

Grade 7 Science
Week of February 16 – February 19

Magnetism

History of Magnets

When was magnetism supposedly discovered, and what were its uses?



History of Magnetism: <https://youtu.be/u6v4J-CpKQE>

One of the most common is that of an elderly shepherd named Magnets, who was herding his sheep in an area of Northern Greece called Magnesia, about 4 000 years ago. It is said that both the nails in his shoes and the metal tip of his staff became firmly stuck to the large, black rock on which he was standing.

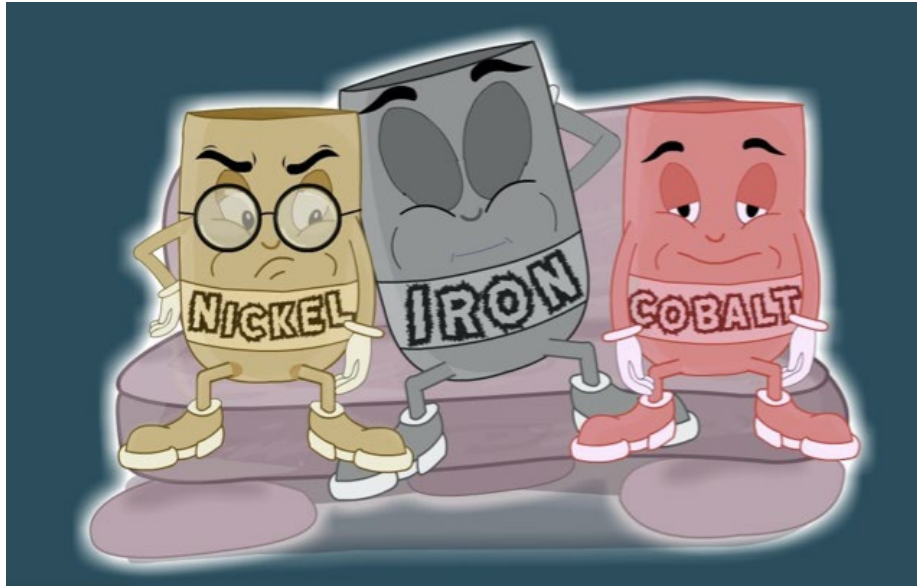


This type of rock was later named magnetite, after either Magnesia or Magnets himself.

For many years following its discovery, magnetite was surrounded in superstition and was considered to possess magical powers, such as the ability to heal the sick and frighten away evil spirits!

Magnets

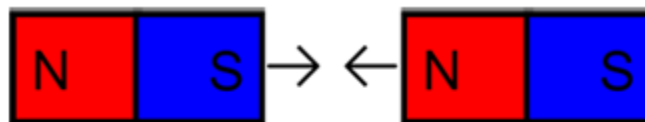
Metals such as **iron**, **nickel**, and **cobalt** are attracted to magnets.



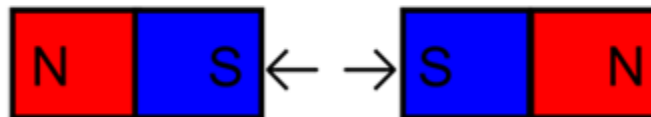
Most metals however are not attracted to magnets, and other materials such as glass, plastic, and wood aren't attracted to magnets either.

The 'North **pole**' of any **magnet** is the one that would be attracted to the Earth's South **magnetic pole**.
Just like protons and electrons, opposites attract!

Two magnets must use the opposite poles in order to attract one another.



Opposite poles **attract**



Same poles **repel**

Take a look at the video below for an introduction to magnetism. Make sure you follow along in your Learning Guide!



