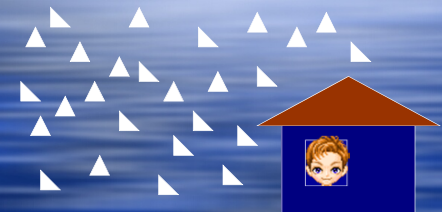


Waves

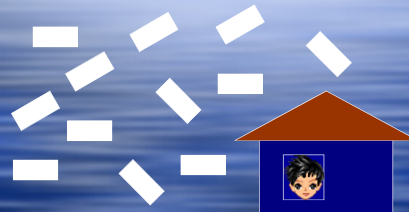
Electromagnetic Spectrum (Light)
&
Polarization

Electromagnetic Spectrum



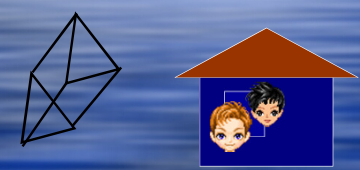
Hey look, it's snowing triangles

Electromagnetic Spectrum



You're nuts, it's snowing rectangles

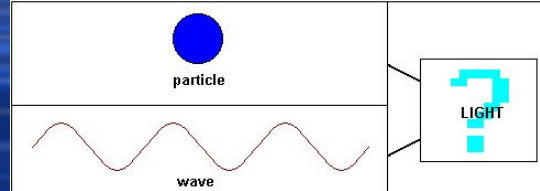
Electromagnetic Spectrum



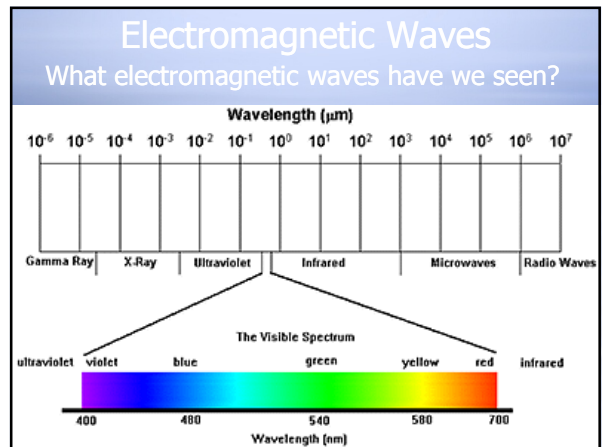
What's really happening?
Snowing PRISMS!

Electromagnetic Spectrum

- ◆ Wave-Particle Duality
- ◆ Light travels both as a wave and a particle




How to imagine the wave-particle duality.



Electromagnetic Waves

Radio -



- ◆ AM, FM
- ◆ SW, MW, LW
- ◆ VHF
- ◆ XM?
- ◆ 3MHz - 30MHz

Electromagnetic Waves

Microwave -

- ◆ UHF
- ◆ Cooking
- ◆ Telecommunications
- ◆ 1 GHz to 300 GHz

Electromagnetic Waves

Infrared -


- ◆ Heat
- ◆ Ovens
- ◆ TV remote controls
- ◆ Night vision goggles




Electromagnetic Waves

Ultraviolet -


- ◆ Disinfecting water
- ◆ UVA, UVB - Sunburns
- ◆ Black lights



Electromagnetic Waves

X-rays -


- ◆ Roentgen Rays
- ◆ To see bones
- ◆ To see cracks in metal



Electromagnetic Waves

Gamma Rays -

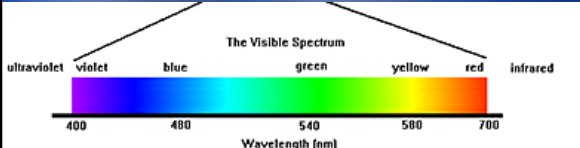
- ◆ Incredible hulk
- ◆ Not very healthy



Electromagnetic Waves

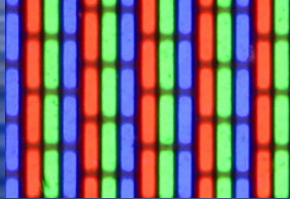
Visible Light -

- ◆ Very small part
- ◆ Red on one end (700nm)
- ◆ Violet on other end (400nm)



Visible Light

- ◆ White light isn't actually white
- ◆ White light is made up of all colours



Visible Light

What are the primary colours?

- ◆ Red
- ◆ Green
- ◆ Blue

What happens when you mix blue, green and red light?

- ◆ You get white

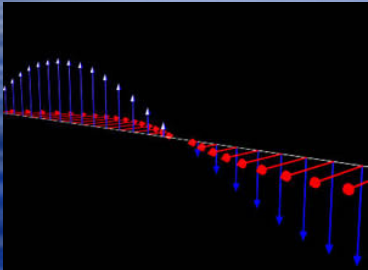


Visible Light

- ◆ White objects reflect all colours
- ◆ Blue objects absorb all colours except for blue light.
- ◆ Red objects absorb all colours except for red light.


Polarization

- ◆ Light coming from a light bulb or the sun is unpolarized



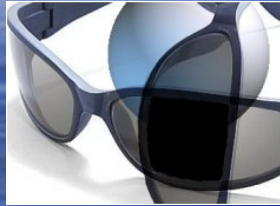
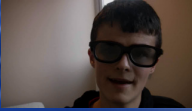
Polarization

- ◆ A polarizing lens gets rid of the blue arrows (the magnetic part)
- ◆ This leaves only the red arrows



Polarization

- ◆ Some sunglasses are polarized
- ◆ 3D glasses are polarized
- ◆ How 3D works



Diffuse Reflection

Reflections:

- ◆ Irregular Surface
- ◆ Surface of a Compact Disc (Tracks are $1.6\mu\text{m}$ apart)

irregular surface

