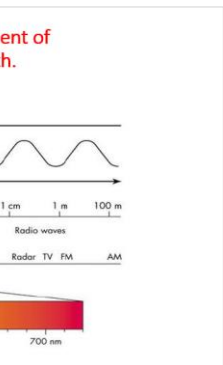


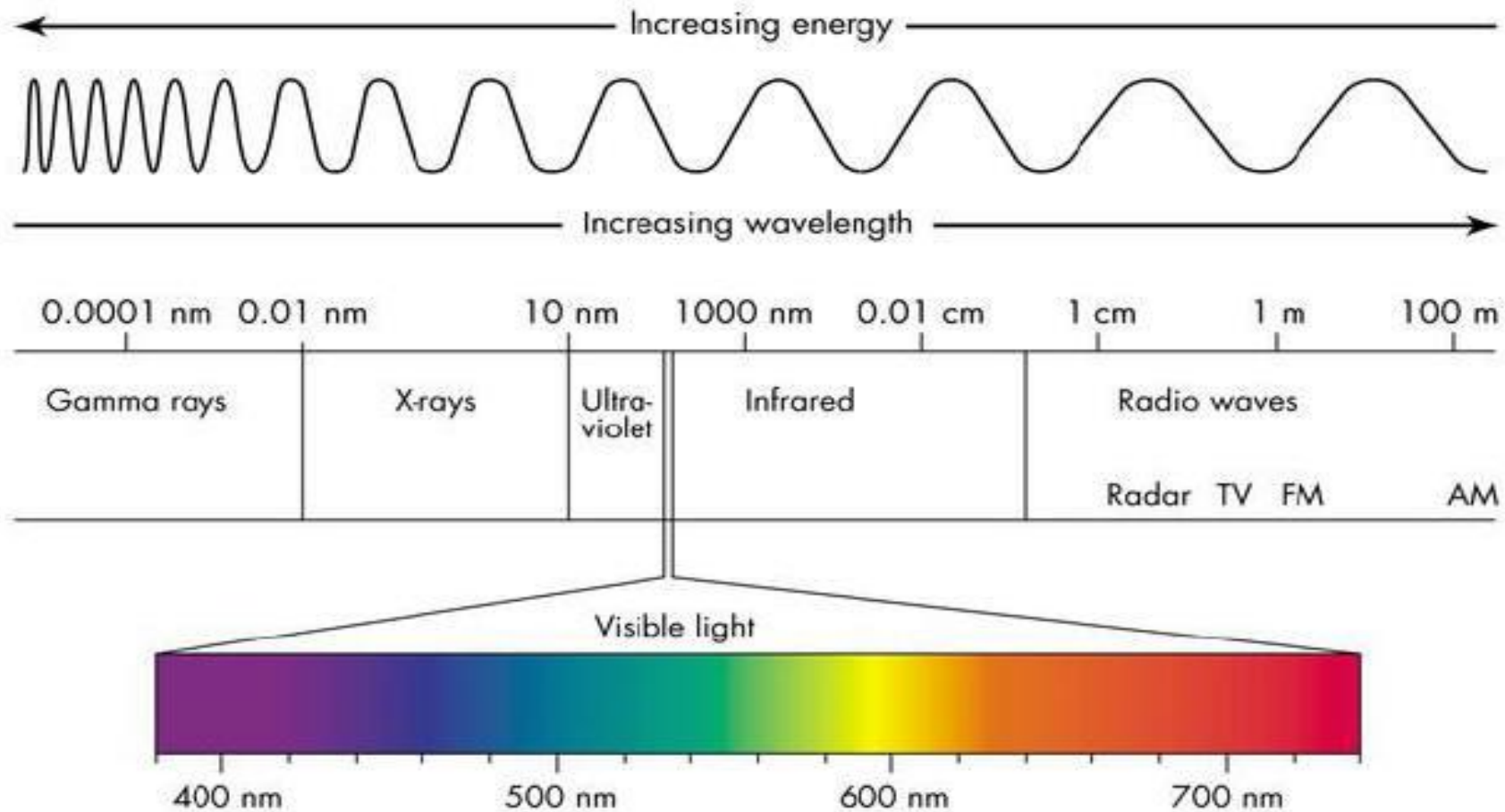
Electromagnetic Spectrum and Visible Light



