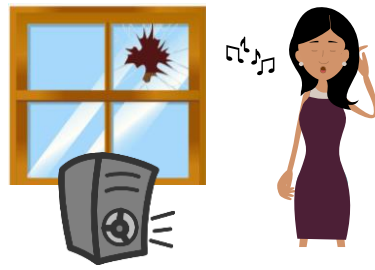


Waves VIDEO GUIDE

Name _____

Instructions: Use the Waves Video at www.crsci.org to help complete the guide below!

1) Car speakers with a lot of bass can shake the windows of your room. Opera singers can break fragile objects if they sing high enough. Why do think this is?



WHAT ARE WAVES?

-WAVES are vibrations that _____ from place to place (1:33)

2) If you wanted your friends to know that you got new shoes for your birthday, you could...

- a. Send them a pic of your shoes
- b. Call them and tell them
- c. Post it on IG
- d. Any of the above would work

The things we go through to transfer or receive info can be called MEDIA. Some waves require a MEDIUM to transfer energy!

HOW do waves transfer energy?

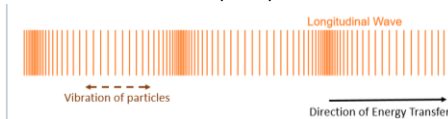
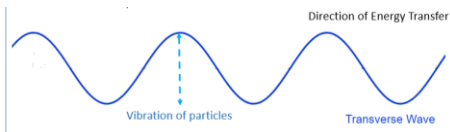
-A MEDIUM is a set of _____ that a wave can _____ through. (1:55)

-MECHANICAL WAVES are waves that _____ a _____ for energy to _____ (2:27)

3) A medium could be a...

- a. Solid
- b. Liquid
- c. Gas
- d. Plasma
- e. All of the above

Mechanical Waves can be **TRANSVERSE** or **LONGITUDINAL!** (2:41)

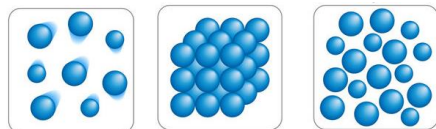


TRANSVERSE

Vibrations are _____ to the _____ of travel

4) Sound Waves are TRANSVERSE mechanical waves

True or False, if false, explain why. (2:46)



LONGITUDINAL (Compression)

Vibrations are _____ to the _____ of travel

5) A sound wave travels through the three mediums shown, Rank them 1-3 in order from the fastest to slowest speed of sound. (3:05-3:36)

ELECTROMAGNETIC WAVES (3:54)

-ELECTROMAGNETIC WAVES do _____ a _____ to _____

-They are ONLY _____, NOT longitudinal

-They travel through vacuums at the _____ which is 3.00×10^{20} m/s!

6) A vacuum is a chamber or space with NO matter inside. Gerardo believes that sound should travel the fastest through a vacuum. Abeni believes that light should travel the fastest in a vacuum. Which student is correct and explain.

7) We SEE lightning before HEARING thunder because...

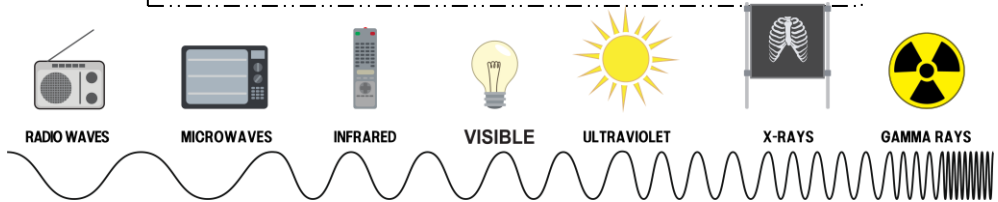
- a) Light waves are longitudinal and sound waves are transverse
- b) Light waves are mechanical waves and sound waves are electromagnetic
- c) Sound waves require a medium and light waves do not
- d) None of the above

8) Light is the only electromagnetic wave

True or False. _____

Explain _____

The Electromagnetic Spectrum



9) Use your knowledge of the electromagnetic spectrum to identify which portion is used for the following:

Using your remote to turn on the TV _____

Getting a tan at the beach _____

Using your cell phone to send text messages _____

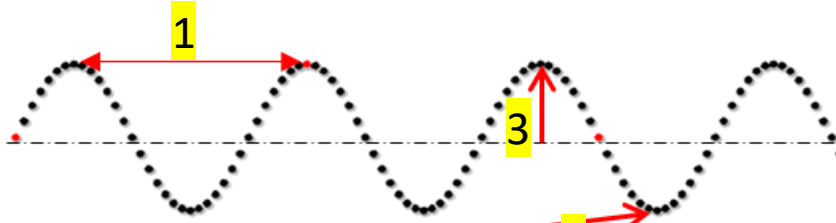
Speeding up the water molecules in food to heat it faster _____

