B-day: Due Thurs., April 15
A-day: Due Fri., April 16

2009-10 Light 2

From the "Light" notes:

1. What part of the electromagnetic spectrum:
   A. Has the least amount of energy?
   B. Has the shortest wavelength?
   C. Has the fastest speed?
2. What is the speed of x-rays? Radio wave?
3. Both x-rays and radio waves are examples of what?
4. If the moon is approximately 384,000,000 m from the earth, how long did it take the radio signals from the Apollo moon lander to reach the earth?

1 MHz = 1×10^{6} Hz
So, 45 MHz = 45×10^{6} Hz

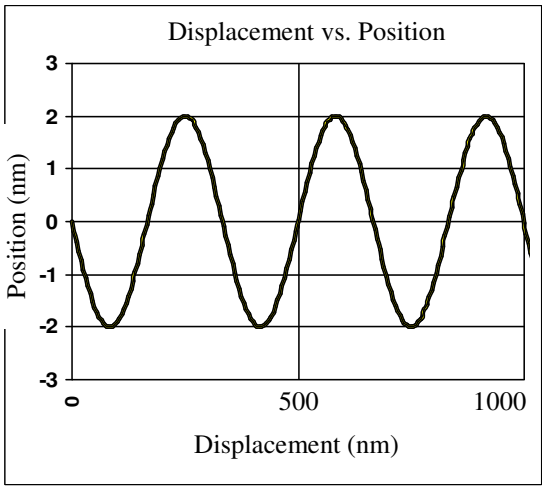
1 nm = 1×10^{-9} m
So, 340 nm = 340×10^{-9} m

5. FM radiowaves have a frequency of 101 MHz.
   A. Convert MHz to Hz (*see info at right*).
   B. Calculate the wavelength.

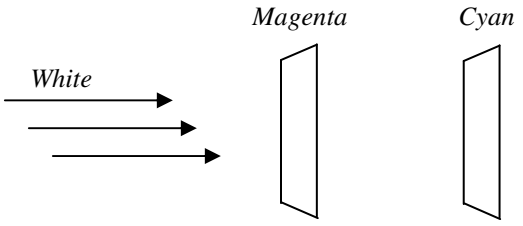
6. What is the frequency of yellow-green light that has a 560 nm wavelength?
   A. Convert wavelength to meter.
   B. Calculate the frequency.

7. Use the graph at the right to answer the following.
   A. How many wavelengths are shown on the graph? ____λ
   B. How long is the graph (*notice units*).
   C. Set your answers in A and B equal to each other and solve for the wavelength λ.

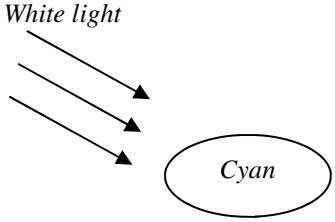
   D. What is the speed of this light ray?
   E. What is the frequency of this light ray?



8. Given three lights: red, green, and blue.
   A._____ What color is the background (*before you turn the lights on*)?
   B._____ How do you make blue?
   C._____ How do you make magenta?
   D._____ How do you make yellow?
   E._____ If you make red, what colors are off?
   F._____ To make magenta, what color is off?
   G._____ What color is off when you see cyan?



9. White light goes thru a magenta filter, then a cyan filter. Draw each step on the diagram.
   A. What colors is white light comprised (made) of?
   B. What light or lights gets thru the magenta filter?
   C. So, what does magenta block?
   C. What light or lights gets thru the cyan filter?
   D What does cyan block?



10. An object is cyan.
    A. Draw what colors are going into object.
    B. Draw what colors must be reflected off the object for it to look cyan.
    C. What color is absorbed by the object?

11. If you are using the CMYK model for making color:
    A. _____ Is CMYK paints or lights?
    B. _____ What color is the background?
    C. _____ How would you make Red?
    D. _____ How would you make Cyan?
    E. _____ What are the two ways to make black?
    F. _____ What is the most economical way to make black?
    G. _____ How would you make Blue?

12. If you look at a blue object thru green glasses,
    A. What color does it look like?
    B. Why?

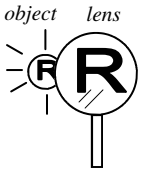
From the "Optics Basics" Notes:

13. What is the focal point?

14. Does the image come into focus at the focal point?

15. Label the two shapes at the right.

_____ _____



Read about real images.