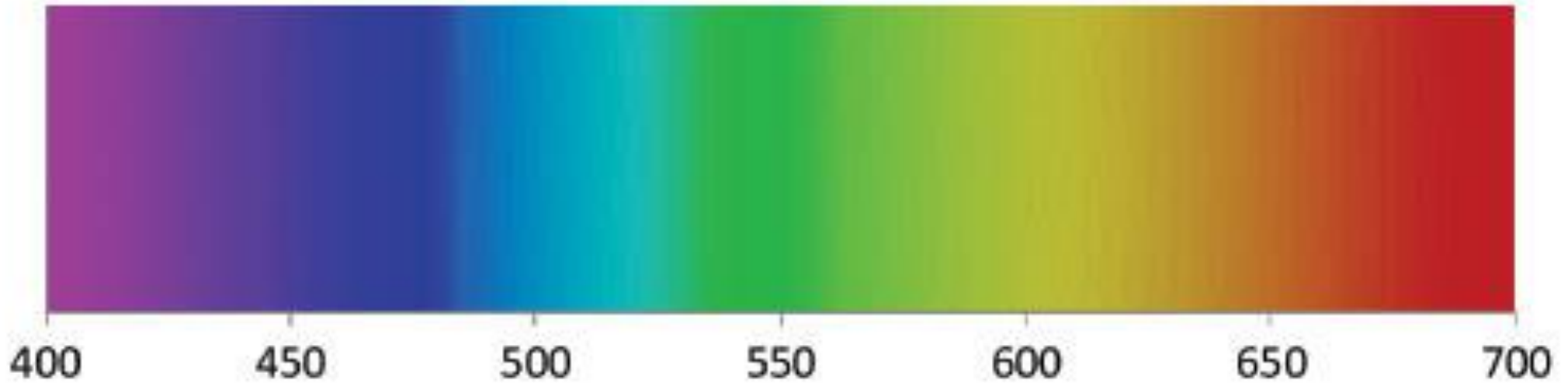
Underline the questions on the handout.

- 1) What type of waves are light waves? What type of medium do they need to travel?
- 2) In which type of medium light waves travel the fastest?
- 3) What is the electromagnetic spectrum?
- 4) Look at the figure on page 374. All the waves in the electromagnetic spectrum are electromagnetic. Explain what is different about these waves.
- 5) What is visible light?
- 6) Why are radio waves and microwaves important to us?
- 7) Why are infrared waves, gamma rays and x-rays important to us?

The electromagnetic spectrum is an arrangement of electromagnetic waves according to wavelength. It includes all the types of waves below.



Visible Spectrum — the shorter wavelengths are colors like violet, whereas the longer waves are closer to red. Anything longer than red can not be seen by the human eye, as anything shorter than violet cannot be seen with our eyes.

