

### C3 Study Guide "Light"

Name: \_\_\_\_\_

The speed of light, any electromagnetic wave, is 300,000,000 m/s, or 300,000 km/s in a vacuum.

An electromagnetic wave can travel through empty space or matter.

EM waves from the sun are the Earth's major source of energy.

The entire EM spectrum is divided into regions by wavelength.

White light is the entire range of colors of visible light.

Constructive interference is a wave interaction that occurs when waves combine and produce a resulting wave which has a greater amplitude than the individual waves.

Destructive interference is a wave interaction that occurs when waves combine and produce a resulting wave which has a smaller amplitude than the individual waves.

Refraction can separate white light into different colors.

The type of light transmission an object has determines whether light will be transparent, translucent, or opaque.

Colors of transparent objects are determined by the color of light they transmit.

The mixing together of colors of light is known as color addition. The primaries for light addition are red, green and blue.

Color subtraction is the result of mixing pigments. The primaries for light subtraction are cyan, yellow, and magenta.

Microwaves are used in radar for detecting speeds.

Infrared rays cause the warmth you feel from the sun, or a camp fire.

UV rays can cause sunburn.

Visible light is the light you can see with your eyes (ROYGBIV).

Gamma rays are used for treating cancerous tumors.

An illuminated object is one that reflects light.

A luminous object is one that emits its own light, such as the sun, or flashlight.

Interference is the combination of two or more waves that results in a single wave.

Diffraction is the bending of waves around barriers or through openings.

Refraction is the bending of light as it passes at an angle from one substance, or material, to another.

The bouncing back of a ray of light, sound, or heat when the ray (or wave) hits a surface is known as reflection.

Scattering is the interaction of light with matter that causes the light to change direction. For instance blue light is scattered more than red and green light as it passes through the atmosphere, which causes the sky to look blue.

Absorption is the transfer of energy carried by light waves to particles of matter. This is why a dark colored object gets warmer than a light colored object when placed in sun light. The darker pigments absorb more of the electromagnetic energy and convert it to thermal energy.

Transmission is the transfer of light through matter. Objects that easily transmit light are known as transparent. Examples include clear glass, crystals, and plastic.

A pigment is a material that gives a substance its color.

A translucent material transmits lights, but also scatters it. An example would be wax paper.

An opaque object does not transmit any light.