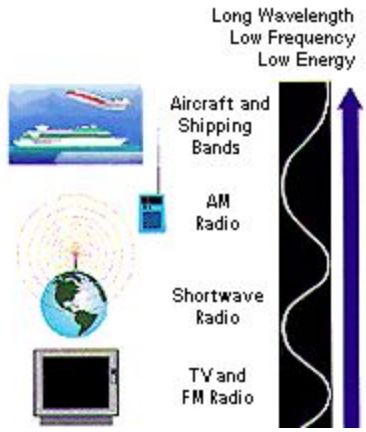
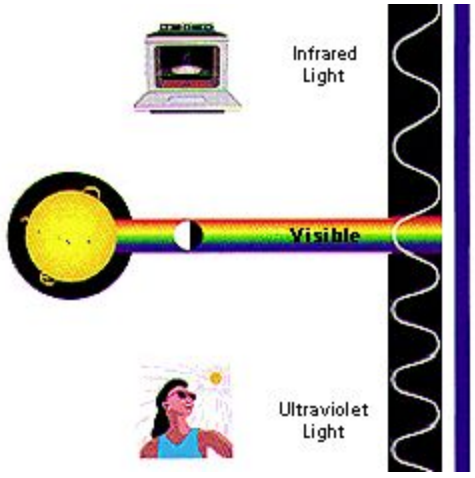
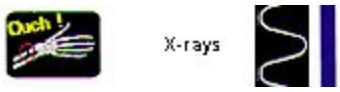
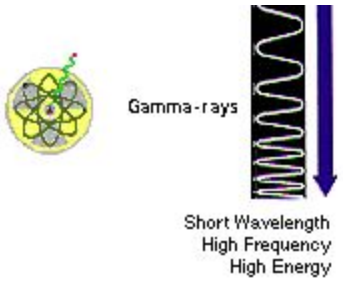
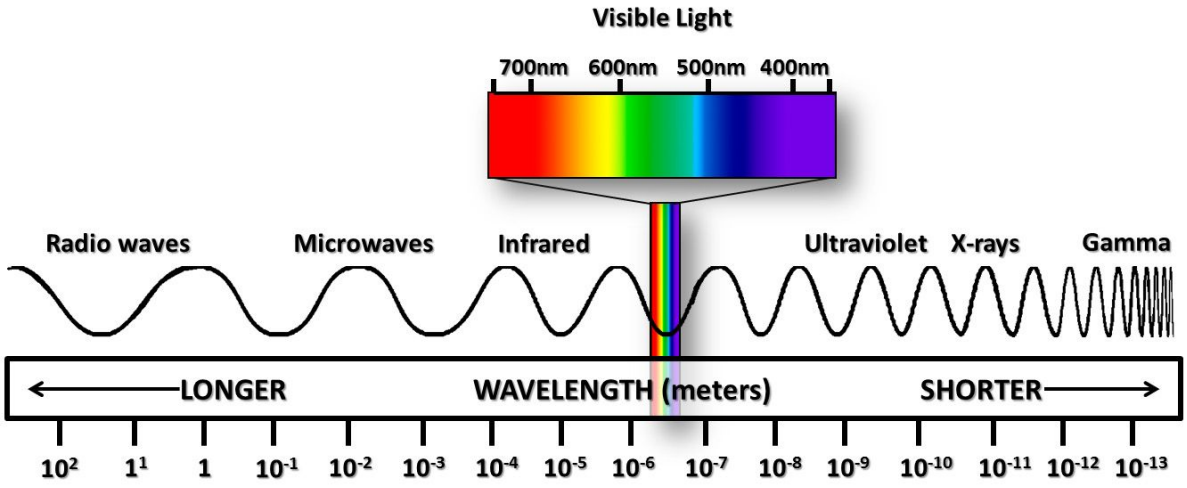
Riverton Street Charter School
Class: _____