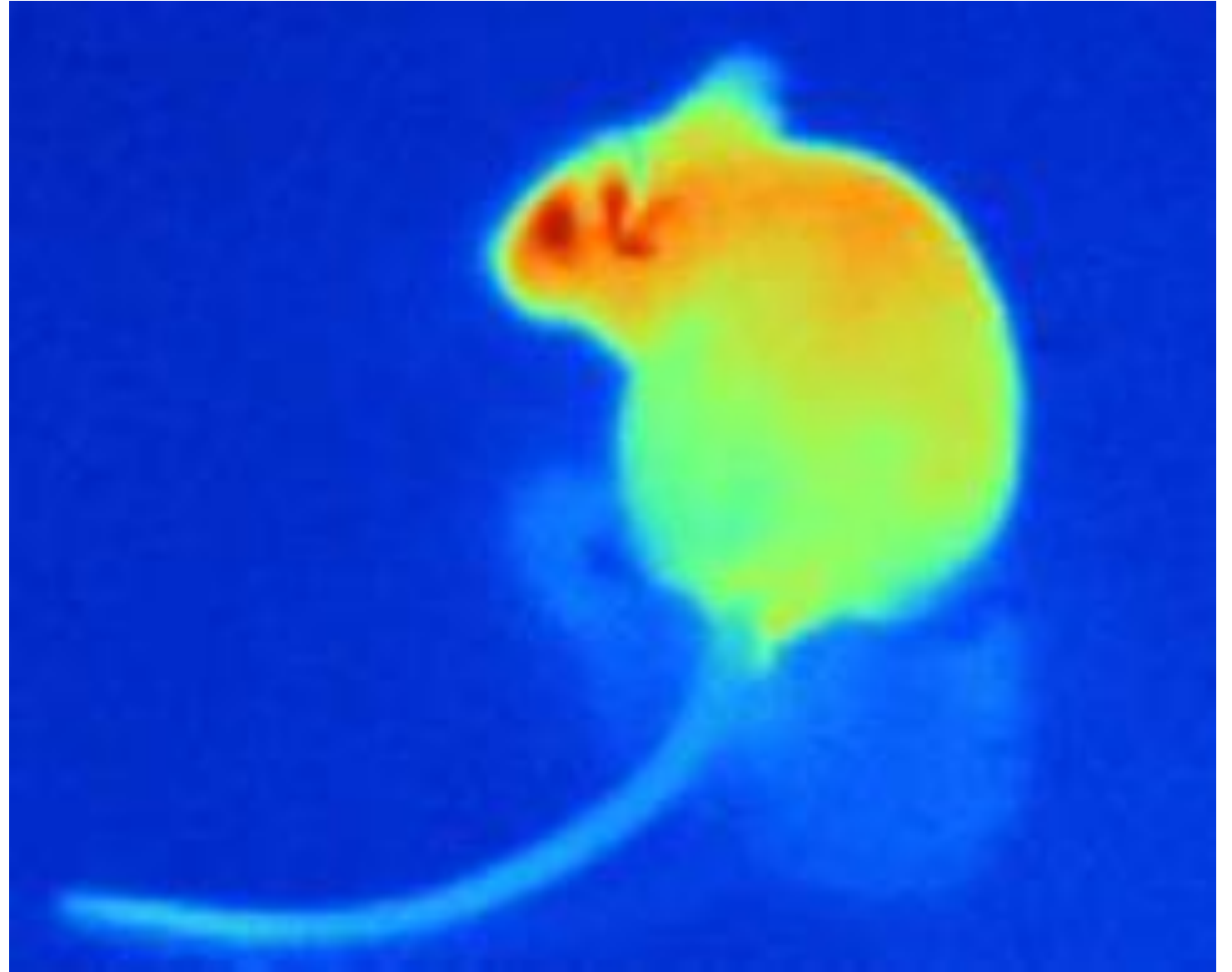


Wavelength (nm)