Bill Nye – Magnetism: <https://youtu.be/8PyqL9y7VZo>

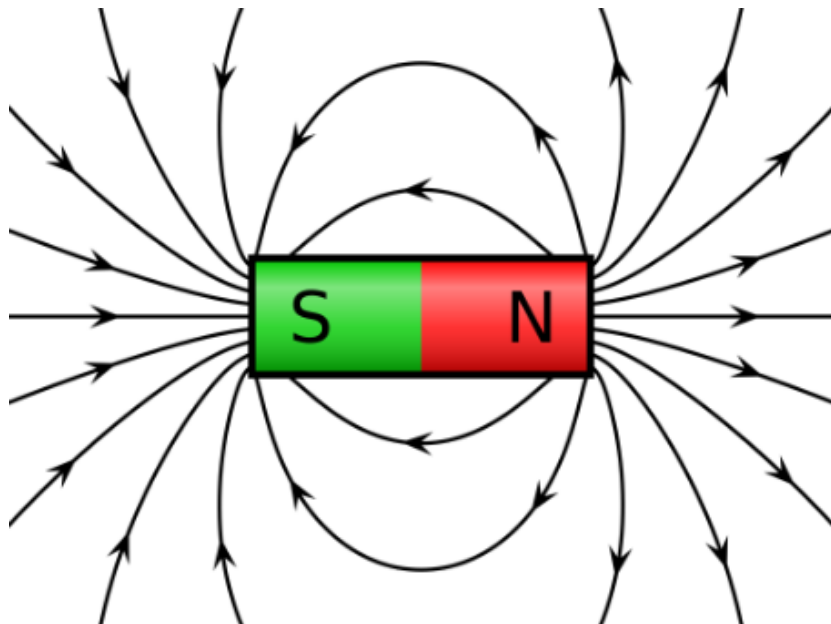
Magnetic Fields

Magnets are objects that produce something called a magnetic field. These fields can be used for different things, such as electronics, MRI machines, and more.



The Science Behind Magnets: <https://youtu.be/MZtTVsIOA9c>

Magnetic fields by themselves are invisible to the human eye.



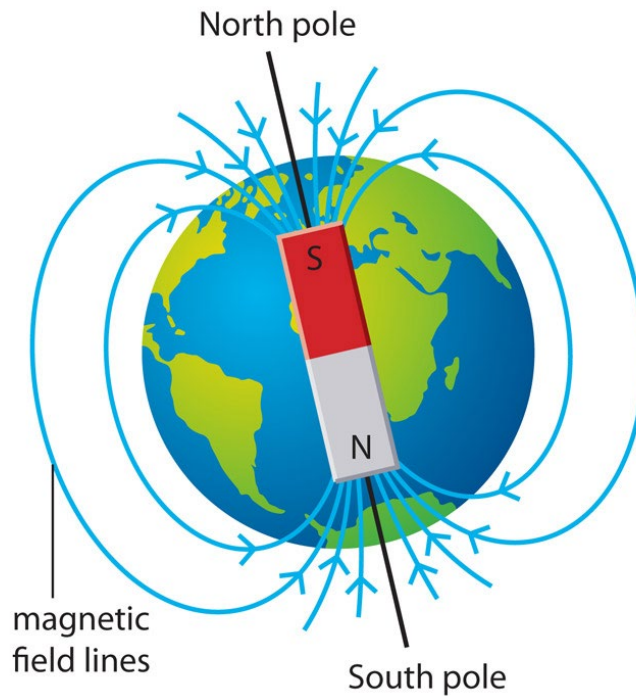
Magnetic fields are always shown as arrows **leaving the north pole** of a magnet and **entering the south pole** of the magnet.



What is the magnetic field?: <https://youtu.be/uj0DFDfQajw>

The Earth is a Magnet

Did you know? Our planet can be treated as one big magnet! At the center of the Earth spins the Earth's core. The core is made up of mostly iron. The outer portion of the core is liquid iron that spins and makes the earth into a giant magnet.



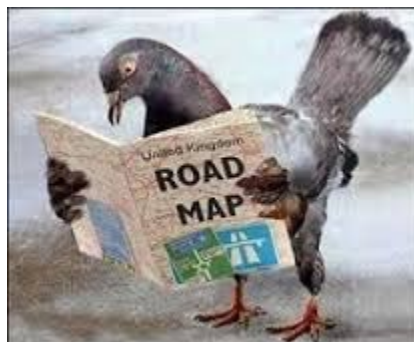
Take a look at the following video to see how the Earth's magnetic field and a compass interact.



How does a compass work?: <https://youtu.be/LroX6ThIDpw>

Built-In Compass

Some birds and whales use the Earth's magnetic field to find the right direction when migrating.



When people started to realize that neither magic nor watching stars were the way they did this, they started to look at how some animals have built-in magnetic sensors.



