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Styrofoam Plate Speaker

Achievements and Competencies

Learning Outcomes

Grades 10-12
Waves
Fields

Achievements and Competencies are based on the Common Framework of Science Learning Outcomes (K-12) set by the Canadian Council of Ministers of Education (1997).

Specific Expectations

Grades 11 & 12

PHYSICS

Waves

327-1 Describe the characteristics of longitudinal and transverse waves.

The students will be able to create a longitudinal wave by creating a solenoid with copper wire which produces a magnetic field. A solenoid functions exactly like a bar magnet, and if a permanent magnet is placed inside the solenoid, the two magnetic fields can repel or attract. By alternating the direction of the electrical current in the coil at a specific frequency, the diaphragm will vibrate at that frequency, creating a longitudinal wave in the air.

327-5 Compare and describe the properties of electromagnetic radiation and sound.

While making the Styrofoam plate speakers, the students will learn that the greater the current, the stronger the magnetic field. The strength of the solenoid's magnetic field is directly proportional to the displacement of the Styrofoam plate. Therefore, the amplitude of the longitudinal sound wave is controlled by the strength of the current flowing into the coil.

327-6 Describe how sound and electromagnetic radiation, as forms of energy, are produced and transmitted.

Music can be produced and transmitted through the Styrofoam plate speakers that the students create out of Styrofoam plates, cardboard, copper wire and a magnet.

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Styrofoam Plate Speaker - Achievements and Competencies

PHYSICS

Fields

328-5 Analyze, qualitatively and quantitatively, the forces acting on a moving charge and on an electric current in a uniform magnetic field.

The movement of the Styrofoam plate and the production of sound will give students the opportunity to analyse the forces acting on a electric current in a magnetic field.

328-6 Describe the magnetic field produced by current in both a solenoid and a long, straight conductor.

The students will create a solenoid by tightly coiling the copper wire around a cardboard tube. The magnetic field that is created will be used to produce the sound from the Styrofoam plate speakers.