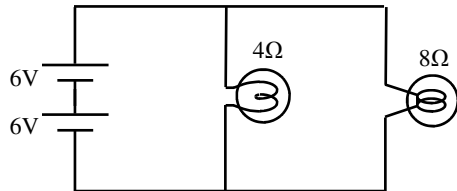


1. Two light bulbs are in the circuit shown.
  - A. Are they in parallel or series?
  - B. What is the current flowing thru each bulb?
  - C. Calculate the voltage used by each.
  - D. Which light bulb has the most current?
  - E. Calculate the power used by each.
- F. Since brightness is about power, which bulb is brighter?

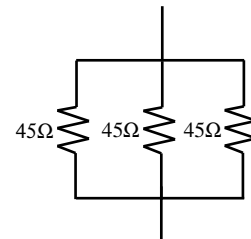
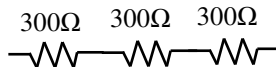


2. Two light bulbs are in the circuit shown.
  - A. Are they in parallel or series?
  - B. What is the voltage across each bulb?
  - C. Which light bulb has the most current?
  - D. Calculate the power used by each.
- E. Since brightness is about power, which bulb is brighter?

3. A. Two light bulbs of different resistance are in series, which one is brighter?  
 B. Why? (*Talk about current and voltage.*)

4. A. Two light bulbs of different resistance are in parallel, which one is brighter?  
 B. Why?

5. For the two diagrams decide if the resistors are in parallel or in series and find their equivalent resistance (total resistance).

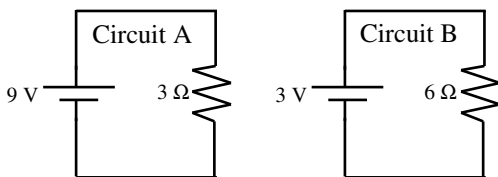
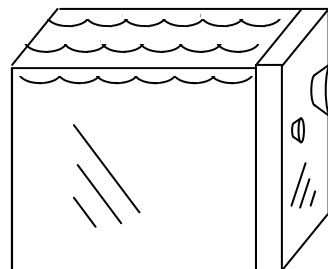


6. Increases or decreases?
  - A. The total resistance if in series.
  - B. The total resistance if in parallel.

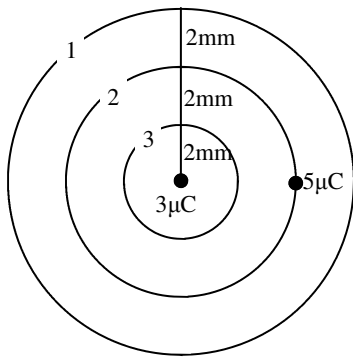
A. Parallel or series?  
 $R_{\text{total}} = \underline{\hspace{2cm}}$

B. Parallel or series?  
 $R_{\text{total}} = \underline{\hspace{2cm}}$

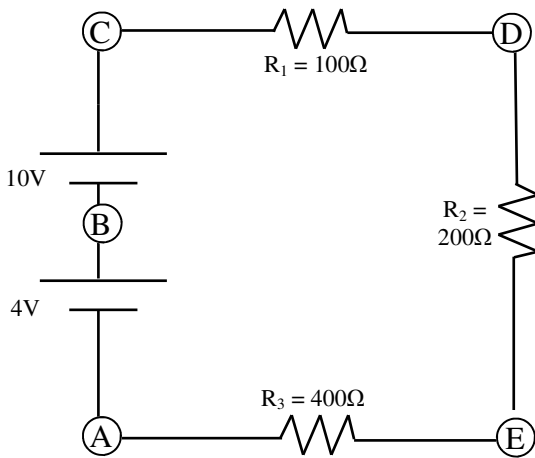
7. A water tank has two holes in it: one large; one small.
  - A. Which one has the greatest resistance?
  - B. Are they in parallel or in series?
  - C. Which one can release a gallon of water?
  - D. Which one has more current?
  - E. True or false: the one with more current can release more water.



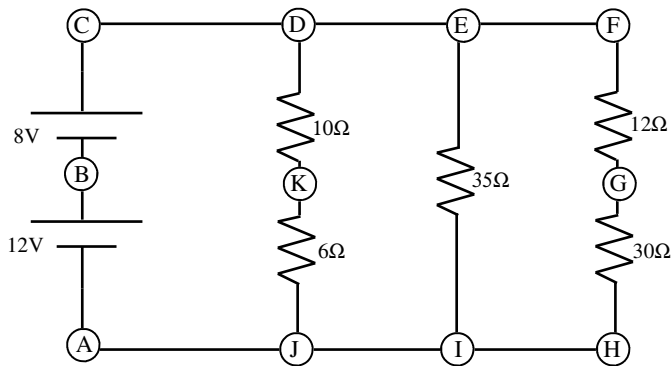
8. (*Using the same logic.*)
  - A. What is the current in circuit A?
  - B. What is the current in circuit B?
  - C. Which one moves more current thru the resistor?
  - D. Which one moves more electrons (more charge)?