Animal Magnetism: <https://youtu.be/EbHSkZySTBw>

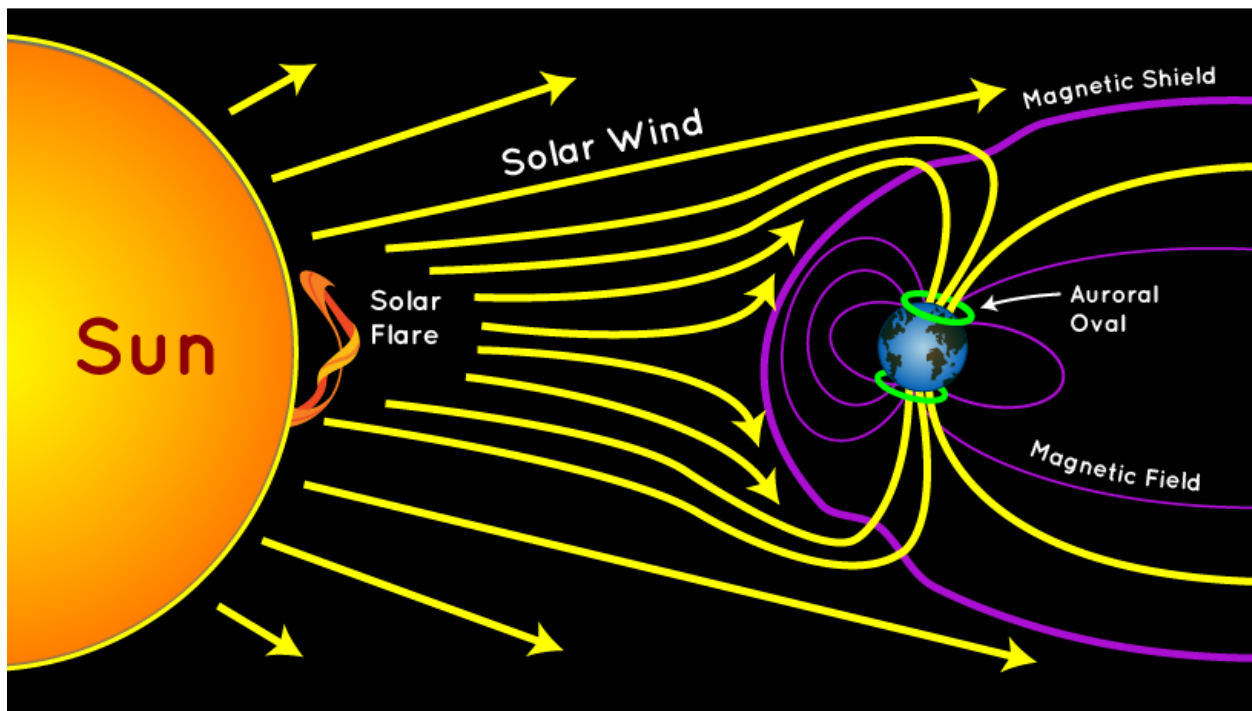
Magnetic Protection

Perhaps the most important feature of the Earth's magnetic field is that it protects us from the Sun's solar wind and radiation.



Why Earth's Magnetic Shield Matters: <https://youtu.be/XXFVpweCixY>

The sun is constantly throwing billions of particles our way, which we call the "solar wind". These particles then meet the Earth's magnetic field and some of the particles are pushed away from the Earth, while some are funneled onto the north or south magnetic pole.



When these particles come flying into the atmosphere at one of the poles, they smash into the gasses in the atmosphere, exciting them, and this excitement allows the gasses to release light! This light is the Aurora Borealis, or the Northern Lights.

Electromagnets

When current flows through any wire it makes a magnetic field around the wire. Usually, this magnetic field is very weak, so a single wire won't make a magnetic field strong enough to pick up metal objects.

Electromagnets are temporary and artificial magnets. They are magnets that are only magnetic when there is a coil of wire with electricity running through it. Electromagnets can also be used to make electricity. Movement of a magnet back and forth in front of the electromagnet will make an electric current.

For example, many generators use electromagnets in order to generate power and electricity.

Take a look at the video below to understand this concept further. It can be a bit tricky to wrap your brain around!



Electromagnets: <https://youtu.be/TTFIXmubvkQ>

World's Strongest Magnet

Here is a look at the world's strongest electromagnet!



Strongest Magnet in the World: https://youtu.be/QGytW_C6hR8

Thor's Hammer

Engineers use electromagnets to help make our lives safer and more convenient, as magnets are used in microwaves, motor vehicles, and technology like phones! That being said, sometimes it's just fun to play around with magnets in a creative way.



Real Mjölfnir: https://youtu.be/0_8Xhzt5YQI



Magnetism

1. You put a magnet close to an iron nail. Will the magnet attract the nail?

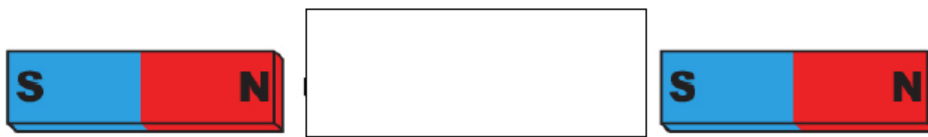
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2. **True or False:** All metals are attracted to magnets.

a. True

b. False

3. For the following magnets, indicate whether they will Attract each other or Repel each other.



4. Watch the video to answer the following questions. **Video 1:** Bill Nye Magnetism

What would happen if you cut a magnet in half? Would you get a magnet that is only north ended and one that is only south ended?

14. What are electromagnets?

15. True or False: The stronger the magnet, the larger the magnetic field

a. True

b. False

Reflect:

What are 5 things you could do to reduce electricity consumption within your home?