16. You are looking thru a lens at an object.
    A. Is the image real or virtual?

    B. Why?

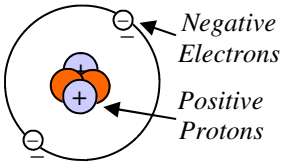
And Do the TAKS Homework

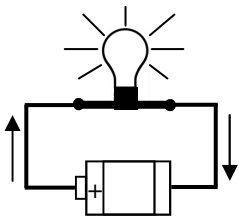
Day 25—Electricity

Electricity

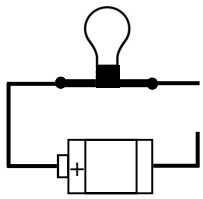
Electricity is the movement of electrons; Protons can't move.

Electricity flows thru conductors (like metals). Insulators resist the flow of electrons. Ionic solutions conduct electricity, too.





A *closed circuit* has no break: electricity can flow.



An *open circuit h*as a break somewhere: electricity cannot flow.

Current (in *amps [A]*)

How many electrons flow. Like amount of water flow.

$$I = \frac{V}{R}$$

Voltage (in *volts [V]*)

What pushes electrons. more batteries = more V = More push = more current.

Resistance (in *ohms [Ω]*)

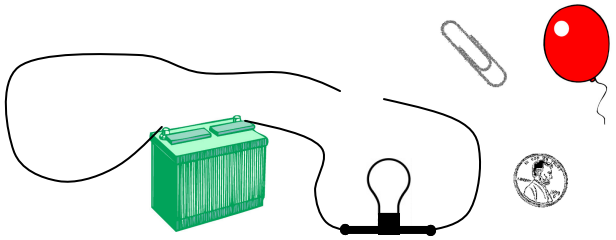
Like a dam holding back water. More bulbs = More R = less current.

Current equals the voltage divided by the resistance.

Types of Circuits

Series circuit—There is only 1 path for the electricity to flow. If one part of the circuit has a break (is open) the whole circuit turns off.

Parallel circuit—There are multiple paths for the electricity. If one part is open, the other part can stay on.

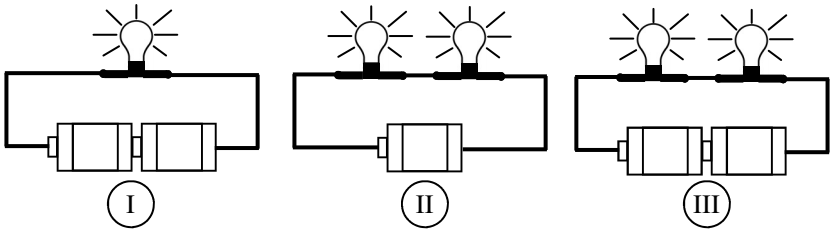


Car battery

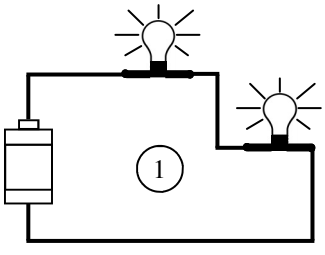
1. A. Will the light bulb light up or not (*as it is right now*)?
   B. Why or why not?
   C. Is it an open or closed circuit?
   D. Which of the objects would complete the circuit?

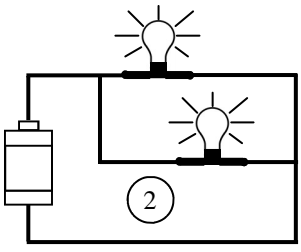
   E. Will the light come on if you touch the two pieces of wire together?

2. Which circuit at the right?
   A. Has more resistance: II or III?
   B. Has more voltage: I or II?
   C. Has more current: I or II?
   D. Has more current: I or III?



3. A 9 volt battery is connected to a circuit that has a 18 ohm resistor in it. How much current flows thru the circuit?





4. Which of the two circuits at the left?
   A.____Has only more than one path for the electricity to flow.
   B.____Has only one path for the electricity to flow.
   C.____If you disconnect one of the bulbs the other will also turn off.
   D.____If you disconnect one of the bulbs the other will stay on.
   E.____Is a parallel circuit.
   F. ___Is a series circuit.

5. A. Is your house wired in parallel or in series?
   B. How can you prove this?