



BRAIN EXPLORERS

- Hands-on, minds-on
- Student-centered
- Multi-disciplinary

A Sample Curriculum

Introduction

This manual includes four sample units from the Brain Explorers curriculum. The Brain Explorers program is a longitudinal curriculum designed to teach children in grades 3 to 5 a variety of basic science and health concepts using the brain and body as the central focus.

Lesson Plan Structure

Each unit in the Brain Explorers curriculum begins with an in-depth background information section. This section is followed by lesson plans, which include the overarching goal, set-up notes, and the procedure for conducting the lesson. The last page of the lesson plans outlines key cognitive skills addressed in the lesson, vocabulary terms, and specific outcomes that students should achieve. Although individual lessons take approximately 1 hour of class time to complete, in some instances lessons can be easily combined if you have a larger block of time. This will be noted in the “additional options” portion of the lesson plan.

Structure of Classroom Activities

The structure of many Brain Explorers lessons is based on the 5-E Model used in many lessons developed by the Biological Sciences Curriculum Study (Trowbridge & Bybee, 1990). This model is based on a constructivist philosophy of learning. Each “E” represents a step in the learning process

whereby students actively build their understanding of a topic. An explanation and an example of each “E” are provided below.

Engage

Much like the scientists in textbooks, students become intrigued by everyday events around them. In the Engage portion of the lesson, students are exposed to a thought-provoking question or event that pertains to the central topic of the lesson. For example, in the first lesson (“Reaction Time Experiment Part I”) the teacher drops a ruler and then asks, “What made the ruler fall?” The open-ended nature of the question is designed to facilitate discussion and to elicit many possible hypotheses.

Explore

The Explore section of the lesson is designed to provide students with opportunities to learn more about a topic. In the Reaction Time lesson, students explore by choosing a light object (e.g., a piece of paper) and a heavy object (e.g., a book) and by making predictions about which object will fall faster.

Explain

Even experts continually update their knowledge by reading journal articles and talking with other scientists. Students also need an opportunity to clarify the understanding gained from

their explorations. Teachers help with this process by explaining key terms and concepts. In Brain Explorers lessons, this goal is often accomplished through a mixture of guided discussions and mini lectures lasting no more than 5 minutes. In the Reaction Time lesson, the teacher begins by telling the students about Galileo. This is followed by another demonstration and more questions such as, “What had to happen in my body for me to catch the ruler?” Finally, the teacher ends this phase of the lesson by using the reaction time poster to explain what must happen in the nervous system for a person to catch a ruler.

Elaborate

The goal of the “Elaborate” segment is to encourage students to apply scientific principles to new situations. Since the nervous system controls all movement, the Reaction Time lesson provides ample opportunities for students to consider all their nervous system does and how quickly the nervous system works!

Evaluate

The final “E” allows students and teachers to monitor mastery of lesson objectives. Each Brain Explorer lesson includes an evaluation mechanism and a corresponding grading rubric. In the Reaction Time lesson, students complete a brief writing assignment in which they describe the process they have just learned.

Linkages to National Standards

Principles outlined in national curricula related to science and other disciplines guided the development of Brain Explorers activities. Thus, each lesson is linked with the Benchmarks for Science Literacy developed by the American Association for the Advancement of Science.