

**Science 10-Electricity & Magnetism**

**Activity 13—Household Circuits and Power Transmission**



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**10**

Name \_\_\_\_\_

Due Date \_\_\_\_\_

Show Me  Hand In

*Correct and Hand In Again By* \_\_\_\_\_

1. Current which keeps on reversing it's direction is called \_\_\_\_\_  
\_\_\_\_\_ or abbreviated \_\_\_\_\_.
2. The number of cycles per second in alternating current is called the \_\_\_\_\_ and it is measured in units called \_\_\_\_\_ abbreviated \_\_\_\_\_.
3. Household circuits in North America have a frequency of \_\_\_\_\_ Hz.
4. There are three wires coming into your house. Two are called \_\_\_\_\_ and the other one is called neutral. The difference in potential between:
  - A hot wire and the neutral is \_\_\_\_\_ volts
  - Two hot wires is ..... \_\_\_\_\_ volts
  - Between the neutral & the ground is \_\_\_\_\_ volts
5. What is the main function of the service panel in your home?
6. In your home, the electric meter is usually on the (*outside/inside*) \_\_\_\_\_ while the service panel is on the (*outside/inside*) \_\_\_\_\_.
7. What are **branch circuits**?
8. All branch circuits are connected to the main supply wires by \_\_\_\_\_  
\_\_\_\_\_ in the service panel.

9. Which circuit breaker controls the main power supply to the whole house? \_\_\_\_\_
10. What happens to a circuit breaker if there is too much current in a circuit?
11. What is the difference between an **overload** and a **short circuit**?
12. Draw a simple diagram of a circuit breaker like the one on page 101. Explain using the bimetallic strip, how this device cuts off the circuit when there is too much current.
13. Most 120 volt circuits have a \_\_\_\_A breaker except those intended for electric motors. These could have a \_\_\_\_ A breaker. 240 volt circuits have a \_\_\_\_\_ breaker and typically have a breaker of about \_\_\_\_ A. In circuits designed to carry more current, the wires must be \_\_\_\_\_ than in circuits with less current. If too much current passes through too small a wire, what could happen? \_\_\_\_\_  
\_\_\_\_\_
14. What happens to a fuse if too much current passes through it? \_\_\_\_\_  
\_\_\_\_\_ What happens to the circuit after this happens? \_\_\_\_\_.
15. What problem could result if a fuse or a breaker is replaced by one with a higher rating (eg. a 15 A fuse or breaker is replaced by a 30 A fuse or breaker.)?
16. In a normal 120 V household circuit, one wire is \_\_\_\_\_ and the other is neutral.
17. Devices in a household circuit are connected in (*series or parallel*) \_\_\_\_\_
18. In a **polarized** plug, the narrow prong is connected to the (*hot or ground*) \_\_\_\_\_ wire.

19. A polarized plug is made so that the center of the “screw in” part of a light bulb is connected to the (*hot or ground*) \_\_\_\_\_ wire. Why is this?
20. The outside of metal appliances is always connected to a wire which is directly connected to the \_\_\_\_\_. If a hot wire accidentally touches the outside of a grounded appliance, what will happen? \_\_\_\_\_  
 \_\_\_\_\_  
 What could happen if the appliance was not grounded and you touched it?
21. The ground wire is attached to which prong in a 3-prong plug, the wide one, the narrow one or the round one? \_\_\_\_\_. Should you ever cut the round prong off of a plug-in so it will fit in a socket made for only two prongs? \_\_\_\_\_ Explain why not.
22. What does GFCI stand for? \_\_\_\_\_  
 How is this better than a normal breaker?  
 Where are GFCI circuits found?

**Now Go to Page 124 of Science Probe Text and answer the following:**

23. Lines that carry electricity to homes and buildings etc. are called \_\_\_\_\_  
 \_\_\_\_\_.
24. Transmission lines have very (high/low) \_\_\_\_\_ voltages and relatively (high/low) \_\_\_\_\_ currents. Voltages are typically \_\_\_\_\_ to \_\_\_\_\_ volts.
25. Give the reason for the high voltage and low current. \_\_\_\_\_  
 \_\_\_\_\_
26. 1 kV = \_\_\_\_\_ volts and 1 MW = \_\_\_\_\_ W
27. If you touched a 500 kV ( \_\_\_\_\_ V) transmission line (don't try it!) and your resistance is 500 000  $\Omega$ , how much current would go through your body? \_\_\_\_\_ A.

What 2 effects would this current have? \_\_\_\_\_

\_\_\_\_\_

28. The picture on the bottom of page 128 is a \_\_\_\_\_ station. Here, devices called \_\_\_\_\_ lower the voltage and \_\_\_\_\_ the current, so the power ( $P = I \times V$ ) remains the same. Some energy is transformed into \_\_\_\_\_ in these devices.

29. Will transformers work with DC current? \_\_\_\_\_ What about AC? \_\_\_\_\_

30. At distribution stations, 60 kV to 138 kV is lowered to \_\_\_\_\_ kV and transported around cities and towns.

31. Before coming into your home, the voltage is lowered to \_\_\_\_\_ V by a \_\_\_\_\_ either located on power poles or on the ground in a metal box.

32. Why are the towers for high voltage transmission lines so high? \_\_\_\_\_

\_\_\_\_\_

33. Why aren't birds electrocuted when they sit on power lines? \_\_\_\_\_

\_\_\_\_\_

34. What is a "Step-Up" Transformer? \_\_\_\_\_

\_\_\_\_\_

Where is it used in power transmission? \_\_\_\_\_

\_\_\_\_\_

35. What is a "Step-Down" Transformer?

\_\_\_\_\_

\_\_\_\_\_

Where is it used in power transmission? \_\_\_\_\_

\_\_\_\_\_