

Vocabulary

Wave – special class of repeating pattern moving through space;

Traveling Waves – moving pattern, quantity that is changing (like the water in a pond)

Node – zero point of a wave

Antinode – another zero point on a wave

Wavelength – the distance from one high point to the next;

Amplitude – the amount of change from the zero point;

Frequency – about how many cycles per second; (measured in hertz)

Cycles – Repeating pattern;

Period – the time it takes to go through one whole pattern and return to the starting point again.

Transverse Wave – their amplitude changes in a direction perpendicular to the direction the wave pattern is moving; (water moves up and down but the movement is horizontal)

Longitudinal Wave – whatever is changing is moving in the same direction as the wave is traveling;

Superposition – if two waves pass the same point at the same point, their amplitudes will add up at that point;

Standing Wave – special case of superposition where the two waves add up and the nodes don't move;

Resonance – energy is put into an object at its natural frequency;

Natural Frequency – the frequency that will set up standing waves

Doppler Shift – source of a wave is moving towards you, the wave will appear to have a different frequency than if the source of the wave was not moving;

Photons – light acting as a particle; no mass or charge, only energy;

Spectrum – range of wavelengths

Reflection – light hits a surface it can't penetrate;

Normal Line – the normal line is perpendicular to the surface at the point where the light hit;

Mirror – an object that reflects almost all of the light that hits it

Optical Axis – the line along which the mirror could be folded in half and exactly match up with itself

Concave - curved away from the viewer

Convex - curved towards the viewer;

Refraction - bending of light as it enters different medium;

Lenses - specially shaped pieces of glass/plastic that bend the light in a certain way;

Concave Lenses - spread apart light rays;

Convex Lenses - bring together light rays;

Colors - the manifestation of different wavelengths of light hitting our eyes;

Prism - which is simply a piece of glass cut so that one side is at an angle to another side so that light rays that go in are refracted and then re-refracted by a different amount;

Dispersion - separation of different wavelengths;

Strong Nuclear Interaction - the force responsible for binding protons and neutrons into atomic nuclei;

Radiation - byproduct of the process of atomic decay

Alpha Particles - a form of radiation

Weak Nuclear Interactions - its strength is many times less than the nuclear interaction;

Gamma Rays - form of electromagnetic radiation;

Beta particles - identical to electrons;

Alpha Decay - alpha particle is emitted;

Beta Decay - nucleus loses a neutron and gains a proton becoming a new element;

Gamma Ray - nucleus loses energy, but remains the same element;

Nuclear Fission - making large nuclei unstable by introducing slight changes to them;

Transuranics - elements heavier than uranium on the Periodic Table;

Nuclear Fusion - binding elements together; binding energy that is now more negative so we appear to have lost energy;

Pitch - principal frequency (altered by size, tension, mass)

Light - wave made up of perpendicular self-propagating electric and magnetic field; light is also a massless particle of energy called a photon;

Scientists

Thomas Young - double slit experiment; showed that light acted as a wave;

Heinrich Hertz - the unit of frequency is named after him

R. D. Oldham - Earth has a liquid core that blocks transverse waves;

Christian Doppler - Doppler shift; Changing frequency of moving objects

Albert Einstein - light also behaves like a particle, even if it is a wave; $e = mc^2$; nobel prize photoelectric effect;

James Clerk Maxwell - electric/magnetic fields can change light waves; light propagates by variations in strength of EM fields

Dr. Arthur Walker - used x-rays to study the corona;

Olaus Roemer - sunlight reflects from the moons of Jupiter takes longer to get to Earth, the speed of light can't be infinite;

Hippolyte Fizeau - measured light's speed;

Inge Lehmann - earthquake waves appeared to be bent as if there was a solid surface in the liquid core;

Henri Becquerel - wanted to learn about new x-rays; discovered alpha particles;

Marie Curie - discovered radioactivity; woman scientist; won 2 Nobel prizes; systematic survey of the known elements lead to nuclear physics; things happen in a nucleus, nuclear physics not chemistry;

Pierre Curie - invented a device that lead to the discovery of thorium, tested radioactivity;

James Chadwick - nucleus contained neutral neutrons, rather than neutral proton-electron pairs;

Maria Goeppert Mayer and Hans Jensen - both independently theorized of nuclear shells

Enrico Fermi - creating transucnics;

Lise Meitner and Irene Curie - made elements/theorized about making elements;

Otto Hahn - told Meitner that elements were acting like barium but couldn't be barium

Frederic Joliot - Irene Curie's husband;

Hengemeh Karimi - looking for a place to store nuclear waste;

Issac Newton - Colors/spectrum

Wilhelm Roentegen - x-rays; unit of radiation is named in his honor