6th Grade Science Key Concepts
Energy: Conservation and Transfer (6.P.3)

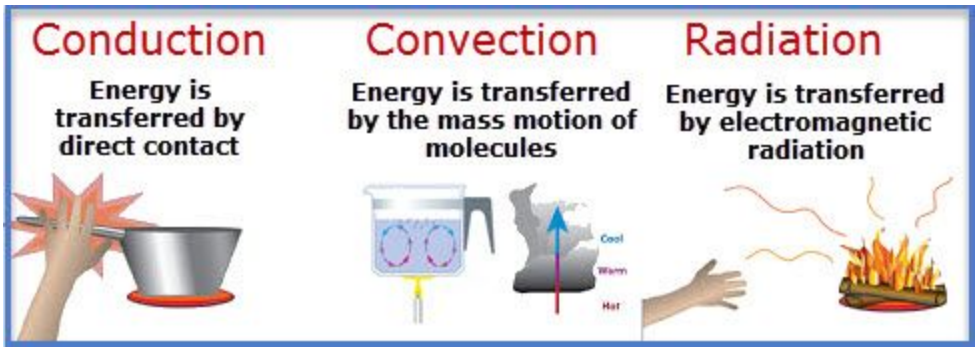
DURHAM PUBLIC SCHOOLS

6.P.3.1 Convection, conduction, & radiation

Energy can be transferred from one system to another or system to environment in different ways:.

- **Thermal energy**- heat travels from a **WARM** object to a **COLDER** object
- **Mechanical energy**- push or pull on each other over a distance
- **Electrical -** energy of electrical charges (lightning, electricity, radios, batteries)
- **Electromagnetic**- energy that travels through space; usually in wave; (sunlight)

Ways Energy can be transferred



- **Conduction**: Heat flows from a warmer object to a colder object until both are at the same temperature
- **Convection**: Circulation of heat through liquids and gases (air)
- **Radiation:** Energy traveling across a distance; travels from the sun

6.P.3.2 Effects of electromagnetic waves

Electromagnetic waves (like sunlight) can warm objects. The object's **temperature** change depends on how intense (strong) the light is striking the surface, how long the light shines and how much is absorbed.

When light interacts with matter, it is either

- **Absorbed-** when matter captures electromagnetic radiation (generally, dark colored objects absorb more light than light colored objects)
- **Scattered**- light is transmitted into different directions;
- **Reflected**- bounces off the object; allows us to see the object (generally, light colored objects reflect more light than dark colored objects)

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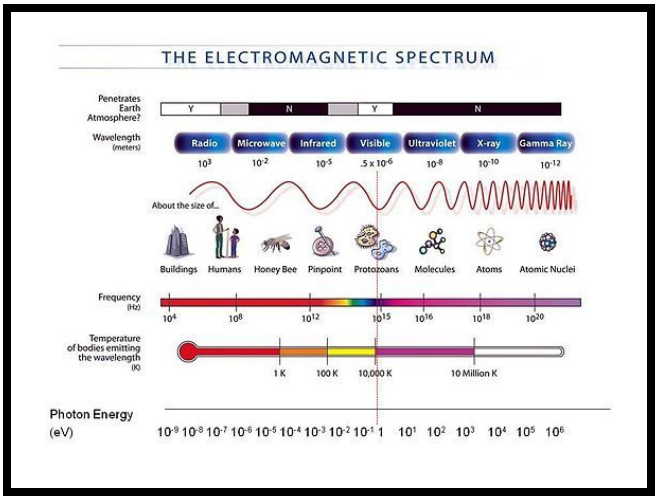
The sun's energy is made up of many different wavelengths. This is generally referred to as the **electromagnetic spectrum.**



Type of Wavelength	Description
Visible spectrum	Is visible to the human eye. Electromagnetic radiation or Light
Infrared light	Longer wavelengths, detected its heating effect; used in space exploration, satellite imaging
Ultraviolet light	Shorter wavelengths than visible light; causes our sunburns, most blocked by ozone.

6.P.3.3 Technological design based on response to heat and electrical energy

Thermal energy can be transferred by currents in the air, water or fluids (convection), direct contact with objects (conduction)

- **Thermal Conductors** are materials that allow thermal energy to flow easily. Examples: metals such as copper, iron, aluminum, steel
- **Electrical Conductors** are materials through which electrical current can flow easily. Examples: most metals, water
- **Thermal Insulators** are material that limit the flow of thermal energy. Examples: rubber, concrete, pot handles, styrofoam
- **Electrical Insulators** are materials through which electrical current cannot flow easily. Examples: non metallic solids (rubber, glass, porcelain, ceramic)