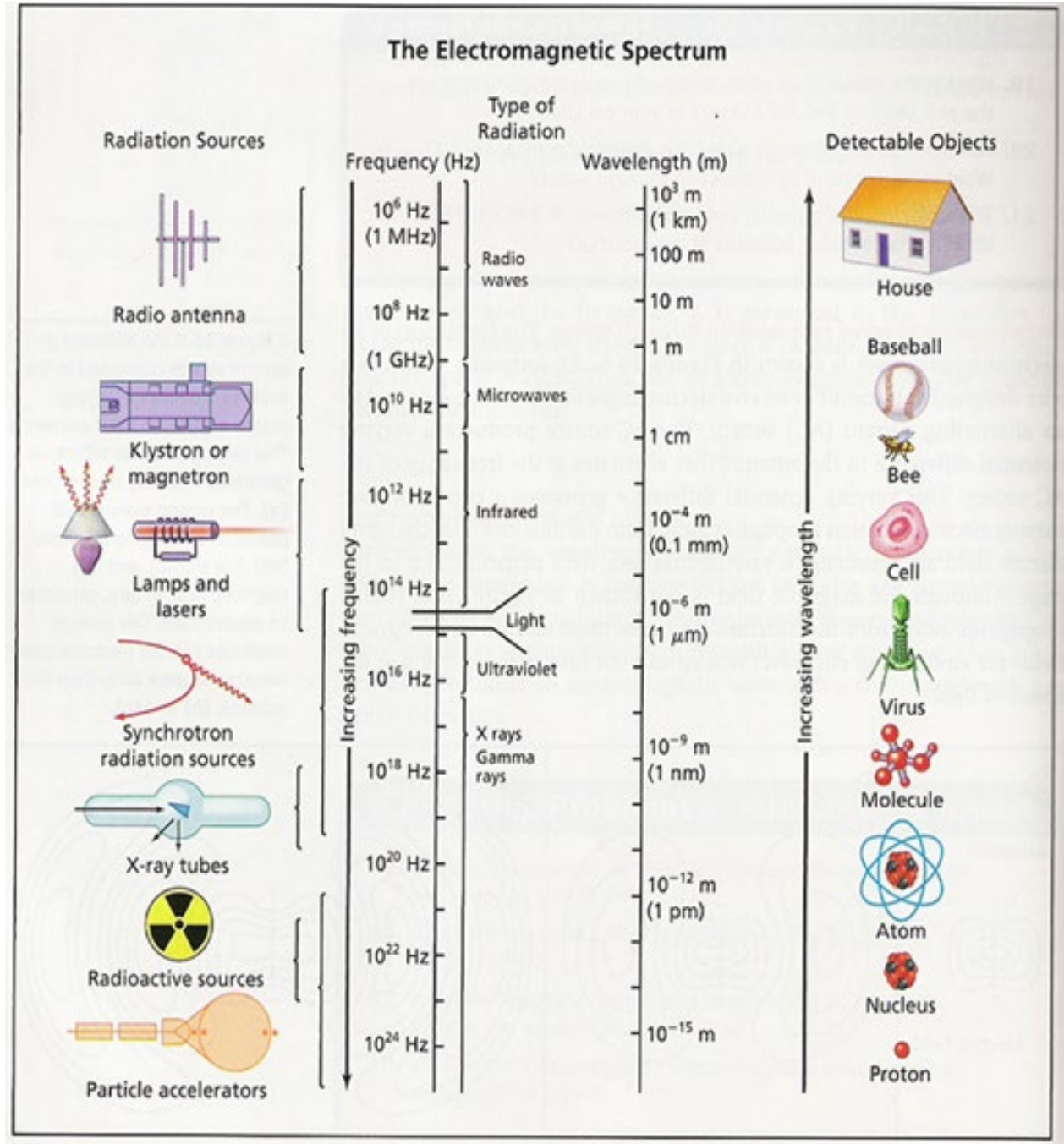
15 Light

Visible light is only a tiny segment of what is called the Electromagnetic Spectrum.



