KIPP Nashville AmplifyScience

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KIPP/2024/_____

Remote Learning Packet
Assignment #2

Review of Magnetic Fields and Electromagnetics

Directions: Try the first 3 problems to help you remember the concepts from our second unit.

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A force is a push or pull. Describe **two ways** a magnet can exert a force.

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Can magnets exert forces on things that **are not magnets**? Explain.

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If you have two magnetic train cars positioned like they are in the picture, what is most likely to happen? Why?

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Directions: Read and **Annotate** the following text to help you to review Magnetism.

Magnetism and Electromagnets

Two magnets can snap together and stick like glue or they can push away so that they do not touch. Certain objects push or pull on things because they are magnetic. Magnetism is another property of some kinds of matter.

A magnet has a north and south pole. The north pole of a magnet will attract the south pole of another magnet. The north pole of a magnet will repel the north pole of another magnet, and the south pole of a magnet will also repel the south pole of another magnet. In short, like poles repel, and unlike poles attract.

One kind of permanent magnet is called a bar magnet. The area surrounding a magnet is called its **magnetic field.** The magnetic field of a magnet is an invisible field which is created by its magnetism. The magnetic field travels in the direction from the north pole of a bar magnet to the south pole. To ancient people, magnetism probably seemed like magic. The force for magnets to attract or repel each other or to attract other objects is caused by moving electrons.

A magnet may also be used to convert an unmagnetized piece of magnetic material, such as an iron nail, into a magnet. This is done by rubbing it with the magnet. This is called magnetization. Magnets made this way are called temporary magnets because they eventually lose their magnetism. Another method in creating a temporary magnet is by using electricity. This can be done by wrapping an iron nail with a coil of wire. By passing electricity through the coil of wire the iron nail will become a temporary magnet or an **electromagnet**. The strength of the electromagnet depends on the **amount of the electric current** and the **number of times the coil is wrapped around the nail**. If the electricity stops flowing through the coil the nail will no longer be magnetic.

There are many uses for permanent magnets and temporary magnets like an electromagnet. Electric appliances with electric motors use magnets to turn electricity into motion. Other examples include electric toothbrushes, fans, lawnmowers, and anything else containing a motor. Magnets are used to hold doors closed, such as in refrigerators, kitchen cabinets and others.

Post Reading Questions:

1. In two magnets, facing the same poles together will cause the magnets to _____ and facing two opposite poles together will cause the magnets to _____.
2. How are electromagnets different from permanent magnets?

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3. How do you “turn off” an electromagnet?

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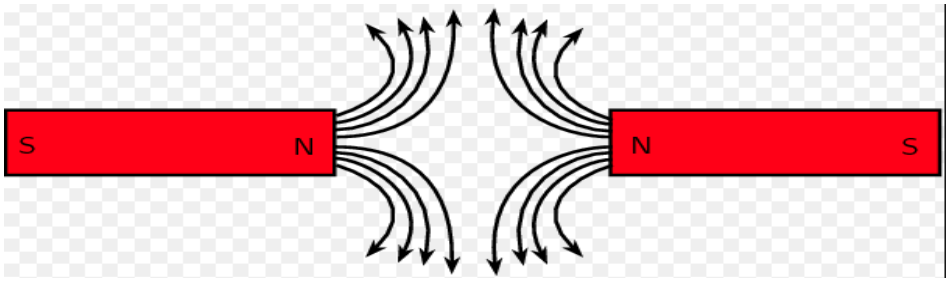
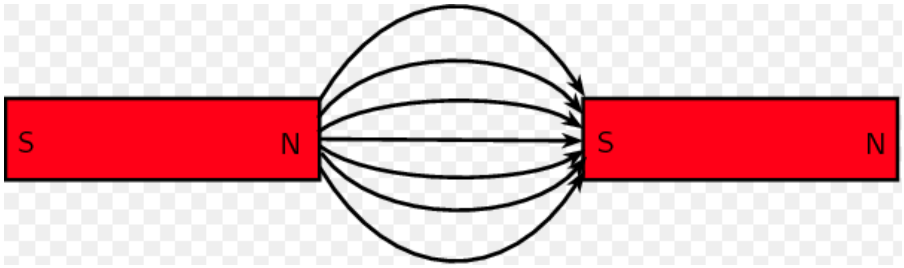
4. Two magnets are put very close to each other on a desk. What will happen next, why?



a. The magnets will move closer to each other because the magnetic force will pull the magnets together.
b. The magnets will not move because the magnets are not touching.
c. The magnets will move away from each other because the magnetic force will push the magnets apart.
d. The magnets will move away from each other because the magnets are not touching.

