

SYNOPSIS:

Magnetism has been the subject of scientific inquiry since it was first discovered thousands of years ago. This force that causes like-charged things to repel and oppositely charged things to attract exists in everything from the biggest stars to the tiniest bacteria. Electromagnetism is one of the fundamental forces in the universe.

This program offers a comprehensive review of the principles of magnetism and its roles in the world around us. The program explains magnetic fields, and demonstrates how magnets work, and how they are made. The DVD illustrates the magnetic field of the sun and how it affects solar output. The role of earth's magnetosphere in relation to the sun is also examined and the Northern Lights are explained.

CURRICULUM UNITS:

Astronomy
Earth & Space Science
Electricity
Magnetism
Physics

CAREER OPPORTUNITIES:

Astronomer
Biologist
Engineer
Inventor
Radiologist
Physicist

PROGRAM OVERVIEW:

Magnetism exists in everything, from the biggest start to the tiniest microbes. One of the four fundamental forces in the universe, electromagnetism causes like-charged things to repel and oppositely charged things to attract, thus allowing atoms to bond and form molecules which hold matter together.

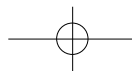
This program explores both magnetism and magnetic fields. Using iron filings suspended in liquid and a computer scanner, it illustrates how some materials are magnetic while others are not. It demonstrates magnetic poles and discusses repulsive and attractive forces. Animations illustrate how atoms in a nail line up to form a magnet, and how wrapping a nail in a coil of wire and passing a current through it creates an electromagnet. It also shows how a magnet can be made by lining up a nail with the earth's magnetic field, then heating the nail and tapping it gently.

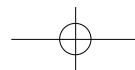
Everything has magnetic properties, even living beings, and scientists believe magnetism may be the reason that migratory animals are able to navigate. We also use the bio-magnetism of living bodies in medicine with diagnostic technology like Magnetic Resonance Imaging. Magnetism is used to generate electricity. It is also used in a wide variety of modern technology including motors, computers, and sound and video recorders and other equipment. However, we can expect scientists to continue to delve into the secrets of this fundamental force in the universe in order to create technologies that we have not yet imagined.

CRITICAL THINKING EXERCISES:

After showing the DVD, ask your students the following:
Why do we study magnetism?
What is the difference between an electromagnet and a permanent magnet?
What are some ways in which we can create a magnet?
What is the magnetic force?
How does the magnetic field of the sun affect its Corona?

Discuss the Northern Lights and how they are created.
Discuss bio-magnetism and what that means.
Discuss solar storms and how they are created.
Have students research the other basic forces in the universe.
Have students bring in magnets, batteries, nails, and wire, and have them duplicate some of the experiments on this program.





GLOSSARY:

ALIGNMENT- adjusting parts so they are in the proper relative position.

CYCLE- a series of events that repeat regularly.

DIAGNOSE- to identify a disease from its signs and symptoms .

FORCE- an influence that causes motion or physical change.

FUNDAMENTAL- basic; primary; of central importance; principle.

MAGNETOSPHERE- region surrounding a planet within which the magnetic field dominates and charged particles can be trapped.

MIGRATE- to go from one region to another seasonally for feeding and breeding.

MOLECULE- smallest particle of matter that is the same chemically as the whole mass.

PLASMA- a gas composed of charged subatomic particles.

RADIATION- emission of energy in the form of rays or waves.

REPEL- to push away.

SOLAR MAXIMUM- the most active point of the sun's eleven-year cycle.

SOLAR MINIMUM- the least active point in the sun's eleven-year cycle.

SOLAR WIND- a stream of plasma blowing off the sun's surface.

THERMONUCLEAR- related to the fusion of atomic nuclei at high temperatures.

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MAGNETIC FORCE AT WORK



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