Revised 2.21.2021 Some diagrams from Pearson Physics by Walker. Used with permission

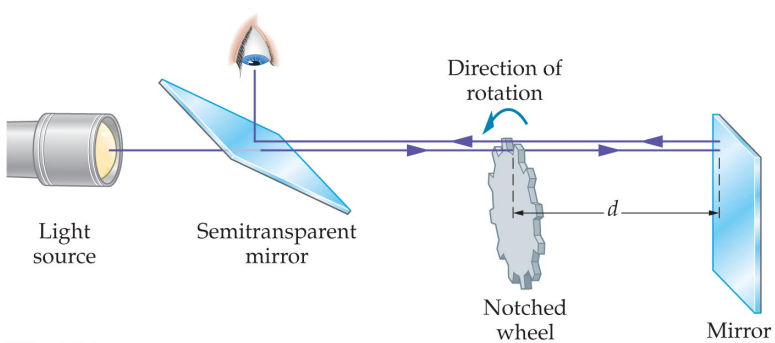
Speed of light:
1. Galileo's Experiment (failed)
2. Romer's Observation (moons of Jupiter)
3. Fitzeau's Experiment

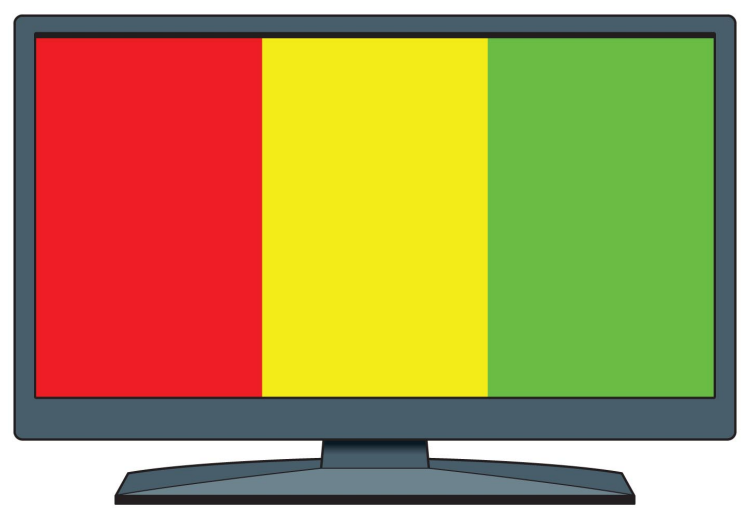
c=299,792,458 m/s
= 3.00 x108 m/s

Doppler effect applies to light

Light behaves like a wave, and also like a particle!

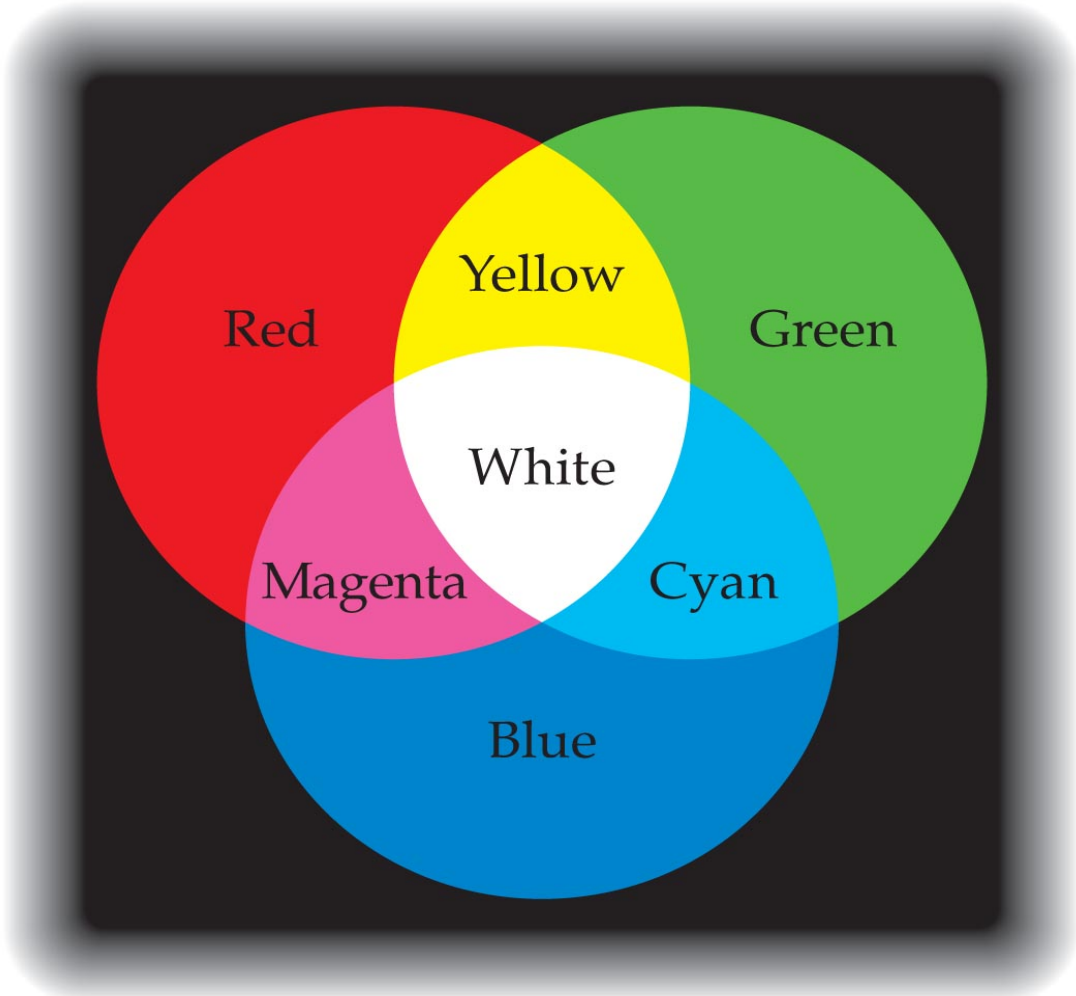
v=fλ applies to light also.