5. Two magnets are put very close to each other on a desk. What will happen next, why?



a. The magnets will move closer to each other because the magnetic force will pull the magnets together.
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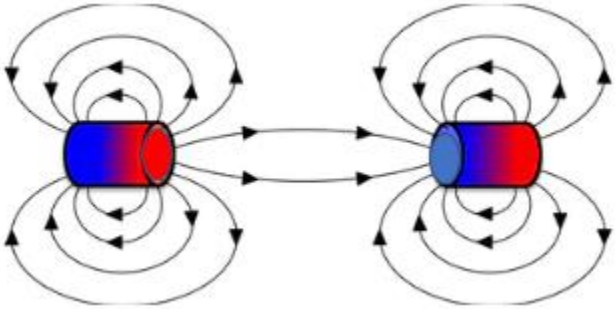
c. The magnets will move away from each other because the magnetic force will push the magnets apart.
d. The magnets will move away from each other because the magnets are not touching.

6. Magnetic field lines travel from _____
   a. north pole to south pole through the magnet
   b. In a circle around the entire magnet, while never touching the magnet
   c. South pole to north pole outside the magnet
   d. North pole to south pole outside the magnet

Independent Practice Problems

1. A student holds two iron magnets, one in each hand. The south pole of one magnet is pointed towards the south pole of the other magnet. As the magnets get closer to each other, they will…
    a. attract each other more strongly.
    b. attract each other more weakly.
    c. repel each other more strongly.
    d. repel each other more weakly.

2. Does the picture below represent a pair of attracting or repelling magnets? Use evidence from the field lines to support your answer.



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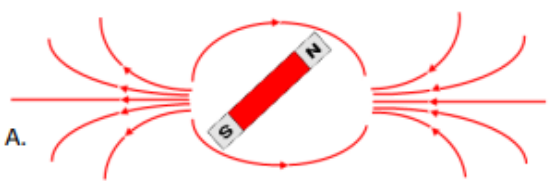
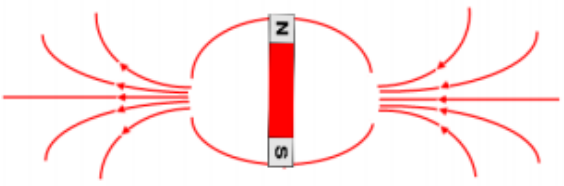
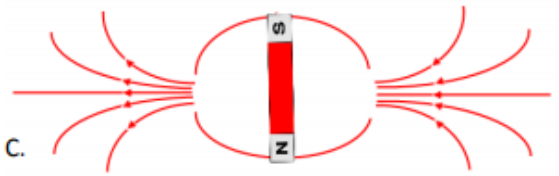
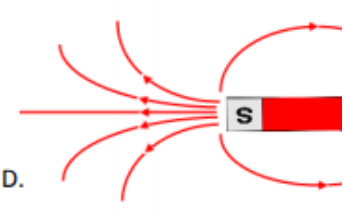
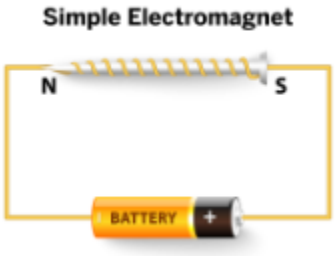
3. Which picture best represents how magnetic field lines look in a bar magnet?

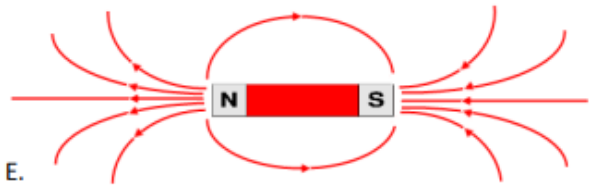












An electromagnet can be created using a battery, some wire, and an iron nail. The wire is coiled around the nail a bunch of times and then connected to a battery. When the electric current from the battery runs through the wire, suddenly the nail will repel or attract magnets.

1. Which of the following best describes an electromagnet?

    a. It is a magnet that produces electricity.
    b. It is a magnet produced by the magnetic fields of an electric current.
    c. It is a magnet that produces electric fields.
    d. It is electricity that has a magnetic field.

2. Which of the following actions will make an electromagnet stronger?
    a. Wrap the wire carrying the current around a pencil.
    b. Make fewer loops with the wire carrying the current.
    c. Make more loops with the wire carrying the current.
    d. Decrease the current through the wire.

3. Which electromagnet is strongest?

Support your answer with 2 pieces of evidence from the picture above and the article on page 2 of this packet.

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- ❏ Claim
- ❏ Evidence
- ❏ Reasoning