

# Unit Summary

The hands-on activities in Frey’s Inquiry Investigations™ Module Physical Science Series II, 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 II 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: Gravity

Inquiry Investigation™ Lab 1 —  
Exploring Gravity

In **Activity 1**, students will determine the density and calculate the specific gravity for each sample.

In **Activity 2**, students measure the acceleration caused by gravity by studying a simple pendulum.

In **Activity 3**, students learn about Archimedes Principle.

In **Activity 2**, students watch as the teacher performs a demonstration about pressure.

*Suggested Going Further* investigations allows students to create a density gradient in a test tube and compare the gravitational force of different planets in our solar system.

## Unit 2: Magnetism

Inquiry Investigation™ Lab 1 —  
Exploring Magnets and Magnetism

In **Activity 1**, students investigate the behavior of a magnetic compass.

In **Activity 2**, students explore the magnetic field of a bar magnet using iron filings.

In **Activity 3**, students construct an electromagnet.

In **Activity 4**, students use magnetism to produce an electric current.

*Suggested Going Further* investigations provide students with an opportunity to explore electric motors and generators. Students are also asked to read about motors and research how to build a simple motor.

## Unit 3: Properties of Sound

Inquiry Investigation™ Lab 1 —  
Exploring Sound Waves

In **Activity 1**, students investigate the properties of sound.

In **Activity 2**, students explore the interactions of sound waves and the phenomenon of “beats”.

In **Activity 3**, students learn about the Doppler Effect.

In **Activity 4**, students observe the properties of a wave.

*Suggested Going Further* investigations provide students with additional challenges. Explore how to make a soundproof room and how architects take into account the action of sound waves when they design theaters.

## Unit 4: Forces, Motion, and Simple Machines

### Inquiry Investigation™ Lab 1 — Exploring Force and Motion

In **Activity 1**, students investigate Newton's laws of motion.

In **Activity 2**, students learn about a force that acts in the opposite direction to the motion of the moving object – friction.

In **Activity 3**, students explore how the mass of an object impacts the movement of that object as it rotates about an axis.

In **Activity 4**, students demonstrate the relevance of momentum and energy conservation to collisions in one dimension between two objects.

*Suggested Going Further* investigations prompt students to design an experiment to further investigate the principle of conservation of momentum.

### Inquiry Investigation™ Lab 2 — Exploring Simple Machines

In **Activity 1**, students learn about the different types of levers: first-class, second-class, third-class, and combination levers.

In **Activity 2**, students construct another type of simple machine which is made of a rope wrapped around a grooved wheel – the pulley.

In **Activity 3**, students investigate the inclined plane and its uses.

*Suggested Going Further* investigations further explore second and third class levers by studying the relationship between the magnitudes of forces needed to lift similar objects.

## 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.