



LIGHT

What is Light?

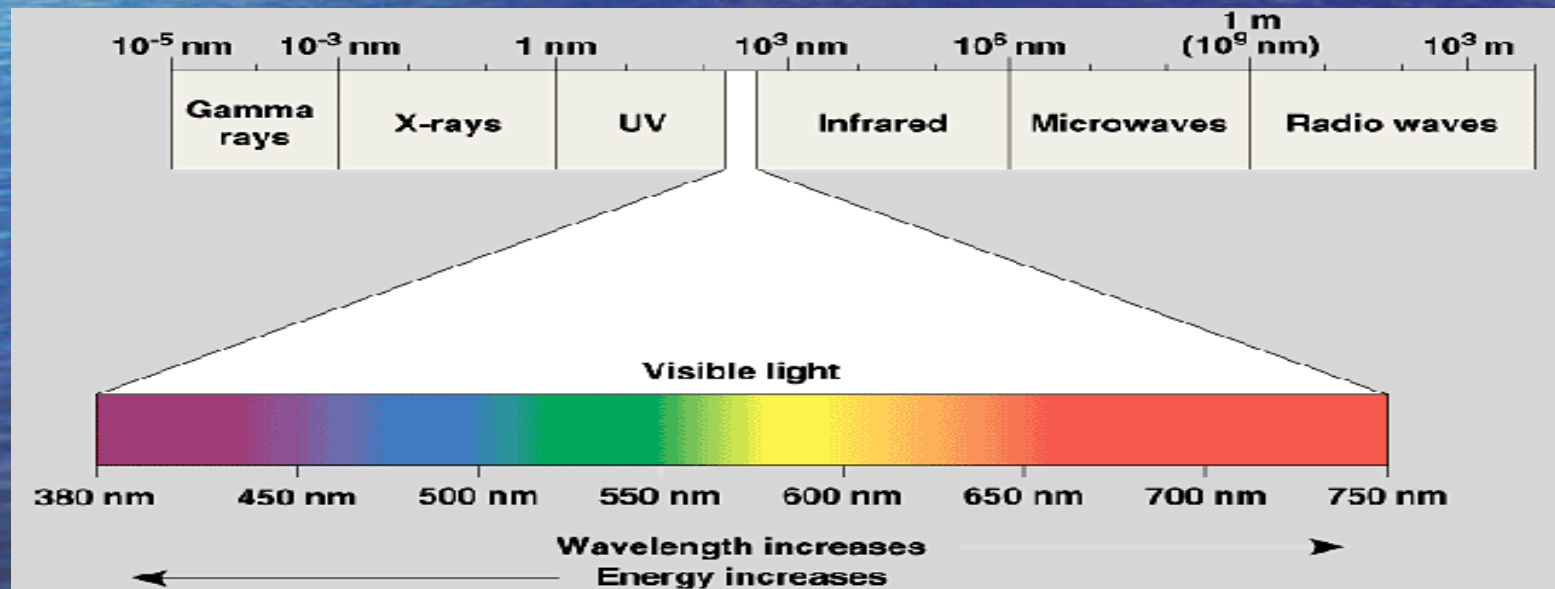
- What are Colors?
- What is White?
 1. When There is no Colored Light
 2. When there is no Light at All
 3. When all of the Visible Light mixes
- What is Black?
 1. When all of the Light mixes together
 2. When there is no Light
 3. When there is only Black Light
- Are there more?