← Visible Spectrum →

Infrared Waves

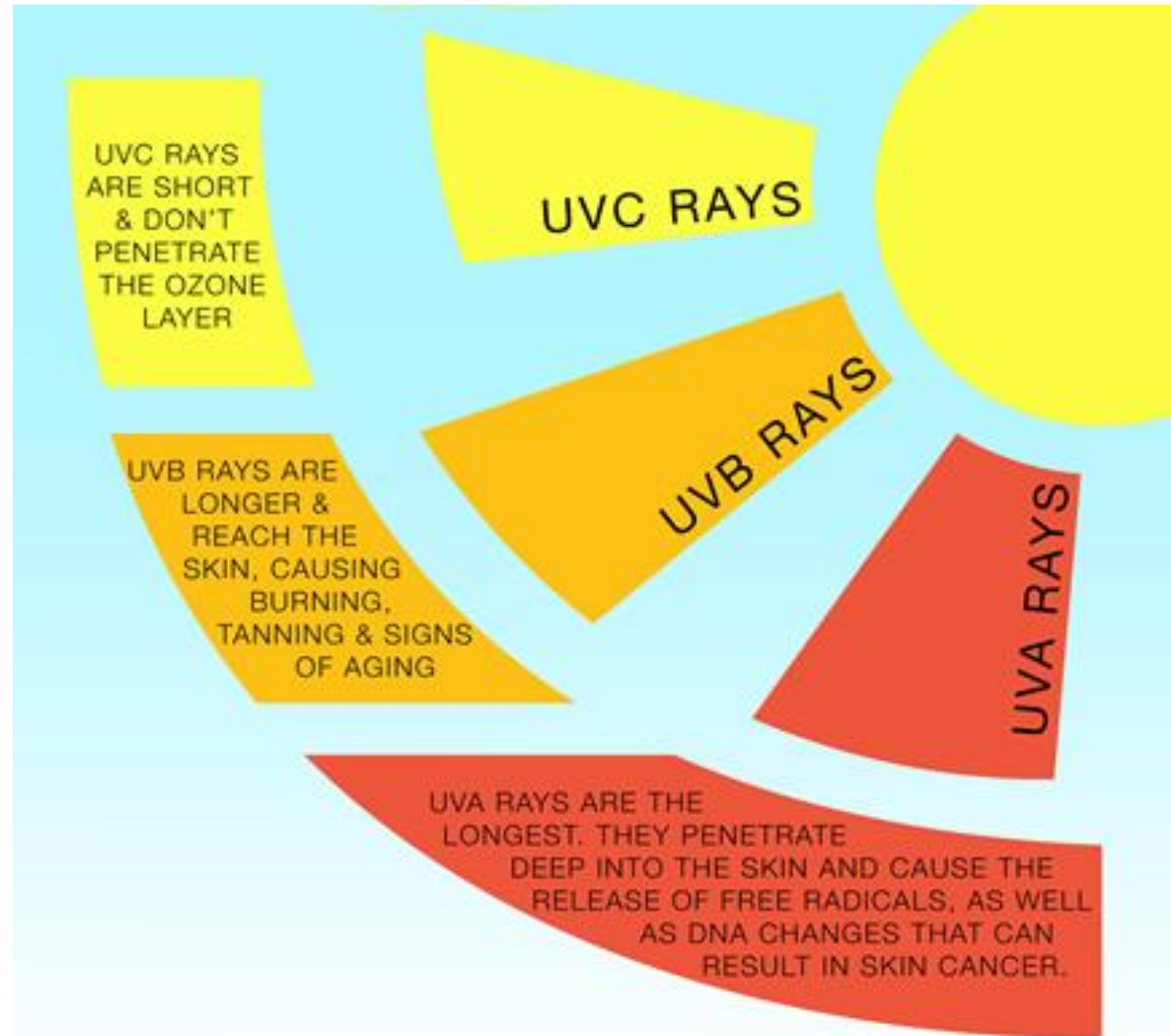
- Any object with temperature, irradiates infrared waves.
- Rattlesnakes have special infrared detectors that allow them to see a warm prey during the night, making it easier for them to capture this prey.
- Special night goggles are used to see people in the dark.



Sunlight

- Sunlight is composed of a portion of the electromagnetic spectrum in particular infrared, visible, and ultraviolet light.
- 40% at wavelengths of infrared (IR) – waves that make you feel warm
- 50% at visible wavelength – allows you to see colors and objects
- 10% at wavelengths of ultraviolet – can burn our skin in case of a long exposure, but also help your body synthesize vitamin D.

UV Rays – good part is blocked by the Earth's atmosphere:
UV are divided into UVA, UVB and UVC



UV RAYS & THEIR EFFECT ON SKIN 

Prisms: When white light passes through a prism, the different wave lengths bend (refraction) and separate, allowing you to see different colors.

