Student Notes

Topic 2 WAVES

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – a repeating movement or disturbance that transfers \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_through matter or space.
* All waves carry \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ without transporting matter from place to place.
* Molecules \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy along to neighbor molecules who then pass energy to neighbor
* All waves are produced by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Waves will travel as long as there is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to carry

WAVES MOVE ENERGY… … NOT MATTER

BOAT STAYS IN THE SAME PLACE.

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – matter through which a wave travels.
  + A medium can be solid, liquid, gas or combo of these.
  + Not all waves need a medium to travel – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ waves can travel through space.
* Mechanical Waves – waves that can only travel through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Waves \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Waves

matter moves back and forth matter in medium moves in

at right angles to direction the same direction that

that waves travel wave travels (symbol)

FEATURES OF WAVES

Parts of a Wave

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – the highest points, and

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – the lowest points of waves

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ have dense regions (coils close together) called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and less dense regions called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – distance between one point on wave and similar point nearest to it (crest to crest, trough to trough, compression to compression or rarefaction to rarefaction)

Wavelength of wave decreases as frequency increases

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – number of wavelengths that pass a fixed point each second (hertz - Hz)
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_– a measure of energy in a wave; the more energy a wave carries greater

amplitude

* Distance from crest or trough to normal position in transverse wave.
* The denser the compression the larger the amplitude in compressional wave.

BEHAVIOR OF WAVES

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – the angle of incidence (i)

Of a wave is always equal to the angle

r r

i

Of reflection (r)

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – occurs when a wave strikes an object and bounces of it – all types of waves can be reflected (ex. sound, water, and lignt)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – bending of wave caused by a change

In its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_as it moves from one medium to

another.

Pencil in water looks broken due to refraction

\* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the change in speed the more the wave bends

Diffraction – an object causes a wave to change direction and bend toward it. GOES AROUND!!!

\* Both refraction and diffraction cause waves to bend however, refraction occurs when waves pass \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ an object while diffraction occurs when waves pass around an object

ELECTROMAGNETIC SPECTRUM

* Electromagnetic Waves – made by vibrating electric charges and can travel through space.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of electromagnetic waves is the

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of vibrations per second (H2)

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – the entire range of electromagnetic wave frequencies

The Electromagnetic Spectrum includes:

Radio Waves – low frequency waves with wavelength of about 1 – 10 cm

(radio stations, microwaves, radar)

Infrared waves – have slightly higher frequency than radio waves

(remote control, warmth of fire, satellites)

Visible Light – range of electromagnetic waves you can detect with your eyes

(ROYGBIV – different colors have different wavelength)

Ultraviolet Waves – frequencies slightly higher than visible light

(sunburns, Vitamin D production, flurescent, materials absorb it, kills bacteria)

X Rays & Gamma Rays – Ultra – high frequencies that can travel through

matter, damage cells (bone images, radiation therapy, production of superhero

HULK)

COMMUNICATING WITH RADIO WAVES

Radio transmission – radio converts electro – magnetic waves into sound waves.

Each radio station is assigned a particular radio frequency for their broadcast – this specific frequency is called the carrier wave.

Carrier waves can transmit a signal in one of two ways:

Amplitude modulation (AM) Frequency modulation (FM)

AM radio broadcast info by varying FM radio varies the frequency of carrier

the amplitude of the carrier wave. wave.

Television – audio is sent by FM radio waves and video is sent by AM radio signals.

Cathode – ray tubes – produce images you see on TV – surface is covered by spots

that glow red, green, or blue when struck by electron beams.

Telephone – electrical signal creates radio wave that is transmitted to and form a

microwave tower.

Global Positioning System (GPS) – system of satellites, ground stations and

receives that receive high freq microwave signals, amplify it and return it to

Earth.