Properties of Light

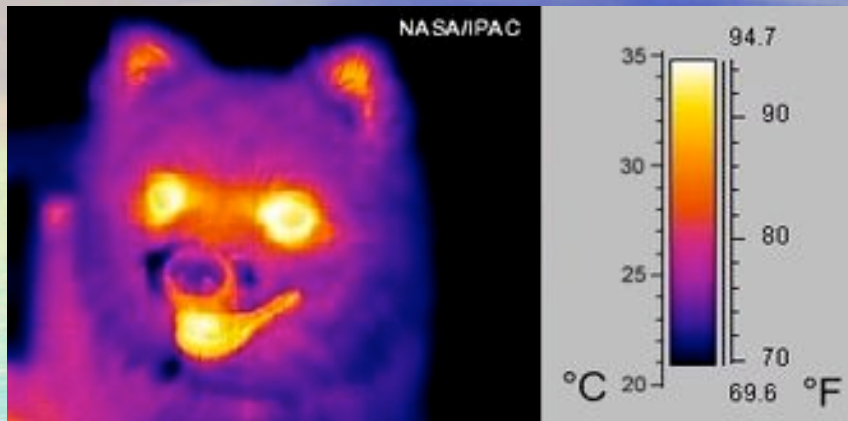
- Speed
- Intensity - Brightness
- Length – Type of Light
- Think of it like the Ocean

Visible Light

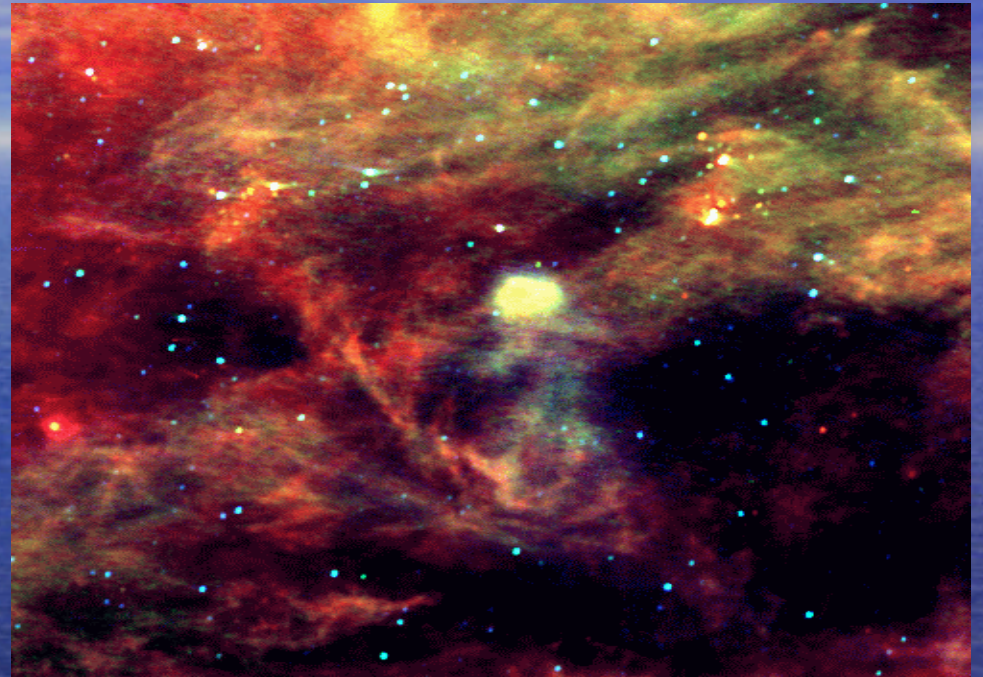
- What we can see
- Light mixes to make new colors
- White Light contains every color equally



Infrared



- Beyond Red
- How do we know its there?



Microwave



Radio

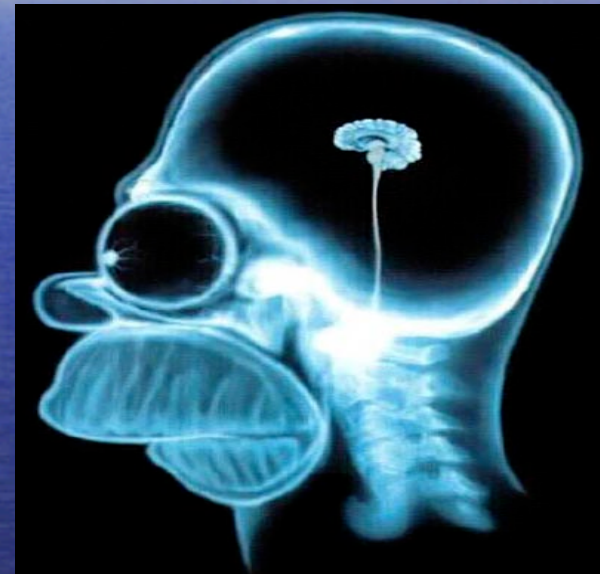


On The Other Side we have...