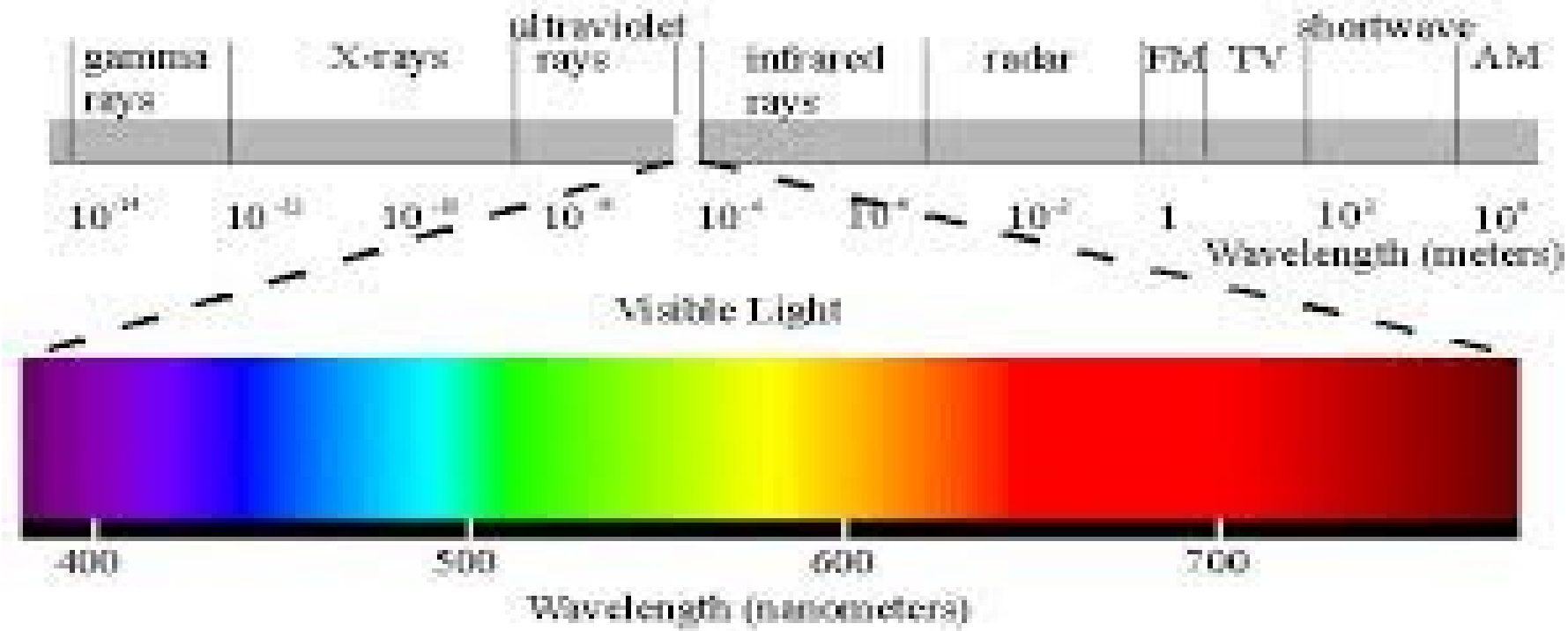


Schematic of Fitzeau's Experiment

Colors are just different wavelengths.



Colors: Different colors correspond to different λ's
White: addition of all colors.
Black: absence of radiation.