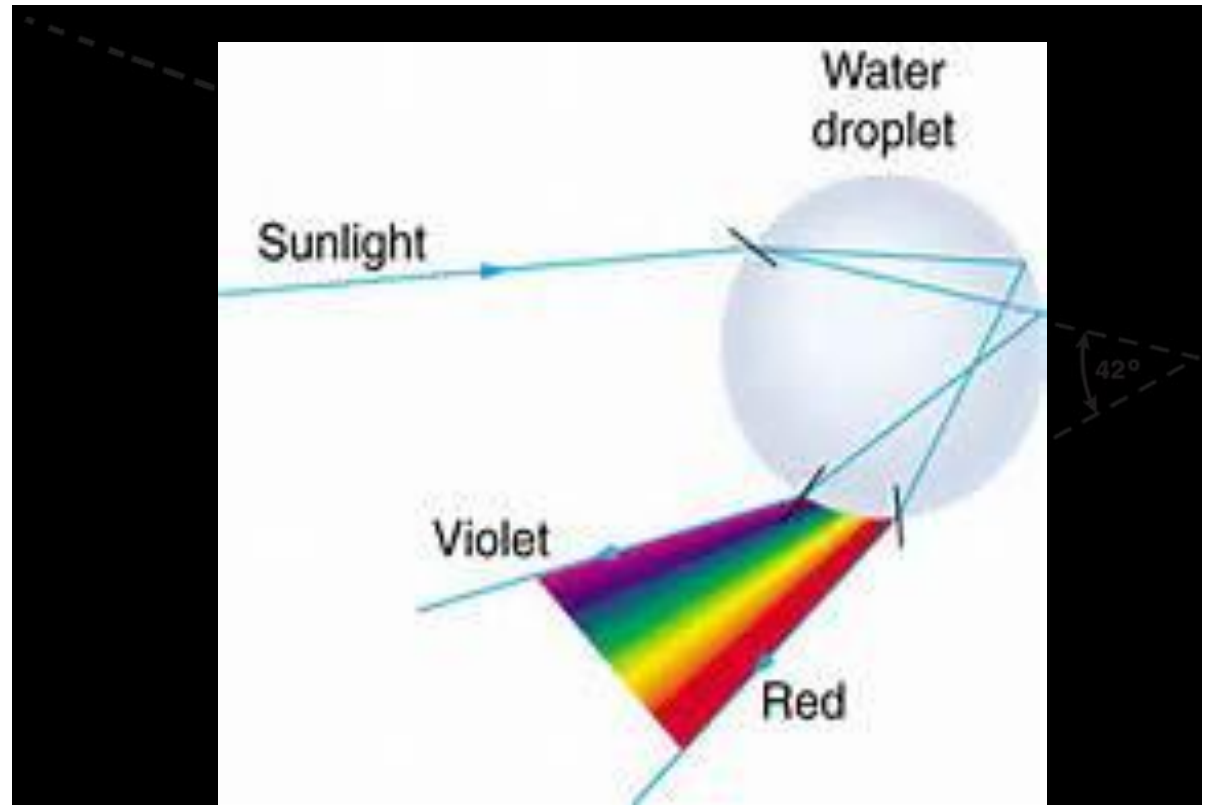


<https://www.youtube.com/watch?v=9hzUJAlIi3E> – Why is the ocean blue??