UV

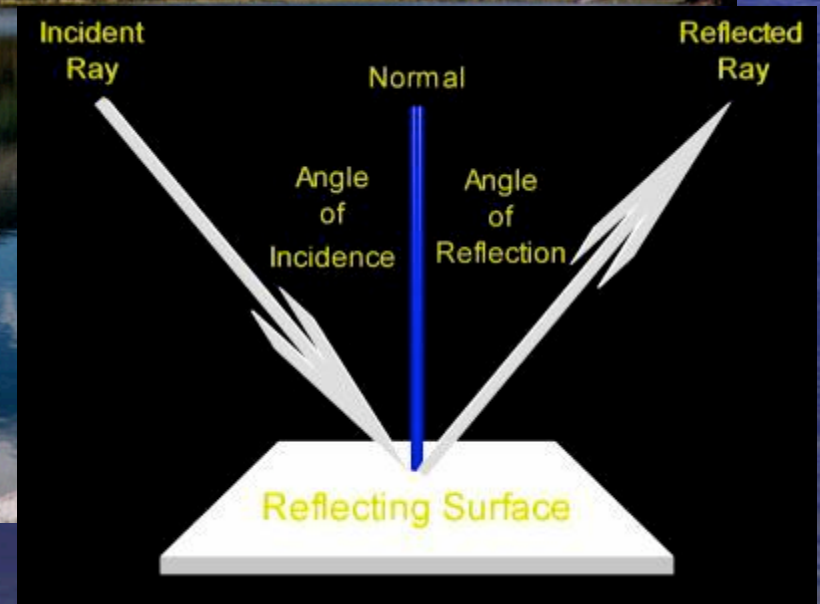
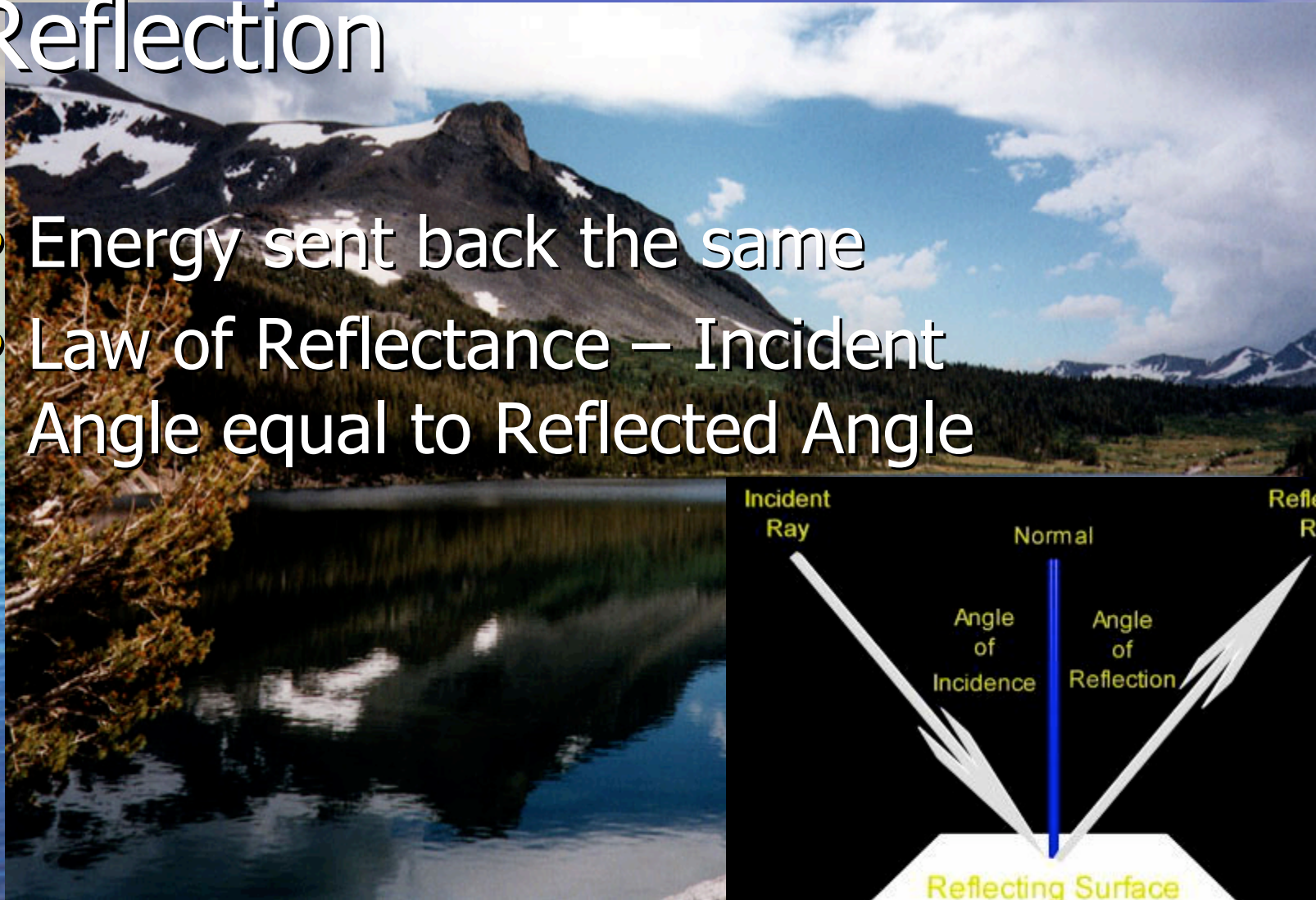


