Electromagnets Review

Part 1: Read the following paragraphs and answer the questions about electromagnets.

An **electromagnet** is a solenoid wrapped around a bar of iron or other ferromagnetic material. A solenoid is a coil of wire with electric current flowing through it. This gives the coil north and south magnetic poles and a magnetic field. The magnetic field of the solenoid magnetizes the iron bar by aligning its magnetic domains. You can see this in the diagram below. The combined magnetic force of the magnetized wire coil and iron bar makes an electromagnet very strong. Simple electromagnets are made up of an iron nail, wire, and a battery. You can add a switch to it as well.

1. **What is an electromagnet?** _____

_____

2. **What do you need to make an electromagnet?** _____

_____

Ways to strengthen an electromagnet: Electromagnets are the strongest magnets made. An electromagnet can be made stronger first, if there are more turns in the coil of wire, 2nd there is more current flowing through it, and 3rd if there is a larger voltage source. A bigger bar or one made of material that is easier to magnetize also increases an electromagnet's strength.

2. **How could you increase the strength of an electromagnet?** _____

_____

_____

3. **How could you decrease the strength of an electromagnet?** _____

_____

_____

Easily turn them off and on: Besides their strength, another pro of electromagnets is the ability to control them by controlling the electric current. Turning the current on or off turns the magnetic field on or off. The amount of current flowing through the coil can also be changed to control the strength of the electromagnet. This is one huge difference between electromagnets and permanent magnets. You can not turn permanent magnets on and off, but you can turn electromagnets on and off.

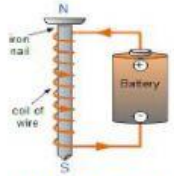
4. **What is one thing that you can do with an electromagnet that you cannot do with a permanent magnet?** _____

_____

Examples of electromagnets and their uses: Some electromagnet uses in the home include an electric fan, electric doorbell, induction cooker, magnetic locks, etc. In an electric fan, the electromagnetic induction keeps the motor rotating on and on making the blade of the fan to rotate. Other examples of electromagnets and their uses include motors, generators, transformers, loudspeakers, headphones, MRI machines,

5. **What are three uses of electromagnets?** _____

_____



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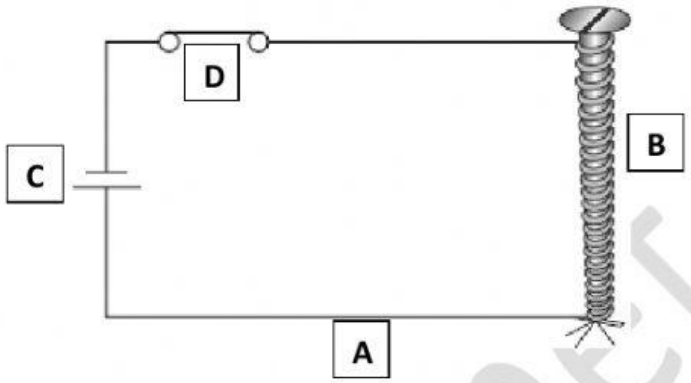
Part 2: Parts of an electromagnet. Write or drag and drop the parts of the electromagnet where they go on the diagram.

Iron nail
Wire
Battery/voltage source
Switch



Part 3. Answer the following questions based upon your acquired knowledge of electromagnets from the review above.

6. Select ALL of the following that would increase the strength of an electromagnet. (3 choices)

A. Shortening the iron nail

B. increasing the number of coils of wire

C. Adding more voltage

D. Increasing the current

7. Which of the following is NOT part of an electromagnet?

A. wire B. nail C. battery D. needle

8. Which appliance does NOT use an electromagnet?

A. telephone B. radio C. broom D. television

9. How are electromagnets different from magnets?

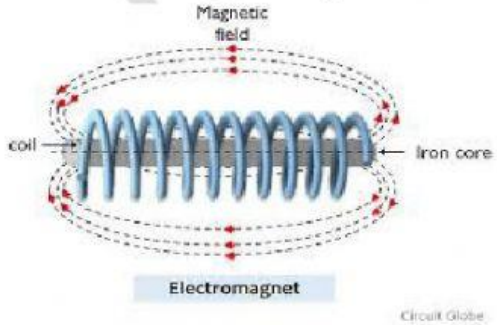
A. Magnets can be turned on/off.

B. You can turn an electromagnet on/off.

C. Magnets are more powerful.

D. Magnets have a north and south pole.

10. What is created when you run electric current through an electromagnet?



a. gamma radiation field

b. nuclear field

c. magnetic field

D. positive and negative protons

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