Notes for Light Interactions

Solar Winds

- Sun's corona sheds positively and negatively charged particles
- Charged particles collect to form solar winds that travel to Earth

Earth's Magnetosphere

- Earth's iron core creates a giant magnet with a magnetic field that extends far into space
- As particles in solar wind encounter the Earth's magnetosphere, the charged particles are directed around and away from Earth

Auroras

- Occasionally the Sun ejects a large mass of plasma.
- Earth's magnetosphere becomes overwhelmed and some charged particles are directed towards Earth's poles.
- In the thermosphere, the charged particles collide with nitrogen and oxygen atoms releasing small bursts of colored light.

Radiant Energy

- Visible light waves is the only part of electromagnetic spectrum we can see.
- White light – all colors combined – ROYGBIV
- Different colors have different wavelengths – red is the longest and violet is the shortest.

Light Wave Behavior

- Reflected light waves bounce back off object
- Transmitted light waves travel through object
  - Transparent – all light travels through
  - Translucent – only some light travels through
- Absorbed light waves do not pass through or bounce off
  - Opaque – no light travels through
- Pigments – chemicals in substances that absorb some colors of light and reflect others. (We see reflected light).

Light Refraction

- The bending of light as it changes speed when traveling from one medium to another (example - from air to water)
- As light changes mediums, the different wavelengths of colored light bend at different rates. Red bends the least and violet bends the most.
- Rainbows occur when light passes through water droplets in the air and the different wavelengths of light are refracted and separated.

Scattering of Light

- Occurs when light waves strike atoms in the atmosphere and are scattered in all different directions.
- Clouds – large water droplets scatter all colors of light equally so they appear white
- Air molecules, nitrogen and oxygen, are so small that they scatter the smaller light waves more, so the sky appears blue.
    - Violet light waves are absorbed in the upper atmosphere

- **Red, yellow, and orange light remain together, so when we look at the Sun, it appears yellowish white.**
- **Sunrises and sunsets – when the sunlight shines through the lower atmosphere, it passes through larger water molecules and dust particles, so the red, orange, and yellow light waves are then scattered and we can see them.**