**NOTES 4.3: Light and the Electromagnetic Spectrum**

**Light and the Electromagnetic Spectrum**

* The sun is the most important source of \_\_\_\_\_\_\_ on earth
* Light spreads out or \_\_\_\_\_\_\_\_\_\_\_ from the sun and other stars in all directions
* Energy such as light that travels by radiation is often called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* In addition to light, the sun radiates several forms of energy that are not visible to the human eye

**Electromagnetic Radiation**

* In a water wave, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ vibrate up and down
* In a light wave \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ fields vibrate up and down
* Visible light and all of the forms of radiant energy emitted by the sun are parts of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Electromagnetic spectrum**

* The electromagnetic spectrum shows all of the forms of \_\_\_\_\_\_\_\_\_\_\_\_\_ from \_\_\_\_\_\_\_\_\_\_\_ wavelength to \_\_\_\_\_\_\_\_\_\_\_ wavelength



**Wavelengths longer than visible light**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_waves have the longest wavelength and the lowest frequency
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are types of radio waves

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* In magnetic resonance imaging (MRI), \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ are used to see parts of the brain
* Microwave ovens use a specific wavelength and frequency that is strongly absorbed by \_\_\_\_\_\_\_\_\_\_\_\_\_ molecules
* Only foods that contain water can be heated by water molecules (see simulation)
* Microwaves are used in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



**Radar**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ wavelength microwaves are used in radar
* Radar is an acronym: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Radar is used for tracking movement of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Infrared waves**

* Infrared waves are a type of electromagnetic radiation used in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Infrared radiation is also known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ emit infrared radiation including you!

**Wavelengths shorter than visible light**

* Wavelengths that are shorter than visible light carry \_\_\_\_\_\_\_\_\_\_\_\_\_ energy than light waves

**Ultraviolet Waves**

* Ultraviolet rays striking your skin allows your body to make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Overexposure to ultraviolet waves (UV) can cause sunburns and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and damage to the surface of the eye
* UV can kill \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in food and sterilize medical equipment

**X rays**

* X rays have a very short \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and high \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* X rays are used to photograph \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Special precautions must be used when using x rays such as wearing protective padding



**Gamma Rays**

* Gamma rays are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy and frequency
* Gamma rays are produced in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Gamma rays can be used to kill cancer cells during radiation therapy