

Bill Nye: Magnetism

Introductory Items

Magnets stick to things - it is invisible

Magnets made from minerals in the earth

Minerals: Iron, nickel, and cobalt

Come from moving electrons-called electricity - makes magnetism

Earth is a giant magnet - lets compasses work - just a magnet allowed to spin freely

Making an electromagnet

Need wire, nail, battery

Wrap wire carefully around nail many times

Attach battery w/switch

Circuit open - no magnet; circuit closed you have an electromagnet - picks up paper clips

Earth is a magnet

Created by earth's spin with its nickel/iron core makes electrons form huge loops

Forms giant magnetic field around earth

Helps birds, honey bees, dolphins

Makes compasses work - people can navigate

Protects us from dangerous particles from outer space

Going through you right now

Where do you find magnet?

Bank cards, audio and video tapes, can openers, doorbells, MRI machines, etc

Attraction VS Repulsion

Attract means pull together - Repulse means to push apart

Opposite poles attract (N to S)- Like poles repel (N to N or S to S)

How iron becomes a magnet

In iron, electrons are spinning every possible direction in their own areas called domains

When domains are lined up, you get a magnet (ex. Bill Nye's electron cars of science)

They line up with north on one end and south on the other - this is north and south poles

Break a magnet - you always get two smaller with north and south!

Making a compass

Weak Magnet Game

Rub a needle w/a magnet - always in the same direction
use old weak magnets
It lines up electrons in needle
glue on some pictures
Put needle on film cap - it is a compass
have slide races down 'fridge

MRI

Magnetic Resonance Imaging machine
Patient goes into huge magnetic machine -takes magnetic pictures
inside a person
Being in MRI machine doesn't hurt, shows what's wrong if anything is
wrong
EX. Girl is checked for brain tumor (see pictures of the girl's brain

Finding your way

Called orienteering
Use compass to line up north of map with earth's north
Use map to locate things on earth's surface

Earth's magnetic field

Earth's moving electrons (magnetic field) create large bands around
the earth
George Van Allen discovered them so named after him - Van Allen Belts
Protect us from solar wind (charged particles) Strongest at the North
and South Poles
Poles trap charged particles create N. Lights (Aurora Borealis) and S.
Lights (Aurora Australis)

Magnets in space

Sun is a giant super strong magnet (all molten, spins really fast) -
make sun spots
Moon, Mars, Venus not magnetic - their cores don't have enough liquid
they don't spin fast enough
Other planets have huge fields Neptune and Uranus 1000X's more
than Earth, Mercury 100X's less than earth
Galaxy has a magnetic field