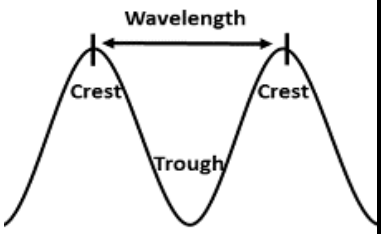
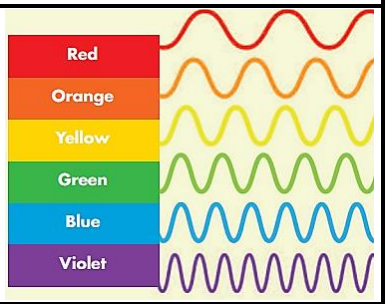
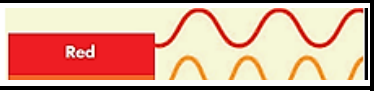
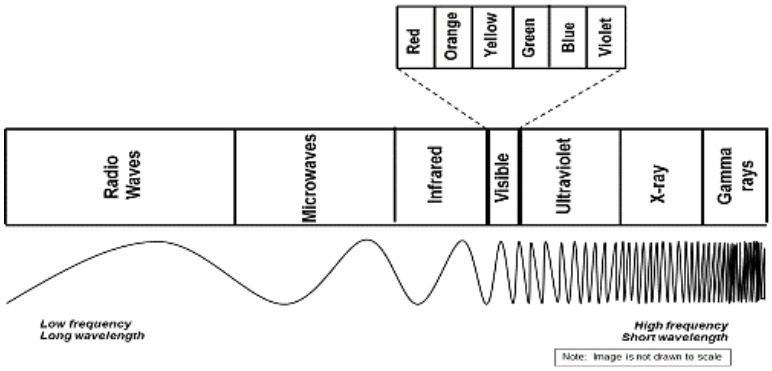
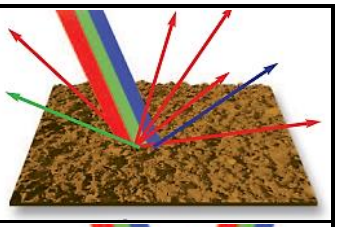
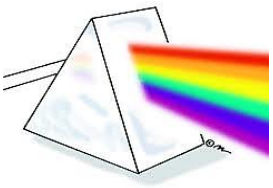
5.3 Force, Energy, & Motion- Light — Question/Answer Packet

The student will investigate and understand basic characteristics of visible light and how it behaves. Key concepts include:

5.3a) transverse waves	
1. Light	A form of energy that or eyes can detect. *It is the combination of several different wavelengths of light traveling together.*
2. How does light travel?	• It travels in Transverse waves. • It travels in straight paths. • Light **does not** need a medium through which to travel.
3. Transverse wave	A wave that moves up and down at the same time it moves forward.
4. Light wavelength	The distance between two crests or two troughs in a wave. 
5. Crest	Top of a wave
6. Trough	Bottom of a wave
7. How fast does light travel compared to sound?	**Compared to sound, light travels extremely fast.** It takes light from the sun less than 8½ minutes to travel 150 million kilometers to reach the Earth.
5.3b) the visible spectrum	
8. Visible spectrum	The light that the human eye can see. It represents a small part of a whole range of wavelengths of light energy.
9. What are the wavelengths that make up visible light?	The wave lengths are represented by the colors red, orange, yellow, green, blue, indigo, and violet (**ROYGBIV**).(Scientists now do not include indigo) 
10. How are light waves characterized?	They are characterized by their wavelengths.
11. Which color has the longest wavelength?	In the visible spectrum, **red** has the longest wavelength. 
12. Which color has the shortest wavelength?	In the visible spectrum **violet** has the shortest wavelength. (most energy) 
13. What is the progression of wavelengths along the visible spectrum?	Wavelengths get progressively shorter from red to violet.

14. Electromagnetic spectrum	The entire range of light energy. From longest to shortest waves, these wavelengths of light are: radio waves, microwaves, infrared waves, **visible light waves**, ultraviolet rays, X-rays, and gamma rays. 
5.3c) opaque, transparent, and translucent;	
15. The amount of light that passes through an object can be classified in three ways.	1. Transparent 2. Translucent 3. Opaque
16. Transparent	**Material that allows light to pass through easily**. Examples include: Clear glass, clean water, air, and clear plastics 
17. Translucent	**Material that allows some light to pass through** Examples include: Waxed paper, frosted glass, sun glasses, and tracing paper Nature creates translucence with fog. 
18. Opaque	**Material that stops light from passing through** Examples include: brick wall, a desk, pillow**,** and a sofa 
19. When light hits an opaque object, what does it produce?	A shadow
5.3d) reflection of light from reflective surfaces **5.3e) refraction of light through water and prisms**	
20. Reflection	**The bouncing of light off an object (mirror)** 

21. What happens when light reflects off a bumpy surface?	The light scatters in many directions. 
22. What happens when light hits a smooth surface?	It creates a perfect reflection. 
23. Mirror	Most mirrors are made of polished glass with a thin coating of silver behind them. Light waves bounce off (reflect) this polished surface without scattering. Practical uses of mirrors: • Cameras and telescopes work by using mirrors to reflect light. • Searchlights use multiple mirrors to create more intense beams of light. • Flashlights use curved mirrors to focus light beams.
24. Refraction	**The bending of light as it passes from one medium to another. (to bend)** Refraction happens because the speed of the light wave changes when it enters the new medium. *Sunsets produce a range of colors as light gets refracted through the air, changing from yellow to red, and even blue and purple.* 
25. Prism	An object that refracts and disperses white light into visible light. 
26. What happens when white light is passed through a prism?	It is bent at different angles to produce the visible spectrum.
27. Water	Nature's prism-water refracts light. It can act as a prism or a magnifier. 
28. Transmit	**The passing through of light.** 
29. Absorbed	Light rays can be *absorbed* as thermal energy (heat).