

Unit Summary

The hands-on activities in Frey's Inquiry Investigations™ Module Physical Science Series I, bring problem-based science into your classroom that link science and technology to real world problems and solutions. Students investigate electricity, electric currents, heat and energy, the scientific method, measuring methods and techniques, and the properties of light.

The Inquiry Investigations Module™ Physical Science Series I consists of five investigative units featuring over twenty-two hands-on laboratory activities. Each unit begins with a thorough introduction of the science concepts and skills presented in the lab activities that follow. The lab investigations can be performed in the sequence presented (see pacing chart) or separately based upon the time available for this section of your studies.

Suggested Going Further investigations allow students to design and carry out their own investigations to expand their knowledge and understanding of our physical world.

Unit 1: The World of Physical Science

Inquiry Investigation™ Lab 1 — Exploring the Scientific Method

In **Activity 1**, students run an experiment to determine if different water temperatures affect the rate at which sponge creatures will emerge from their gelatin chrysalis. Students use the scientific method to determine the answer by forming and testing their hypothesis, analyzing their results, and drawing conclusions.

In **Activity 2**, students determine if pH has an effect on the rate of emergence of the sponge creatures.

Suggested Going Further investigations allows students to design and carry out additional experiments to identify other factors that effect the rate of at which sponge creatures will emerge.

Inquiry Investigation™ Lab 2 — Exploring the Science of Measurement

In **Activity 1**, students learn about the units of the metric system by measuring length, volume, and mass of various objects.

In **Activity 2**, students learn about density as they compare the mass and volume of various solutions.

In **Activity 3**, students learn about temperature and its various units of measurement.

In **Activity 4**, students measure the pH of various solution and understand the pH scale and the differences between acids and bases.

In **Activity 5**, students understand how water pollutants are measured in concentrations of ppm and ppb.

Suggested Going Further investigations allow students to explore additional topics related to measurement in science.

Unit 2: Heat and Energy

Inquiry Investigation™ Lab 1 — Exploring Heat and Energy

In **Activity 1**, students use a calorimeter to investigate concepts related to heat and energy.

In **Activity 2**, students demonstrate thermal conductivity and heat transfer of different metals.

In **Activity 3**, students demonstrate thermal expansion of various metals.

In **Activity 4**, students use a radiometer to explore radiant heat and energy.

In **Activity 5**, students learn about heat measurement, calibrate an unmarked thermometer and learn about temperature conversion.

Suggested Going Further investigations provide students with the opportunity to explore related topics such as electrical conductivity and thermal expansion.

Unit 3: Light and Optics

Inquiry Investigation™ Lab 1 — Exploring Light and Optics

In **Activity 1**, students use a prism to investigate the visible light spectrum.

In **Activity 2**, students investigate how color is produced.

In **Activity 3**, students use lenses and mirrors to investigate the reflection of light and the images produced.

In **Activity 4**, students investigate how polarized light is produced and its uses.

In **Activity 5**, students use a laser pointer to study how a laser beam is produced and compare it to the light beam of a flashlight.

Suggested Going Further investigations provide students with the opportunity to explore the use of corrective lenses, the various products that depend upon the ability to produce, control, and detect light in special ways.

Unit 4: Electricity

Inquiry Investigation™ Lab 1 — Exploring Electricity

In **Activity 1**, students use an electroscope to indicate charges of various materials.

In **Activity 2**, students will learn the basic concepts of electric potential, voltage, current, and circuits. Additionally, they will create their own battery and work with electrical currents.

In **Activity 3**, students learn about basic circuit design and test circuits with resistors connected in series and parallel.

Suggested Going Further investigations allow students to build their own electroscope and create batteries using commonly found materials.

Unit 5: Comprehensive Inquiry Investigation

Inquiry Investigation™ Lab 1 – Simulating the Gallows Telephone

In **Activity 1**, students will use skills and concepts presented in previous units to re-create the famous tuning fork experiment that Alexander Graham Bell performed.

Suggested Going Further investigations provide information which will allow students to set-up a true gallows telephone and investigate the effect that pH has on the ability to transmit sound through a solution.