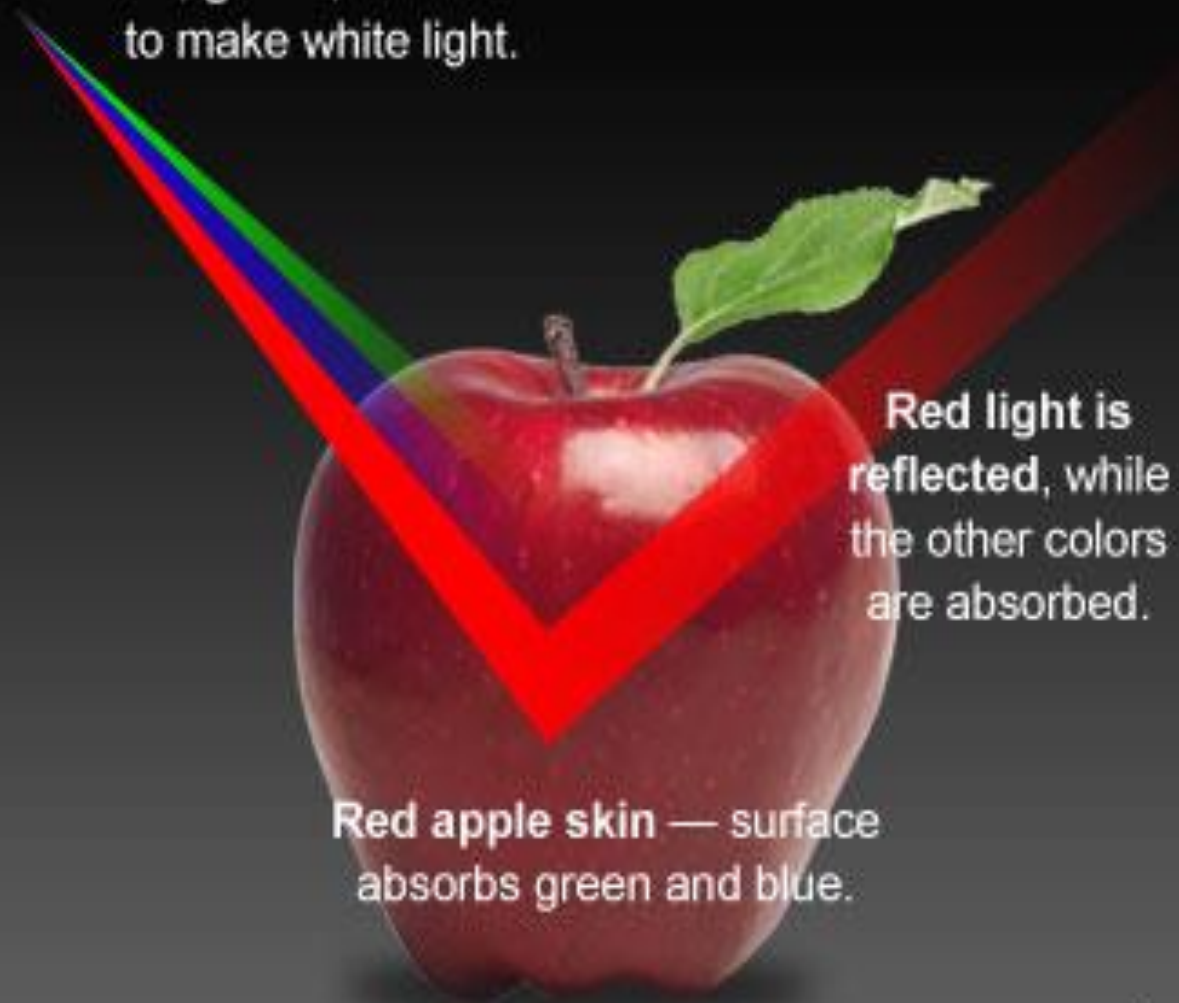
What is a rainbow?

It is the result of sunlight, which is white light, crossing rain drops suspended in the air. It is refraction.

- Light enters a water droplet (acts like a prism)
- The rays slow down when moving from air to the denser water and bends.
- The light reflects and refracts inside of the droplet. When it refracts, it separates into its different wavelengths—or colors, making a rainbow.



Incoming light has red, green, and blue to make white light.



Red light is reflected, while the other colors are absorbed.

Red apple skin — surface absorbs green and blue.



- Why do we see colors? Ex:
- A red object will be hit by white light. The red wavelength will be reflected by the object and will reach our retina. We will see red.
 - The other wavelengths will be absorbed and not seen.
 - When all wavelengths are absorbed we see the color black.
 - In a white object, all wavelengths will be reflected