9. Two charges are separated by 4mm.
- To make the force between them 4 times as strong, to which circle would you move the  $5\mu\text{C}$  charge?
  - What is the force between them where they are right now?
  - How many electrons has the  $5\mu\text{C}$  charge gained or lost?



10. Use the circuit at the left to answer the following:
- Calculate the total current.
  - How much voltage does the  $200\Omega$  resistor use?
  - How much voltage does the  $400\Omega$  resistor use?
  - How do these voltages compare?
  - What much power does the circuit use?



11. Use the circuit at the left to answer the following:
- Calculate the total current flowing thru the batteries.
  - Calculate the total resistance of the circuit.
  - $V_{C \text{ to } F} =$
  - $V_{H \text{ to } B} =$
  - Total power =

**Plants—**

Autotrophic—make their own food (glucose) thru photosynthesis:  $\text{CO}_2 + \text{H}_2\text{O} + \text{energy} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$   
Photosynthesis occurs in the plant cells in the chloroplast organelle.

**Plant structures—**

**Leaves**—absorb sunlight. Bigger leaves = more absorption. Have a waxy coating (cuticle) to reduce water loss.

Leaves have stoma/ stomata on underside of leaves—opening that lets in  $\text{CO}_2$  and lets out  $\text{O}_2$ .

Stomas open if there is enough water in the plant and close if there is not enough water, to protect against more water loss.

**Stems**—support structure (cell wall) and for veins (circulation) for moving water and nutrients around.

**Phloem** (flow-em) - moves sugars down (“flows low” or “flows food”).

**Xylem**—draws water up (“xy—high”).

Allow **Transpiration**—water is pulled up thru plant (called “capillary action” - water sticking to itself, like a straw). This water “chaining” pulls water up from the roots, which pull in water by **osmosis**.

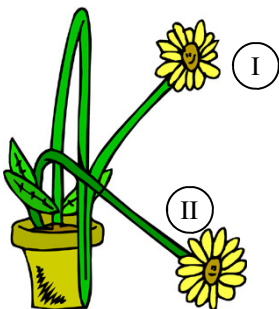
**Roots**—draw up water and dissolved nutrients from the ground.

Fibrous root—spreads out like spider webs. Holds top soil.

Tap root—goes down deep (like a carrot), searching for water.

**Wilting**—when plants don’t have enough water. Water give **turgor pressure** (like a balloon). When plants don’t have enough water they wilt, lose turgor pressure and become **flaccid** (limp).

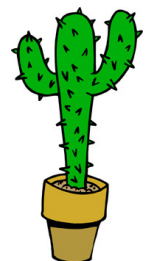
12. All plants make their own food, so plants are called \_\_\_\_\_.
13. Where do plants get their energy?
14. What is glucose?
15. Where is glucose produced in a plant cell?
16. If plants make their own food (glucose), where do plants use glucose?
17. The process of water evaporating from leaves and pulling more water up thru the plant is called:
18. Leaves, Stems, or Roots?
  - A. \_\_\_\_\_ Absorbs water thru osmosis.
  - B. \_\_\_\_\_ Pulls water up to the leaves.
  - C. \_\_\_\_\_ Has stomas.
  - D. \_\_\_\_\_ Supports the plant, like a skeleton.
  - E. \_\_\_\_\_ Helps keep land from eroding.
  - F. \_\_\_\_\_ Have waxy coating (called the \_\_\_\_\_).
19. The \_\_\_\_\_ transports water up the plant, while the \_\_\_\_\_ transports glucose back down.



20. Flower I or Flower II?

- A. \_\_\_\_\_ Is wilting.
- B. \_\_\_\_\_ Has sufficient water.
- C. \_\_\_\_\_ Is flaccid.
- D. \_\_\_\_\_ Has less turgor pressure.
- E. \_\_\_\_\_ Is probably closing its stomas.
- F. \_\_\_\_\_ Will be drawing water up thru its roots.

21. Cacti grow in harsh desert environments, where there is a lack of \_\_\_\_\_. This is why cacti grow slowly and must defend themselves from consumers. For this defense, the leaves of cacti have evolved into small, sharp n \_\_\_\_\_. These are not green, so they do not have c \_\_\_\_\_. To make food, p \_\_\_\_\_ occurs in a cacti’s green stem. Also to retain moisture cacti stems have a very waxy, called the c \_\_\_\_\_. The stems also act like plant leaves by having the s \_\_\_\_\_.



22. Why do cacti only open their stomas at night?