S8P5.c I can plan and carry out investigations to identify the factors (e.g., distance between objects, magnetic force produced by an electromagnet with varying number of wire turns, varying number or size of dry cells, and varying size of iron core) that affect the strength of electric and magnetic forces. (Including, but not limited to, generators or motors.)

**8th Grade Physical Science Review: Factors that affect Electromagnets Review – Match the following words with their correct description.**

| | | | |
|---|---|---|---|
| **Electromagnet** | **Electric generator** | **Motor** | **Dry cell** |
| **Iron core** | **Electric force** | **Magnetic force** | **Solenoid** |

1. _____ device that converts mechanical energy into electrical energy.

2. _____ a type of electric battery that uses an electrolyte in the form of a paste that does not leak; commonly used for portable electrical devices.

3. _____ created when a wire is coiled and an electric current flows through it.

4. _____ repulsive or attractive interaction between any two charged bodies.

5. _____ a metal core that acquires magnetic properties only when an electric current flows through the solenoid and loses the magnetic properties as soon as the current is switched off.

6. _____ a coil of wire commonly wrapped in the form of a long cylinder that when carrying a current acts as a magnet.

7. _____ a device used to convert electricity into mechanical energy.

8. _____ attraction or repulsion that arises between electrically charged particles because of their motion.

**Use the following words to complete the cloze read below.**

| | | | | |
|---|---|---|---|---|
| **Temporary** | **Electromagnet** | **Switch** | **Coiled** | **Electrical** |
| **Charges** | **Increase** | **Electric** | **Metal** | **Magnetic field** |

An _____ is created when a wire is _____ and an _____ current flows through it. Generally, electromagnets have a _____ core that helps to _____ the strength of the electromagnet. Magnetic force is created by the movement of _____ charges through a wire. A _____ is created around the wire, and this magnetic field lines up the domains in the core, turning the core into a _____ magnet. When the electric current is turned off, the _____ field quickly fades. An electromagnet can be made using a circuit with a battery, a _____, and wire wrapped around a nail.

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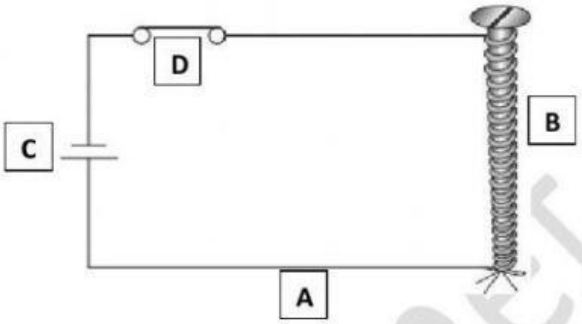
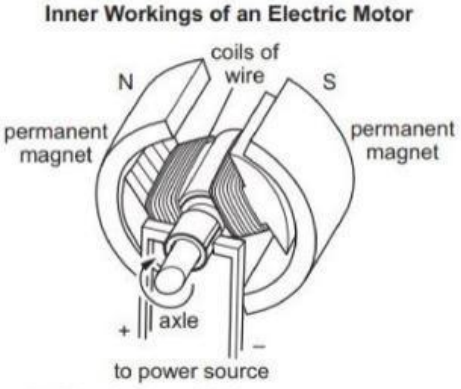
**Parts of an Electromagnet: Write or drag and drop the parts of the electromagnet where they go on the diagram.**

| |
|---|
| **Switch** |
| **Battery/voltage source** |
| **Iron nail** |
| **Wire** |



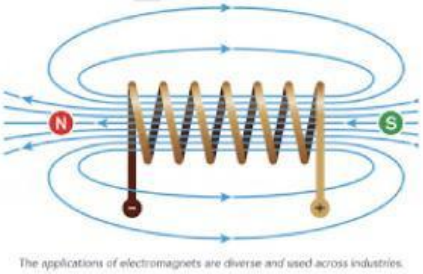

**9. A group of students is investigating the different factors that affect the strength of an electric motor. A diagram of the motor is shown.**




**What step should the students take next in the investigation to increase the strength of the motor?**

A. Decrease the number of coils of wire within the two sections of the motor.
B. Place the permanent magnets and coils of wire farther apart inside the motor.
C. Increase the number of coils of wire within the two sections of the motor.
D. Decrease the voltage of the power source being used to operate the motor.

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




a. gamma radiation field
b. magnetic field
c. atomic radiation field
d. nuclear field

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**11. The picture shows an electromagnet attracting some nails that are the same size and are made of the same materials as the four nails out of the box on the table.**

**Which is the MOST LIKELY reason that the other nails do not move closer to the electromagnet?**

A. The nails on the table are not magnetic like the nails attracted to the electromagnet.
B. The nails on the table are not light enough to be pulled by the electromagnet.
C. The nails on the table are being repelled by the electromagnet.
D. The nails on the table are outside of the magnetic field produced by the nails attracted to the electromagnet.

**12. A student builds a simple electromagnet with copper wire, an iron bolt, and 3-volt battery. The electromagnet was able to lift 3 paper clips from 3 centimeters away. Select THREE ways the student can increase the strength of their electromagnet.**

A. They can reverse the orientation of the battery.
B. They can use a thicker piece of copper wire.
C. They can replace the iron bolt with a plastic rod.
D. They can replace the 3-volt battery with a battery of higher voltage.
E. They can add a switch between the battery and the iron bolt.
F. They can use a longer piece of wire that wraps more times around the bolt producing more coils.

**Put 3 factors that will increase and decrease the strength of electromagnets in the table below.**

| Increase strength of Electromagnets | Decrease Strength of Electromagnets |
|---|---|
| | |
| | |
| | |

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