrospinal fluid and skull **don't protect** the brain from impacts.

**Method:** Put Mr. Egghead in a container (tupperware) that is a bit larger than the egg. The container represents the skull. Now put a tight top on the container and shake it. You should observe that shaking the "brain" (the egg) in this situation results in "damage" (a broken egg).

Now repeat this experiment with a new Mr. Egghead, except this time, fill the container with water. The water represents the cerebrospinal fluid. Note that shaking the container does not cause the "brain damage" as before because the fluid has cushioned the brain from injury.

Drop Mr. Egghead from a standard height (or heights) in different conditions: 1) with fluid in the container, 2) without fluid in the container, 3) with different fluids or materials (sand, rocks) or 4) in different shaped containers, etc.

In groups, make sure you keep notes to record your observations! Compare your results with other groups.

#### Record:

Situation	Result
With fluid in the container	No damage/Partial damage/Serious damage
Without fluid in the container	No damage/Partial damage/Serious damage
With sand	No damage/Partial damage/Serious damage
With salty water	No damage/Partial damage/Serious damage

#### Conclusion:

Do the CSF and the skull protect the brain from impacts?

Why do you think this is?

Is it important to wear a helmet when you ride a bike or practice sport?

