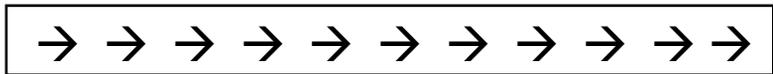
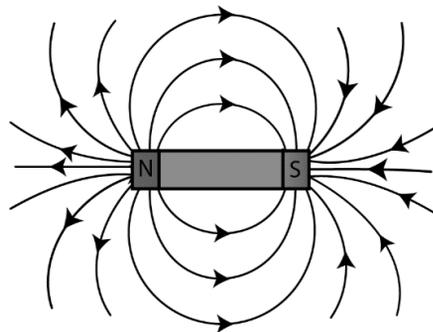


MAGNETISM

From your clothes to your desk to the very air you breathe, every bit of matter is made of tiny particles called **atoms**. Atoms have negatively charged **electrons** that spin around them. Most of the time, the electrons spin in random directions. When the electrons all spin in the same direction, though, they create an invisible force known as **magnetism**.



When an object is magnetic, it can pull materials with iron, cobalt or nickel to it. The two ends of a magnet are called the **north** and **south** poles. The poles are where magnets are strongest. Around these poles is an area known as a **magnetic field**. In the magnetic field, other objects can be drawn to the magnet.



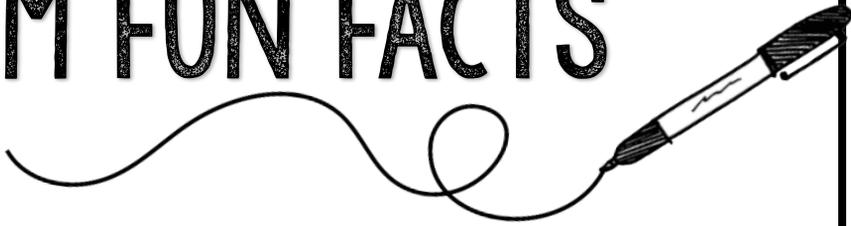
Since it's a force, magnetism cannot be seen; but the effects of magnetism can be felt. Have you ever played with a magnet? If so, you've probably felt a pushing or pulling force by the magnet. This push or pull that a magnet generates is a product of the **Law of Attraction**. The Law of Attraction states that two similar poles of a magnet (like two North Poles or two South Poles) will repel or push each other away. On the other hand, the Law of attraction also states that opposite poles (like a north and south pole) will attract or pull together.



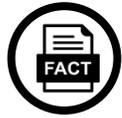
↓ ↑
ATTRACTION

← →
REPULSION

MAGNETISM FUN FACTS



- The Earth has a magnetic field (mainly due to its Iron core). The Earth's North and South poles are highly magnetic.



- A **compass** is a device that has a tiny magnet in it. This magnet aligns with Earth's North and South pole. This is how we determine direction.



- Magnets can also be created by using electricity. In 1820, Hans Christian Oersted realized that magnetism and electricity were related. This was a huge discovery that eventually led to the invention of the **electromagnet**. By wrapping a wire around an iron bar and running current through the wire, very strong magnets can be created. This is called electromagnetism. The magnetic field created by electromagnets can be used in a variety of applications. One of the most important is the electric motor.



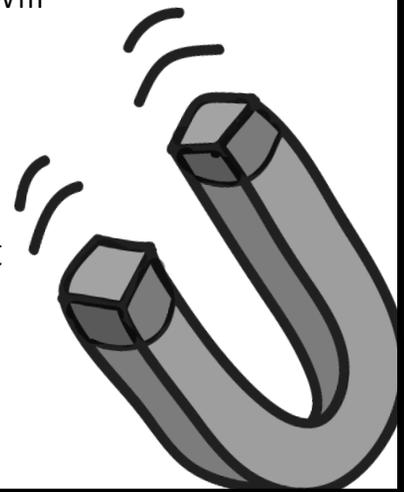
- Magnetic objects must be inside the magnetic field to respond, which is why you may have to move a magnet closer for it to have an effect.



- Magnets always have 2 poles- *North* and *South*. If you cut a magnet in half, two new magnets will be created, each with a North and South pole.



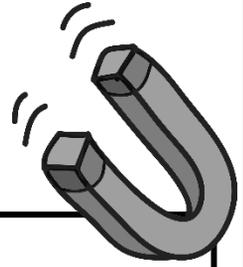
- Magnetism is not new; in fact, magnets have been around for a while. The Chinese are said to have used **lodestone**, a natural magnet 2,600 years ago. Furthermore, ancient mariners are said to have used lodestone to help them navigate their ships.



CHECK YOUR UNDERSTANDING

Directions:

1. Read the passage.
2. Use a highlighter to highlight key terms in the passage.
3. Complete the sections below:



Vocabulary Review:

Provide a definition for each term below:

Electrons: charged particles that spin around atoms

magnetism: the force resulting from electrons moving in the same direction

Magnetic field: the area around the poles of a magnet where objects are drawn towards to it

Law of Attraction: the law that states that two like poles will repel each other and two opposite poles will attract one another

Electromagnet: a invention where a wire with a current is wrapped around an iron object

Compass: a device used to show direction where a tiny magnet align with the north and south poles of Earth

Lodestone: a natural magnet that it is said that the Chinese used 2,600 years ago

Reading Comprehension:

Answer each question below:

- a. What happens when electrons all spin in the same direction? the force magnetism is formed
- b. What materials are magnetic? Iron, cobalt, and nickel
- c. On a magnet, where is magnetism the strongest? the north and south poles
- d. Predict what might happen when these two bar magnets get close to one another.



they will repel one another because they are like poles



CHECK YOUR UNDERSTANDING

e. Why is Earth considered a magnet?

because it's core is made of iron and there are two poles, the north and the south which are very magnetic

f. How does a compass tell direction?

because it has a small magnet where its poles are aligned with the earth's poles

g. Who was the first person to realize that electricity and magnetism were related?

Hans Oersted

h. What discovery came from the discovery of this relationship?

it came to the invention of the electromagnet

i. What is a real-life application of electromagnetism?

the electric motor

j. What happens if you cut a magnet in half?

it creates two magnets with two poles of its own

k. How did the ancient Chinese use magnets?

they used them to navigate their ships

Illustrate the magnetic field that would be present around this bar magnet.

