# Brain Attack Module

## Introduction

This series of activities aims to teach intermediate-grade students about the basic functions of the brain, the nature, causes, types and effects of strokes, and the implications for those who are close to a person who has experienced a stroke.

## Background Information

Blood transports oxygen and other nutrients the brain needs to survive and function. Blood flow may be impaired by the existence of a thrombus between the heart and the brain, the existence of plaque build-up on vessel walls, an embolism in the brain, and hemorrhaging in the brain. Without blood, brain cells will die. Pressure from blood leakage in the brain impairs the function of the brain. If the person survives, he or she may suffer a wide range of impairments, depending on the area of the brain that is injured or starved for oxygen.

## Science Standards

### National Science Education Standards

Life Science Content Standard C: As a result of their activities in grades 5-8, all students should develop understanding of structure and function in living systems. Principles that underlie this standard include structure and functions of cells, tissues, organs, systems for movement, control, and coordination. A behavioral response requires coordination and communication at many levels, including cells, organ systems, and whole organisms. (pp. 155-157).

### AAAS Benchmarks

Human Organism Basic Functions Grades 3-5: At this level, children can begin to view the body as a system, in which parts do things for other parts and for the organism as a whole. Models help children to see and touch the internal organs and to know where they are located in the body. They can begin to understand that each organ affects and is affected by others. By the end of 5th grade, students should know that the brain gets signals from all parts of the body telling what is going on there. The brain also sends signals to parts of the body to influence what they do. (p. 136)

Human Identity Grades 6-8: By the end of the 8th grade, students should know that human beings have body systems for providing coordination of body systems. (p. 129) Students can now develop more sophisticated understandings of how organs and organ systems work together. This includes circulation of and transportation by blood, and the carrying of messages by nerves to help the organism respond to its environment. Asking What if? questions such as What might happen if some other parts weren't there or weren't working? can stimulate students to reflection connections among organs. (p. 137) By the end of the 8th grade, students should know that

interactions among the senses, nerves, and brain make possible the learning that enables human beings to cope with changes in their environment.

**National Science Teachers Association**
**Scope Sequence and Coordination**
At the 6-8 grade level, the curriculum should emphasize the human organism. (p. 48) Students should explore the different systems. From activities they should see a correlation between healthful living and system maintenance. Designers and teachers must avoid a mindless march through the body systems. Coordination with topics from other disciplines results in more dynamic experiments. For example, activities could relate circulation to principles of pressure, muscles and skeletal structures to machines and gas exchange. (p. 49)

**Nebraska Science Standards**
Grades 5-8 At the middle school level, students expand their scientific inquiry skills through knowledge, observations, ideas, and questions. Middle school students will begin to recognize the relationships between explanation and evidence. They understand that background knowledge and theories guide the design of investigations, the types of observations made, and the interpretation of data. Student investigations will shape and modify students background knowledge. (p. 24)

## Hands-On Activity

Stroke is the third largest cause of death and the leading cause of serious long term disability in the United States. 80% of all strokes are caused by blood clots. These activities demonstrate the effects of a thrombous, embolous, and hemorrhage.

## Web Activity

Take a virtual tour of the brain and learn about the different types of stroke.

## Vocabulary

**artery**- blood vessels that carry blood from the heart to the rest of the body.

**oxygen** - an element that is found free as a colorless, tasteless, odorless gas in the atmosphere. It is carried in the blood stream by red blood cells, and is needed for the brain to function normally.

**embolism** - a wandering blood clot that forms in the blood vessel and blocks the flow of blood when it gets stuck.

**thrombus** - a blood clot that forms in the blood vessel and blocks the flow of blood.

**hemiplegia** - loss of vuluntary movement, and/or sensation on one side of the body.

**hemorrhage** - blood leakage when an artery bursts within the brain. As a result the brain may be deprived of blood and pressure may be put on the brain.

**nutrients** - furnishing nourishment; substances that promote or sustain growth, and neccessary for normal cell function.

**hemisphere**- half a sphere, in this context half the brain

## Biography

Blood leakage when an artery bursts within the brain. As a result the brain may be deprived of blood and pressure may be put on the brain.

## Resources and Links

**A gene study to understand stroke**

**American Stroke Association**

**American Heart Association**

**National Stroke Association**

**The Brain Attack Coalition**

**Mayo Clinic**

**Pediatric Stroke Network**