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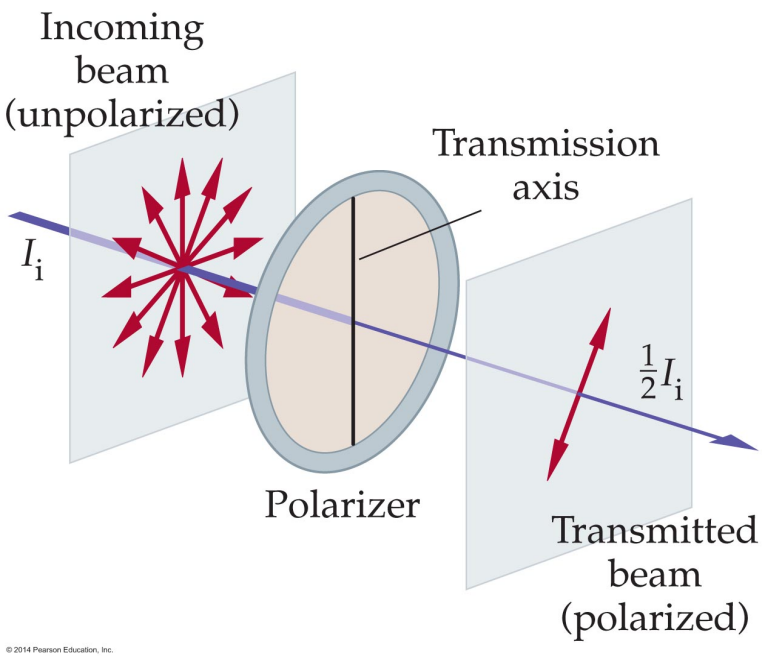
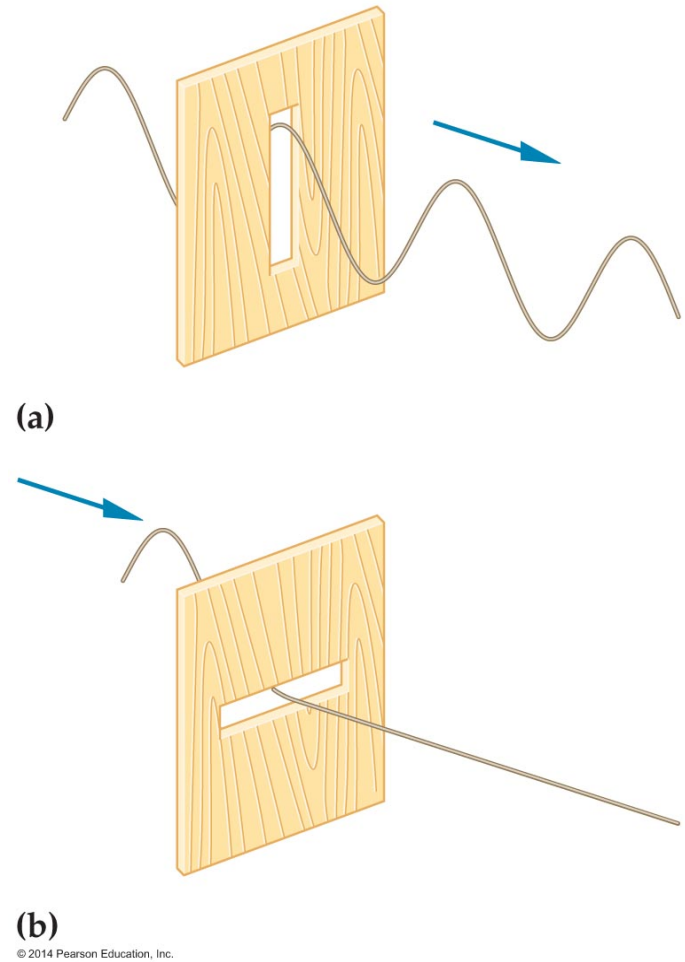
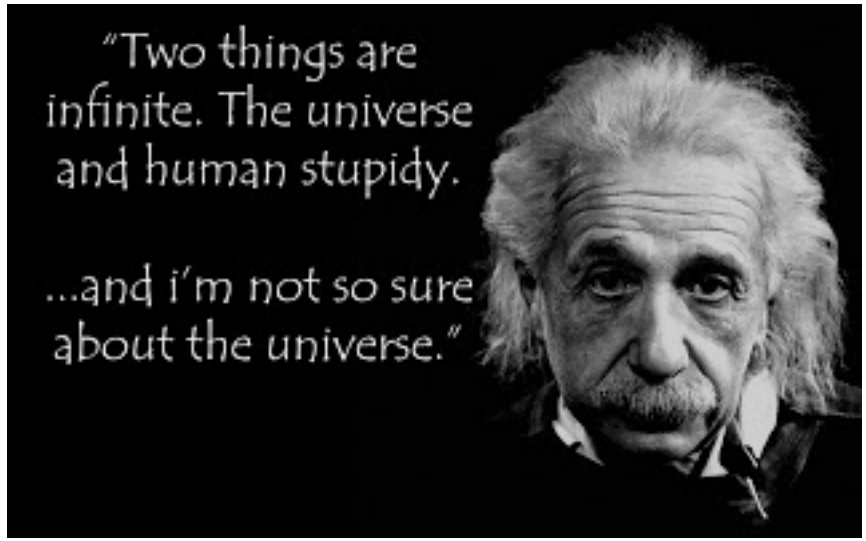
Visual Stimulus