X-RAY



Reflection

- Energy sent back the same
- Law of Reflectance – Incident Angle equal to Reflected Angle

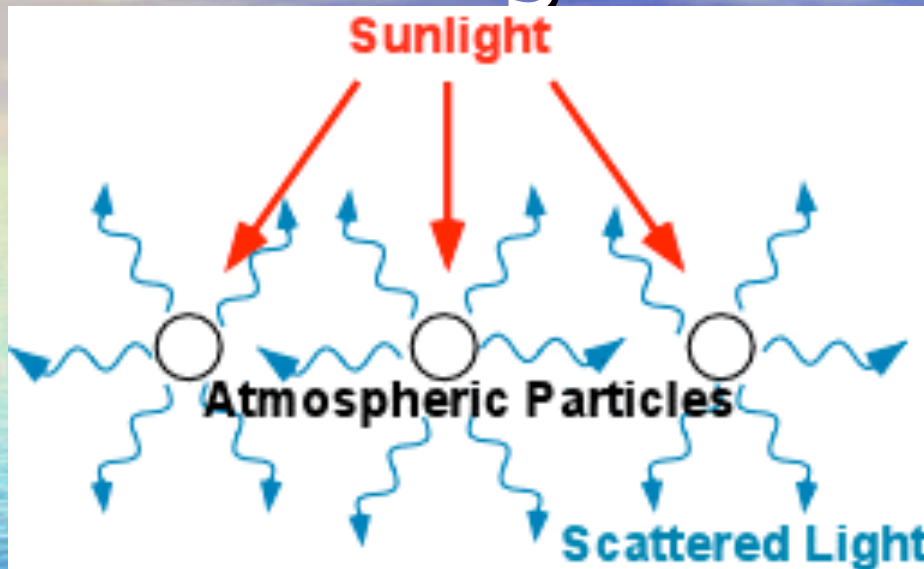


Refraction



- Change of Speed from one Material to the next
- Think of Friction
- Reason for Rainbows
- Walking Demonstration

