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Properties of Light & The Electromagnetic Spectrum Activities

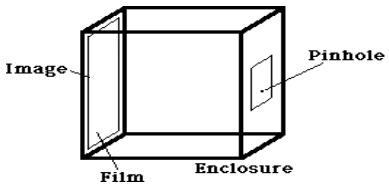
1. The speed of light

- Watch the **Speed of Light video** (bit.ly/3MEK2IM) & calculate the speed of light using chocolate:
  - Frequency of microwave =
  - Wavelength =
  - Speed of light ≈
- Where does light actually travel at 3.0×10^8 m/s?

- Why isn't the speed of light actually 3.0×10^8 m/s on Earth?

2. Straight Lines

- How does a pin hole camera prove light travels in a straight line? Use a diagram to explain.



3. Light radiates in all direction

- If luminous objects radiate light in all directions why do flashlights produce a beam of light?
  HINT: Look inside one

- **Use diagrams to compare** the light from a flashlight to a candle.

4. Radiation

- Watch the **Radiation video** (bit.ly/3D1mDO9) & answer the following questions:
  - When is radiation useful in terms of energy transfer?

  - When are convection and conduction useful?

5. Light as Waves

- **Mix & match** (cut outs provided) the type of electromagnetic wave with its uses & phenomena.
- Watch the **Light as waves video** (bit.ly/3gcgQN5) **sketch** wave properties (wavelength, amplitude, frequency)

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Production of Light Stations

Incandescence

1. What are pros & cons of incandescent light production

2. Why is a coil of wire used in an incandescent bulb rather than a straight wire?

3. Compare the shape of incandescent light bulbs with fluorescent bulbs. Why are these shapes required for the different types of light production?

Fluorescence

1. Why are fluorescent lights considered hazardous waste and should not be thrown in the garbage?

2. Why do soap companies often put fluorescent pigments in their laundry detergents?

3. Why is fluorescence often used as a security measure?

Chemiluminescence

1. What happens to the glow stick in hot water? WHY? Cold water? WHY?

2. When people want to make their glow sticks or glow necklaces last longer they put them in the fridge or freezer? Does this work? Why?

3. Where might chemiluminescence be a good choice for light production?

Bioluminescence

1. Why do you think that 90% of all ocean creatures living below 1500 feet are bioluminescent?

2. How is bioluminescence being used in medicine?

LED

1. Why does the green light brighten when the magnet moves one way and the red light when it moves the other?

2. Why are LED good as Christmas tree or decorative lighting?

3. What are advantages and disadvantages of LEDs?

Laser

1. Why can lasers shine such a far distance?

2. Why are lasers only 1 colour (ie, not white light)?

3. What about lasers make them a useful medical tool? How are they being used?