Polarization:
Limiting the plane of oscillation of a wave.
(Only transverse waves can be polarized.)



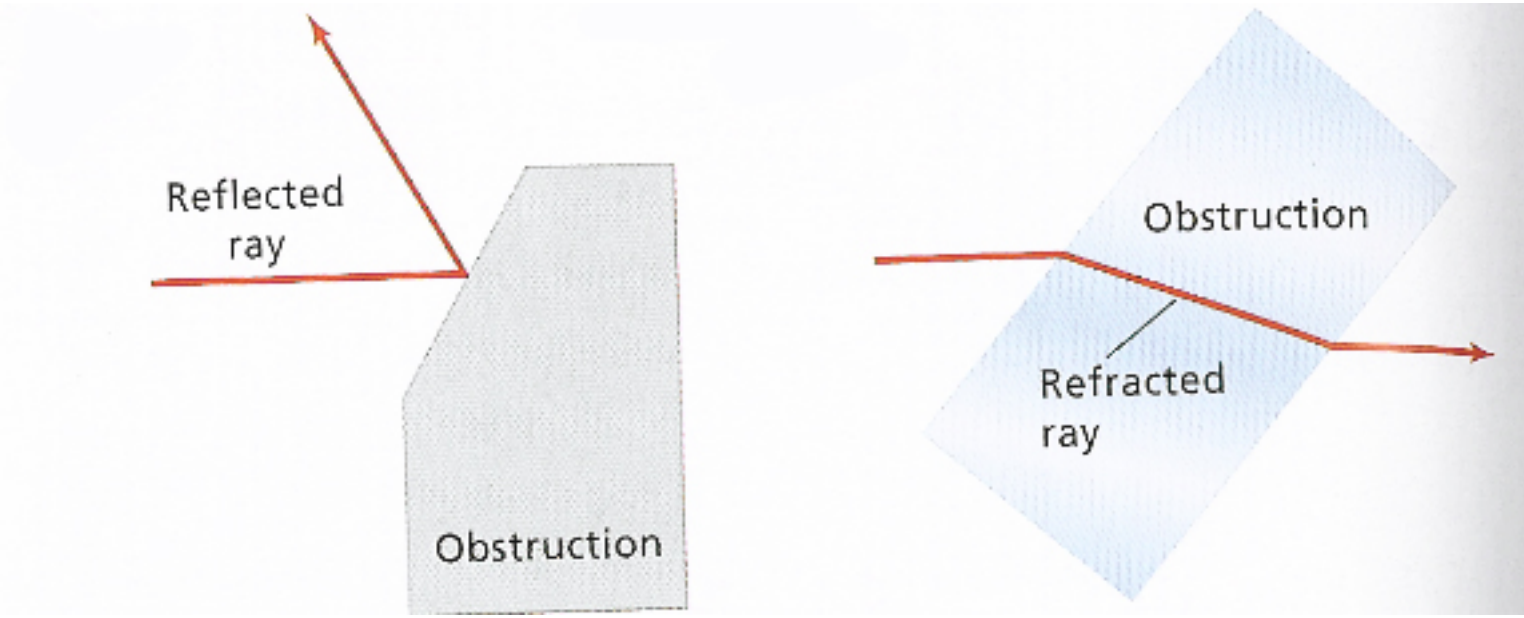


The direction of oscillation of the electric field is the direction of polarization.



The speed of light is the same for all inertial observers.
You can be moving toward the source, or away from it, or not at all. You will always come up with the same number for the speed of light in a vacuum.

Light travels in straight lines except:
When it is reflected, refracted, diffracted



When a wave is reflected it bounces back into the same medium.
When a ray is refracted it enters the new medium, changing direction.