Scattering



- Not able to travel straight
- Reflection off non-uniform materials
- Diffuse Reflection



Speed of Light

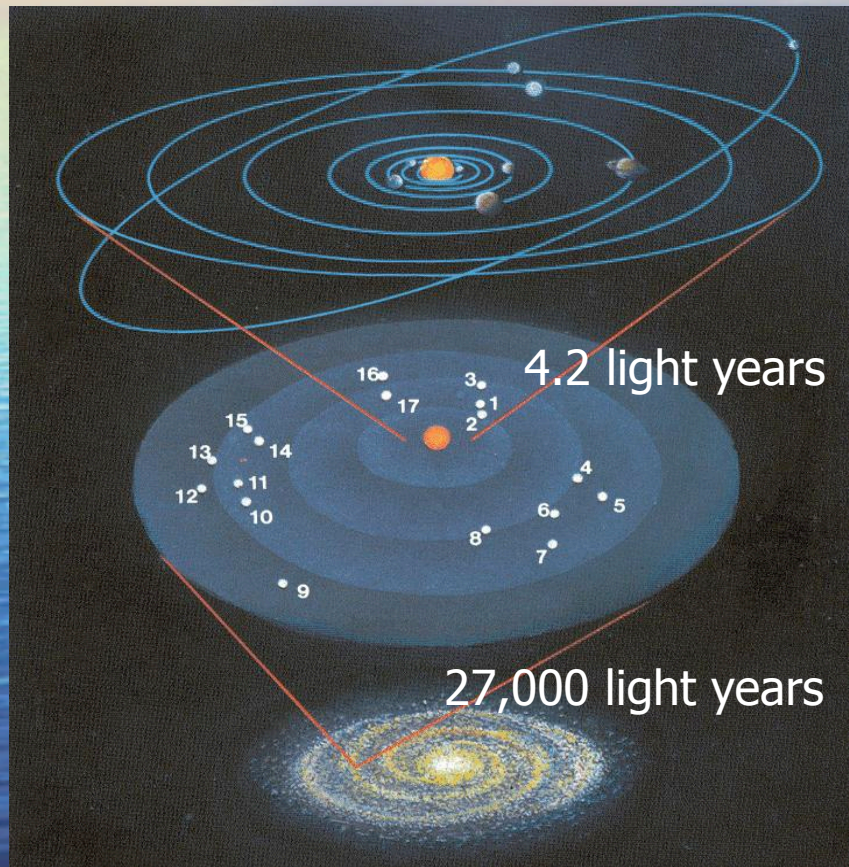
- Universal Speed Limit
- 186,000 miles per second
- 7 times around Earth in one Second
- **5.878 Trillion miles in a Year**





