

Amazin' Magnetism

Magnets can do much more than stick things to your refrigerator.

WHAT TO DO

Move a magnet near the bottle of Ferro-fluid. Move a magnet near the TV screen. Carefully drop a large magnet into the aluminum donut. Can you tell how refrigerator magnets are different from "regular" magnets?

WHAT'S HAPPENING?

The magnets you see here are called ferro-magnets, or permanent magnets, and they always have a north pole on one end and a south pole on the other with a powerful magnetic field extending into space around the magnet (just like the Earth, which is also a huge magnet). If you bring the north pole of one magnet near the north pole of another, their fields will repel each other, but if you bring the north pole of one near the south pole of another then they will attract, and even stick together. The small glass bottle contains Ferro-fluid, which is just tiny particles of iron suspended in a thick dark oil. Iron is a ferromagnetic element, so it is always attracted to another magnet, and since the fluid can move easily, it can show us the shape of the magnetic field. The old-fashioned CRT television tube draws its video by shooting a beam of electrons at the screen, and moving electrons are also affected by magnetic fields, so another magnet held close to the beam can knock them off course and screw up the picture. Aluminum is not ferromagnetic by itself, but moving a very strong magnet quickly nearby makes its electrons move, and this creates a powerful electromagnetic force which then repels the permanent magnet - strong enough to feel (especially when you move the magnet fast), and to slow down the falling magnet. Refrigerator magnets have many closely spaced rows of alternating north and south poles, so they always attract and never repel another magnet.