

Science SOL 5.4 – Electricity

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When you pull a wool sweater off your head really fast, your hair might stand up and look funny. Or, if you rub your feet on the carpet and then touch a metal doorknob, you might feel a little shock or see a tiny spark. Why does this happen? It's because of static electricity!

Static electricity happens when tiny, negatively charged particles move from one thing to another. For example, when you take off your sweater quickly or drag your feet on the carpet, your body can pick up extra particles. When you touch something metal,

like a doorknob, those extra particles jump off your finger as a spark!



- Which of the following can create static electricity?
 - Taking a bath
 - Plugging a power cord into the wall outlet.
 - Rubbing feet on the carpet.
- What might cause foam squares to stick to this cat?
 - glue
 - magnetism
 - static electricity
- Sometimes clothes from the dryer will cling to you. Why?
 - Magnetism
 - Static electricity
 - Resistance



Lightning is caused by static electricity. Friction in the clouds can cause the bottom of a cloud to become negatively charged. A big spark of lightning can “jump” between the negatively charged cloud and the positively charged ground.



- Which of the pictures above shows static electricity?
 - The spark jumping off the finger
 - The lightning
 - Both

Electric current helps power lots of things in our homes, like lights, TVs, and computers. Current electricity happens when electricity flows through a wire.

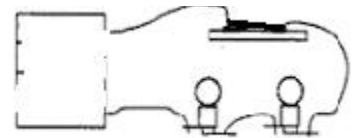
Most appliances in your home need current electricity to flow through a complete path, called a **circuit**, to work. If the circuit is **open**, meaning there's a break in the path, the electricity can't flow, and the appliance won't work. If the circuit is **closed**, meaning there are no breaks, the electricity flows, and the appliance works!

- A(n) _____ will allow the flow of electricity.
 - open circuit
 - closed circuit

- The diagram shows a(n)
 - closed circuit
 - open circuit



- The diagram shows a(n)
 - closed circuit
 - open circuit



- Which will cause electric lights to turn on?
 - an open circuit
 - a closed circuit
- An electric current can only flow through a circuit that is
 - open
 - magnetic
 - closed
 - charged
- _____ is the continuous flow of electrons through a conductor.
 - Static electricity
 - Electric current
 - Mechanical energy

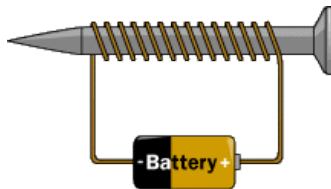
Materials that conduct electricity do so because they allow the flow of negatively charged particles. These materials are called **conductors**. Metals like copper are excellent conductors.

Insulators do not allow the flow of negatively charged particles and therefore do not conduct electricity. Rubber and plastic are good insulators.

- Which of these materials is the best conductor of electricity?
 - Dirt
 - Copper wire
 - A wool sweater
 - Leather

- Air, rubber, glass, and plastic are good
 - conductors
 - magnets
 - insulators
 - circuits

13. Many metals, especially copper and aluminum, are good:
- conductors
 - generators
 - insulators
 - circuits
14. Which of the following are good conductors of electricity?
- | | |
|-------------|------------|
| a. Cotton | f. Glass |
| b. Paper | g. Plastic |
| c. Steel | h. Copper |
| d. Rubber | i. Iron |
| e. Aluminum | |
15. Most wires are coated with plastic because:
- plastic is a good conductor of electricity
 - plastic is a good insulator
16. Which of the following is **not** a source of electricity?
- A wire
 - A battery
 - An outlet
17. Any path along which electricity can flow is an:
- electric outlet
 - electric circuit
18. Magnets can be made by wrapping wire around a metal rod and running electric current through the wire. These magnets are called:
- electromagnets
 - permanent magnets
19. Electromagnets are considered temporary magnets because:
- they can be turned on and off by controlling the flow of electricity
 - they can be easily destroyed
20. Which statement about electromagnets is false?
- They can easily be turned on and off
 - They are used frequently in the home appliances
 - They are weak magnets
21. Adding more coils to this electromagnet will:
- do nothing
 - make the magnet weaker
 - make the magnet stronger



- Use a stronger battery
- Wrap more coils around the nail
- Use a thicker nail or thicker wire

FORCES (5.2 REVIEW)

23. A force that slows or stops a moving object is:
- inertia
 - speed
 - friction
24. What type of surface causes the most friction?
- Smooth
 - Rough
 - Icy
25. A push or a pull is _____ that will cause an object to move.
- a force
 - friction
 - energy
26. A force can change the motion of an object by: (circle all correct answers)
- making it go faster or slower
 - starting or stopping it
 - changing its direction
27. Objects with more ____ are harder to move (require a stronger force).
- volume
 - size
 - mass
28. Massive objects: (circle all correct)
- are hard to set in motion
 - are hard to stop
29. How far an object moves within a certain period of time is:
- inertia
 - friction
 - speed
 - gravity