

Electricity and Magnetism
4th Grade Science Study Guide

Name _____

Test Date: **Thursday, January 12th**

Parent Signature _____

SOL 4.3 The student will investigate and understand the characteristics of electricity. Key concepts include

- a) conductors and insulators;
- b) basic circuits (open/closed, parallel/series);
- c) static electricity;
- d) the ability of electrical energy to be transformed into heat, light, and mechanical energy;
- e) simple electromagnets and magnetism; and
- f) historical contributions in understanding electricity.

Magnet Vocabulary:

Magnetic Field – the invisible force around a magnet.

Electromagnet - a device consisting of an iron or steel core that is magnetized by electric current in a coil that surrounds it.

Repel – to push away. Magnets with the same poles facing each other will repel.

Attract – to bring together. Magnets with opposite poles will attract to each other.

Poles- where the magnetic field on a magnet is the strongest.

Electricity Vocabulary:

Amperes- the flow of electricity is measured in this.

Insulators- do not allow electricity to flow easily through them.

Conductors – allow electricity to flow through them easily.

Circuit – the path in which electricity is allowed to travel.

Be able to recognize and draw an **open, closed, parallel and series circuit**

Static Electricity – an electric charge that builds up on the surface of an object.

Magnets- are materials that will attract objects made of certain metals such as iron, steel, cobalt, and nickel.

Voltage – moves electricity along wires.

People to Know:

Benjamin Franklin – conducted a famous experiment with a kite and a key during a thunderstorm. Proved that lightning was electrical current in nature. Also invented the lightning rod.

Michael Faraday – his experiments with creating electrical charge using a magnet and wire are used in electric motors today.

Thomas Edison – invented the “incandescent lamp” also known as the light bulb. Also helped to plan the construction of electrical power plants so homes and businesses could receive electricity.

Magnet Questions:

4.3e

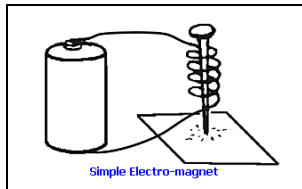
1. Which of the following can you pick up with a magnet?

- A** rubber tire patch
- B** a paper clip
- C** a wooden pencil
- D** work gloves

4.3e

2. When you have a wire wrapped around a magnet is an example of a/an —

- A** parallel circuit.
- B** electromagnet.
- C** open circuit.
- D** series circuit.



4.3e

3. The area called the _____ on a magnet have the strongest magnetic force —

- A** regions
- B** flux
- C** repulsive area
- D** poles

Electricity Questions:

4.3a

4. Which of these is not a conductors?

- A** copper
- B** plastic
- C** water
- D** the human body

4.3b

5. Which type of electrical circuit results when this object is screwed in?

- A** an open circuit
- B** a closed circuit
- C** a parallel circuit
- D** a series circuit



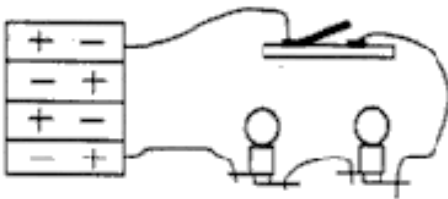
4.3c

6. How is static electricity formed?

- A** Electrical charges build up on the surface of a material.
- B** Electrical charges are collected from the air.
- C** Electrical charges are flowing through the materials.
- D** Electrical charges build up in the air and then flow into an object.

4.3b

7. This circuit, using 2 bulbs, 4 batteries, and a switch, is wired so that when you unscrew one bulb, the other one goes out. This circuit is a —



- A** series circuit.
- B** parallel circuit.
- C** circuit condition.
- D** switch circuit.

4.3c

8. How does static electricity occur *in nature*?

- A** During a rain
- B** during thunderstorms
- C** while your clothes are drying in a dryer
- D** by rubbing a balloon with water.

4.3f

9. Ben Franklin suspected that lightning was —

- A** an electromagnet in nature.
- B** an electrical current in nature.
- C** a freak occurrence in nature.
- D** not important in nature.

4.3b

10. The *flow* of electricity is measured in —

- A** amperes (amps).
- B** volts.
- C** watts.
- D** ohms.