

BRAIN DRAIN OLYMPICS

BENCHMARKS AND TASKS

SC.F.1.2.1 The student knows that the human body is made of systems with structures and functions that are related.

SC.F.1.2.3 The student knows that living things are different but share similar structures.

- The student knows that processes needed for life are carried out by the cells and that complex animals have specialized organs to carry out life processes.
- The student collects personal health-related data (e.g., temperature, heart rate) with simple devices, such as a watch, a thermometer, and a stethoscope, to get a sense of how such information varies.

KEY QUESTION

How does hypertension affect the brain and the central nervous system?

BACKGROUND INFORMATION

The nervous **system** is made up of the brain (the major command center), the spinal cord (the nerve highway), and the neurons (nerve cells). The basic job of the nervous system is to assist the body as it reacts to changes in the **environment** and adjust to any necessary changes. It does this by split-second reactions that transfer electrical impulses via neurons along the spinal cord and then transfer this **energy** to the muscles and internal **organs**. When the nervous system is working properly, it coordinates the normal work of your trillions of cells. It monitors your internal operations as well as what goes on in the world outside your body. It senses changes in the environment and makes the necessary adjustments. It keeps things running smoothly and on course. There are, however, times when things can go wrong with the nervous system.

Hypertension, or high blood pressure, is a serious problem that can damage many organs of the body, particularly the brain and the heart. Hypertension can cause the heart to enlarge and become weak. It can cause arteries to become scarred and less elastic. This can lead to the formation of blood clots that can cause heart attacks or possible strokes to the brain. The occurrence of cerebral hemorrhage or stroke reflects the severe stress that is imposed upon the large arteries. The blood that seeps out accumulates, presses upon the delicate brain tissue, and causes damage to brain cells. This damage can cause paralysis, disturbances in speech, sight, and other complex activities.

MATERIALS

Per station

Stations 1-6:

masking tape

stopwatch or clock with second hand

Station 1:

1 man's shirt with buttons

Station 2:

1 large jar of peanut butter

1 plastic knife

loaf of bread

Science 5, Unit 4

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Per student

Brain Drain Olympics worksheet

Per class

1 bolt with a screw-on nut

paper plates

Station 3:

1 pad of writing paper

1 copy of a poem

Station 4:

scissors

several sheets of paper imprinted with a simple pattern to cut

Station 5:

1 box of paper clips

Station 6:

1 man's shoe with laces and pencil

TEACHING TIP

Set up six stations with the following six task cards:

Station #1: Put on a man's shirt and button all the buttons.

Station #2: Make a peanut butter sandwich.

Station #3: Copy the poem that is provided.

Station #4: Cut out the pattern that is provided.

Station #5: Pour out the box of paper clips onto the desk, pick them up, and put them back in the box.

Station #6: Untie one shoe and put it on. Tie the laces. Untie the laces and remove the shoe.

ENGAGE

Ask for a student volunteer to come to the front of the class. Ask the student if he thinks he could complete a simple task in a very short period of time. Tell the student that you want him to completely screw on a nut to a bolt and then unscrew the nut from the bolt. He must complete this in less than 10 seconds, but the catch is...he cannot use either of his thumbs. He must use only his fingers. Begin timing the student. Once frustration has taken over, discuss why this task was so difficult. Tell students that they are simulating a "nerve" roadblock to completing the task, and they will be investigating several more nerve roadblocks.

EXPLORE

1. Divide the class into groups of four. They will be taking turns at each station as recorders, timers, investigators, and observers.
2. Instruct students to perform the tasks at each station (see Teaching Tips) and time how long it takes to perform these tasks. Record this data on the *Brain Drain Olympics* worksheet.
3. Instruct students to perform the tasks a second time, but this time the student who is performing the task should have his thumb taped securely to his hand so that he cannot use his thumb. (The student who did the task the first time should be the one who repeats it in order to make a comparison.)
4. The students will time how long it takes to perform each activity and record the information on the worksheet.

EXPLAIN

Which task took the longest to perform? (Tasks that required gripping took the longest to perform.)

What problems did you encounter when you performed the tasks with your thumb taped?

Why were the tasks where you couldn't use your thumbs difficult to perform? (We have been programmed since birth to grasp with our thumbs and fingers. Anything that opposes this seems alien.)

EXTEND/APPLY

1. Humans are the only animals that have opposable thumbs. This has enabled the human race to advance and perform to a high degree of efficiency. Have students research monkeys, focusing on their thumbs.
2. Have students research other effects of strokes and share with the class.

BRAIN DRAIN OLYMPICS

TASK	PERFORMANCE TIME (USING THUMBS)	PERFORMANCE TIME (WITHOUT USING THUMBS)
<p style="text-align: center;"><u>STATION 1</u> Put on a man's shirt and button all the buttons.</p>		
<p style="text-align: center;"><u>STATION 2</u> Make a peanut butter sandwich.</p>		
<p style="text-align: center;"><u>STATION 3</u> Copy the poem that is provided.</p>		
<p style="text-align: center;"><u>STATION 4</u> Cut out the pattern that is provided.</p>		
<p style="text-align: center;"><u>STATION 5</u> Pour out the paper clips onto the desk, pick them up, and put them back in the box.</p>		
<p style="text-align: center;"><u>STATION 6</u> Untie one shoe and put it on. Tie the laces. Untie the laces and remove the shoe.</p>		