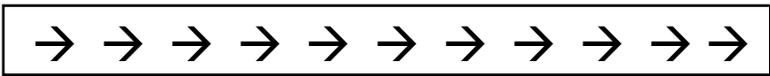
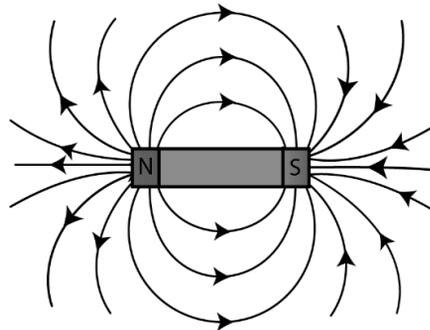


MAGNETISM

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**.



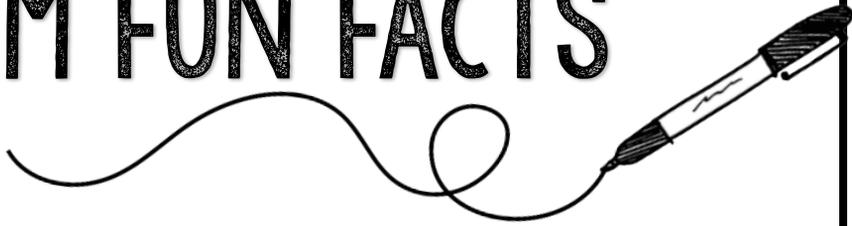
When an object is magnetic, it can pull materials with iron, cobalt or nickel to it. The two ends of a magnet are called the **north** and **south** poles. The poles are where magnets are strongest. Around these poles is an area known as a magnetic field. In the magnetic field, other objects can be drawn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



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.



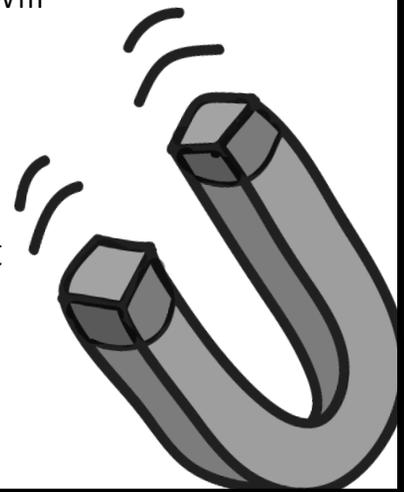
- Magnetic objects must be inside the magnetic field to respond, which is why you may have to move a magnet closer for it to have an effect.



- 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.



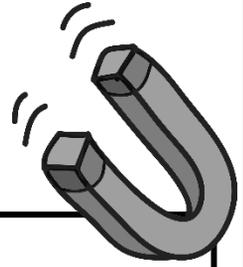
- Magnetism is not new; in fact, magnets have been around for a while. The Chinese are said to have used *lodestone*, a natural magnet 2,600 years ago. Furthermore, ancient mariners are said to have used lodestone to help them navigate their ships.



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:

magnetism:

Magnetic field:

Law of Attraction:

Electromagnet:

Compass:

Lodestone:

Reading Comprehension:

Answer each question below:

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

S	N	N	S
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CHECK YOUR UNDERSTANDING

e. Why is Earth considered a magnet?

f. How does a compass tell direction?

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

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

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

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

k. How did the ancient Chinese use magnets?

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