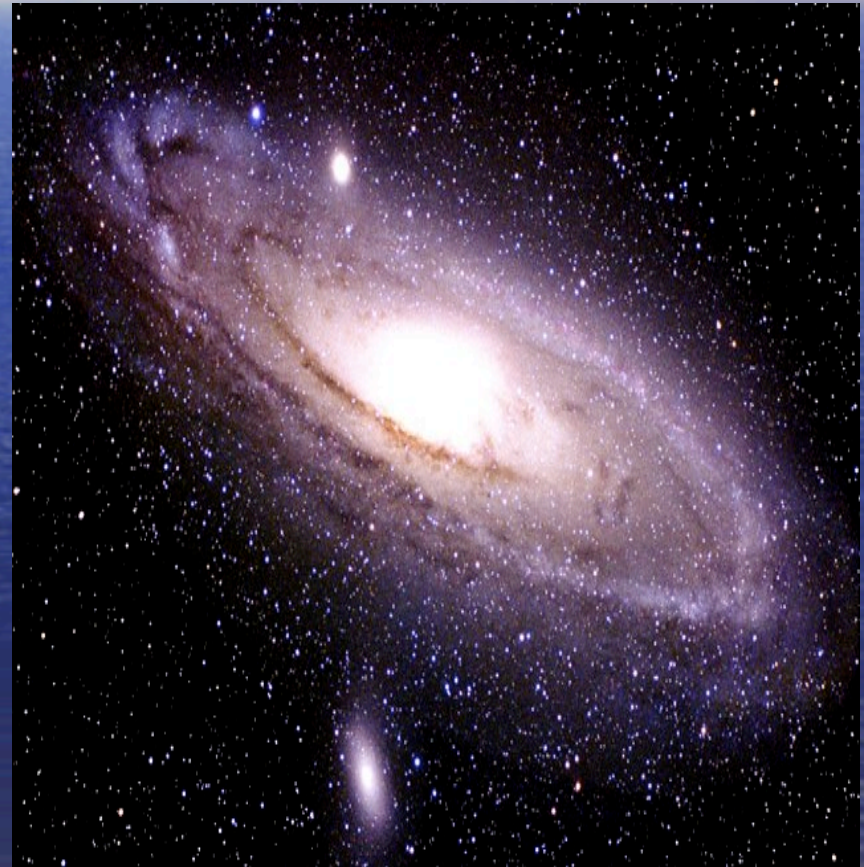
• 4.35 light minutes

Our Galaxy...



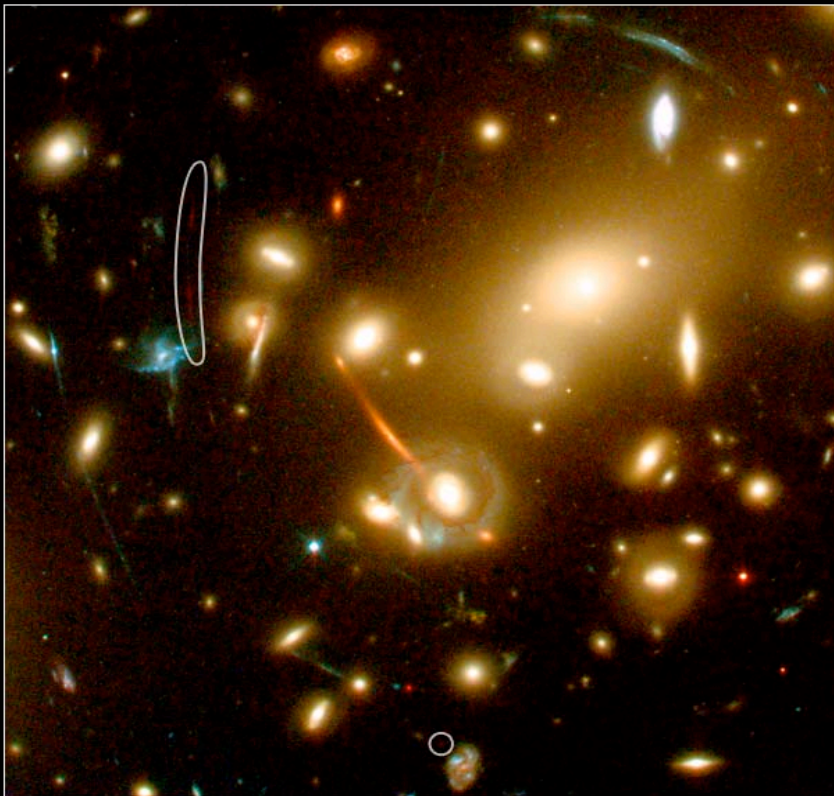
Andromeda

- 3 million light years
- Humans can't use stone tools
- Big Island doesn't exist, 400,000 years old



Farthest Reaches that We can See

Distant Galaxy Lensed by Cluster Abell 2218 HST • WFPC2 • ACS



ESA, NASA, J.-P. Kneib (Caltech/Observatoire Midi-Pyrénées) and R. Ellis (Caltech) STScI-PRC04-08

- 13 Billion light years
- Earth 4.5 billion years old