

4. Permanent Magnets and Electromagnets

Subject: Magnetism

Objective: To demonstrate the variety of magnets and of magnetic effects.

Logistics: This experiment is best conducted in groups of three or four.

Materials (per group):

Lodestone

two bar magnets

compass

four-inch nail

25 feet of insulated wire

battery set of two flashlight batteries

switch

six paper clips

Procedure:

Step 1: Use Lodestone to attract objects. Try ferrous and non-ferrous materials. Show Lodestone influence on compass. The Earth is a magnet.

Step 2: Experiment with bar magnets. Illustrate principle that like poles repel and unlike poles attract. Show effect on compass.

Step 3: Wrap insulated wire around nail and connect to battery set through the switch. Demonstrate electromagnetism using paper clips and compass. No effect on non-ferrous materials such as pencils.

Vocabulary: *Lodestone, permanent magnet, magnetic material, ferrous material, compass.*

What they Learn: Magnetism exists in nature and can be produced as permanent or electromagnets.