Name: _____
Date: _____

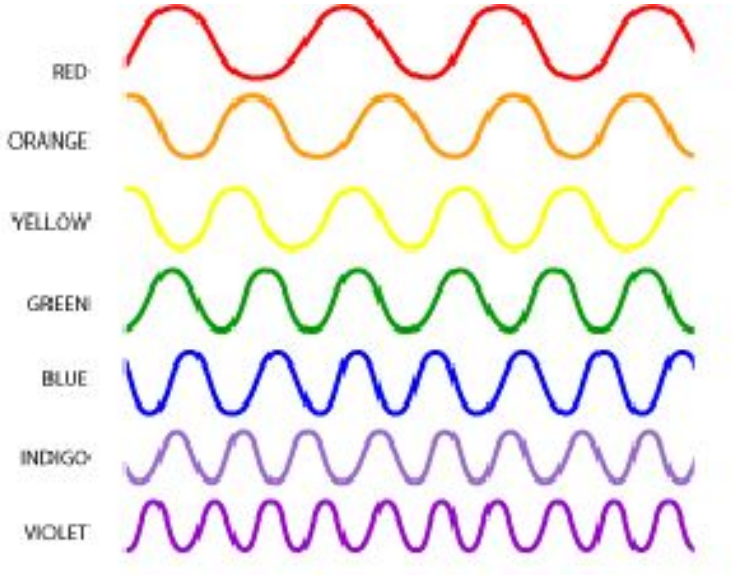
ELECTROMAGNETIC SPECTRUM

Type of Light Wave	Description of Light
	Range: 1000 meters to 1 cm Radio waves are found at the longest wavelengths on the electromagnetic spectrum. These are the lightwaves that are used to send signals to your AM/FM Radio or your television (unless you have cable).
	Range: one-tenth of a mm to 1 cm Microwaves are used in radar and also in your microwave appliance at home that you use for heating food
	**Infrared Radiation** Infrared radiation is what we like to describe as heat. We can't see infrared waves, but we can feel them. Your body gives off heat, so it is an emitter of infrared radiation. The range of infrared wavelengths is about sub-millimeters to micrometers (the size of a bacteria). **The Visible Spectrum** Visible light is the light that we can see, and thus is the only light detectable by the human eye. White light is visible light, and it contains all the colors of the rainbow, from red to violet. The range of visible wavelengths is 400 to 700 nanometers. Ultraviolet light is the radiation from the sun that

	causes a sunburn when you have been outside too long on a sunny day. But, watch out! You can't see ultra-violet light, so you can still get sunburned on a cloudy day. The range for ultraviolet light is 10^{-8} to 10^{-10} meters.
	X-rays are very energetic, and are used in X-ray machines to take pictures of your bones. The range for X-rays is 10^{-10} to 10^{-12} meters.
	Gamma rays are the most energetic light waves found on the electromagnetic spectrum. We can find Gamma rays released in nuclear reactions and particle collisions. The range for a gamma ray is in picometers (10^{-12} meters).



Visible Light Wavelengths



Questions:

1) The component of the spectrum between ultraviolet light and infrared light interacts with the human eye allowing us to see. What is this part of the electromagnetic spectrum called?

_____

2) The sun emits all the different types of radiant energy on the electromagnetic spectrum. The Earth does not receive the full impact of all this radiation. The ozone layer in the Earth's atmosphere absorbs and helps to block which type of radiant energy? _____

3) Which color of visible light has the longest wavelength? _____

4) As the frequency of the radiation increases so does the energy in that type of radiation. Which form of radiation has the highest frequency and therefore most energy? _____

_____

5) Are X-rays longer or shorter than radio waves? _____

6) Which form of solar radiation causes sunburn and skin cancer? _____

7) Ultraviolet rays can cause sunburn, and X rays can penetrate deep inside our bodies. Gamma Rays kill cancer cells. What does this show about how living material is affected by the shortest wavelengths in the electromagnetic spectrum? _____

_____

8) Heat radiation, also known as _____, cannot be seen by your eyes but can be felt by your skin.

9) Which rays have the highest energy of all electromagnetic radiation, causing them to be the most damaging to human tissue? _____

10) Compared to all other types of electromagnetic radiation, radio waves have the lowest _____

Read the statements below. If the statement is true, write T on the line in front of the statement. If it is false, write F and rewrite the statement to make it true.

11) _____ Radio waves, microwaves and ultraviolet waves all have longer wavelengths than visible light. _____

12) _____ X rays have more energy than gamma rays. _____ _____

13) _____ The sun radiates both visible energy and invisible energy. _____ _____

14) _____ Electromagnetic radiation includes only visible light waves. _____ _____

15) Match the kind of electromagnetic radiation (on the left) likely to be used in each of the technologies (on the right).

Electromagnetic Radiation		Technology	
	X rays	A.	TV broadcast signals
	Microwaves	B.	In a hospital to keep surgical equipment sterile
	Gamma rays	C.	Examining the inside of a weld in a steel oil pipe
	Radio waves	D.	Lamp used to warm a baby chick
	Infrared waves	E.	Measuring the speed of a passing car
	Ultraviolet waves	F.	Used by an oncologist (a physician who studies and treats cancer)
	Radar	G.	Cell phone