

The Test Tube Magnet

The Action When iron filings are placed in a closed test tube and a bar magnet is brought near, the filings line up with the north and south dipoles of the magnet. By placing a compass near the now magnetized test tube, we can visualize the magnetic field created in the test tube.

Grade Level Grade 2 – Magnets
Grade 4 – Electricity & Magnetism
Physics 30 - Electromagnetism

Materials A bar magnet
Test tube
Iron filings
Rubber or cork stopper
Compass

Instructions Place some iron filings in a test tube, cork it and shake the filings while holding the tube horizontally. Bring the end of the test tube close to the compass and show that the compass needle is not or very little attracted. Now take the strong bar magnet and magnetize the iron filings in the test tube by stroking the bottom side of the horizontally held tube with one pole of the magnet in a circular motion. After stroking the tube with the magnet about 5 or 6 times, show that the test tube acts as a regular bar magnet by approaching the compass with the two ends of the tube.

Safety

Hints This demonstration can be used to demonstrate the strength of magnets to grade 2 students (here I might not use the compass). It can be further explained and used in Physics 30 when exploring electromagnetism.

Science Principle A bar magnet is made up of very tiny particles that have very weak dipoles or North and South magnetism, just like the iron filings in the tube. They are scattered randomly in the bar. When these particles are lined up by stroking the tube with a magnet, the bar becomes a magnet. The

iron filings in the test tube demonstrate this. When the tube is shaken after it is magnetized, the particles are distributed randomly again, and no magnetism is left in the tube.