



UNIVERSITY OF
NEW ENGLAND

Center for Excellence
in the Neurosciences

Learning and Memory Module

K-5

Driving Question: How do human brains adapt to change for survival and how do our innate characteristics interact with the brain?

Objectives: Students will be able to...

K-2	3-5
<ul style="list-style-type: none"> • Describe how different parts of the brain assist human function. • Explain the “Rule of Two’s” for proper helmet fitting. • Explain how the brain helps the human body function and survive. 	<ul style="list-style-type: none"> • Define the term <i>cognition</i>. • Describe how different parts of the brain are used for specific tasks. • Demonstrate how the brain processes and responds to information differently using the Stroop test as an example.

Next Generation Science Standards:

- **K-2-ETS1-2** Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- **K-LS1-1** Use observations to describe patterns of what plants and animals (including humans) need to survive.
- **1-LS1-1** Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
- **2-PS1-1** Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
- **2-PS1-2** Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.
- **4-LS1-2** Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
- **5-PS1-3** Make observations and measurements to identify materials based on their properties.
- **5-PS2-1** Support an argument that the gravitational force exerted by Earth on objects is directed down.
- **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- **3-5-ETS1-3** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Materials:

K-2	3-5
<ul style="list-style-type: none"> • Franklin’s Helmet book • Helmets • Egg drop materials • Coloring pages of brain lobes 	<ul style="list-style-type: none"> • Stroop test materials • Bill Nye video • Coloring pages of brain lobes • Egg drop materials • Pipe cleaner neuron materials

Procedure:

Engage: Ask the following questions:

- Where is your brain?
- What does it look like?
- What does your brain do?
 - Draw something that the brain helps you do.
- Why do you think it is important to protect our brain?
- Brains are very important to human function. They help you *perceive (or understand)* the world around you and can control how you understand things. Today we are going to learn how the brain helps us make decisions and why it is very important that we protect it.

Explore:

K-2	3-5
<ul style="list-style-type: none"> • Franklin’s Helmet book • Brain awareness/ helmet fitting • Egg drop demonstration • Lobe coloring pages 	<ul style="list-style-type: none"> • Speed of Processing and Selective Attention: <i>Stroop Test</i> • Helmet safety- Bill Nye video • Brain lobe coloring pages • Egg drop demonstration • Pipe cleaner neurons

Explain:

K-2

- Franklin’s Bicycle Helmet/Brain awareness: Students in K-2 will be read the book, *Franklin’s Bicycle Helmet* to understand the importance of helmets and finding one that fits.
- Egg Drop: Students in K-2 will witness the egg drop demonstration by an Outreach volunteer. They will be taught about the effectiveness of helmets and have an introduction to brain structure with this demonstration.
- Lobe Coloring: Students in grades K-5 will color the different lobes of the brain and learn about the different roles they have in brain function. Level of detail for this activity will vary by level of understanding.

3-5

- Stroop test: Students in grades 3-5 will (in pairs or groups of three) perform the Stroop test in order to understand perception and processing. They will hold up the card provided to their partner the partner announces the *color* of the words on the card as fast as they can.
- Helmet/Bike Safety: Students will watch a Bill Nye video on helmet safety.
- Egg drop: Students in grades 3-5 will demonstrate the egg drop in small groups or pairs. They should compare and contrast the structure of a helmet, egg, and brain.
- Lobe Coloring: The students will color and label each of the lobes of the brain, while the teacher explains what functions each lobe has. The level of explanation during this activity will vary based on level of understanding.
- Pipe Cleaner Neurons: Students in grades 3-5 will individually create “pipe cleaner neurons” as an introduction to cells. The level of explanation during this activity will vary based on each grade level.

Elaborate:

K-2

- Franklin’s Bicycle Helmet / Brain Awareness: teaches us that it is important to wear a helmet.
 - What do helmets protect?
 - What are some reasons that it is important?
 - Ask a student to volunteer to come to the front and put on a helmet. Explain the “Rule of Two’s” and have call on students to repeat them. Allow another student to come to the front of the class and teach the Rule of Two’s to the class again.
- Egg Drop demo: have the students describe the structure of the helmet and compare and contrast the structure of a brain to the egg. (Involve cerebrospinal fluid, skull, etc.)
- Lobe Coloring:
 - Depending on the level of understanding by the students, color each lobe and draw a picture next to what it does. (Ex. Occipital lobe- draw eyes next to it)

3-5

- Stroop test activity
 - This activity can be timed each time the students read aloud a card. Compare the time from the first experience reading the card to the second. Which time is faster? Why? Students can make a bar graph of their first and second times. For each member of the group. (y = time, x = student name/trials).
- Bill Nye video:
 - Helmet safety can introduce brain injury. Students will discuss the structure of helmets and why you shouldn't wear a helmet after it was involved in an accident or is damaged.
- Egg Drop:
 - Students will be in small groups or pairs for the egg drop experiment. This is an opportunity to emphasize the structure of helmets and how they protect the brain. Brain structure can also be involved; talk about cerebrospinal fluid and the skull. Have students make a hypothesis before the experiment and name observations after the experiment.
- Coloring lobes:
 - Frontal lobe: located at the forehead; used for reason, make judgments, organize information and control some movement.
 - Parietal lobe: located near the back and top of the head. Used for touch, pressure, senses (ask students to name the senses)
 - Occipital lobe: located at the back of the skull, controls vision
 - Temporal lobes: located either side of the head above the ears.
 - After discussing the functions of each lobe, ask the students what would happen if one were damaged. Ask them how two or more lobes may work together.
- Pipe Cleaner Neurons
 - Ask the students about animal and plant cells and then introduce them to neurons. These cells look different than the animal or plant cell structure and they have different functions. Have the students draw a neuron with a few parts labeled before the pipe cleaners are passed out.

Evaluate:

- Did the CEN Outreach volunteer teach the student objectives?
- Did the CEN Outreach program reach the goals of the teacher?
- Did the CEN Outreach program reach it's own goals/objectives?