Technique to view broken bones in the body _____

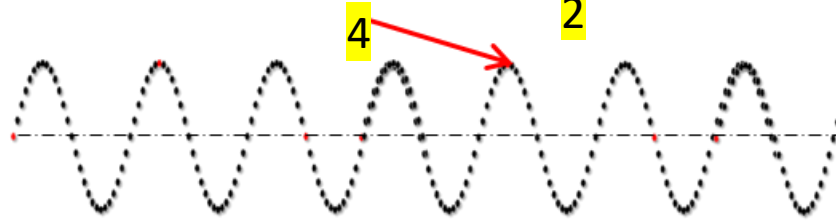
Commonly used to fight cancer _____

The only portion of the spectrum we can see _____

WAVE A



WAVE B



#10-12 Refer to the Diagram of the two Transverse waves above.

10) Match the numbers above to their descriptions in the spaces below (5:04-5:51)

_____ a) **WAVELENGTH**-Distance from crest to crest or trough to trough

_____ b) **AMPLITUDE**-Distance from resting point to crest or trough

_____ c) **TROUGH**-Lowest point of a wave

_____ d) **CREST**-Highest point of a wave

11) Which wave has a higher **WAVELENGTH**? A or B

12) Which wave has a higher **FREQUENCY**? A or B

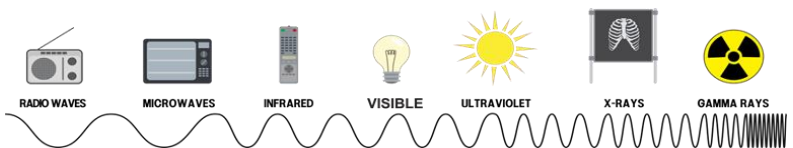
RELATIONSHIP BETWEEN WAVELENGTH Frequency & ENERGY (5:52)

Wavelength and frequency have an _____ relationship!

This means the **HIGHER** the **FREQUENCY**, the _____ the **WAVELENGTH**!

Frequency and Energy have a _____ relationship!

This means the **HIGHER** the **FREQUENCY**, the _____ the **ENERGY**!



13) Which portion of the electromagnetic spectrum has a higher **FREQUENCY**? X Ray Waves or Infrared

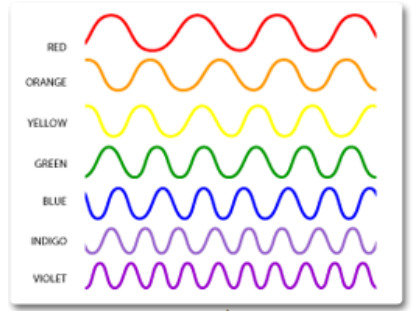
14) Which portion of the electromagnetic spectrum has a longer **WAVELENGTH**? X Ray Waves or Infrared

15) Which portion of the electromagnetic spectrum has a higher amount of **ENERGY**? X Ray Waves or Infrared

OUR EYES...

Detect different wavelengths and frequencies of light as _____! (6:10)

16) Using the figure on the right Which color on the Visible Light spectrum has the highest frequency?



WHITE LIGHT contains ALL colors of the Visible Light Spectrum. When white light from the sun strikes a leaf, the pigment Chlorophyll _____ EVERY color on the spectrum EXCEPT green. Green is _____! Leaves also contain other pigments that reflect _____ wavelengths of light, like yellow, orange, and red. As Fall and Winter arrive, the sun shines LESS and chlorophyll becomes less active, allowing other pigments to reflect _____ frequencies of light.

This explains why we see leaves as _____, except in Fall and winter!

17) Fill in the blanks shown in the passage above with the following words:

- higher lower green absorbs reflected



OUR EARS...

-Detect different wavelengths frequencies and wavelengths as _____

-PITCH is how _____ or _____ a sound is.

-Frequency and Pitch have a _____ relationship

C	D	E	F	G	A	B	C
130 Hz	147 Hz	165 Hz	175 Hz	196 Hz	220 Hz	247 Hz	262 Hz

Organism	Freq Range
A	4-16Khz
B	2-9Khz
C	8-44Khz

17) The ears of dogs can detect higher pitches than humans. The human ear can detect frequencies up to 19Khz. Based on this information, which organism in the table shown could be the frequency range of a dog.

THE DOPPLER EFFECT (7:34)

The change in _____ of a wave _____ of a wave due to the _____ of a wave _____ or an _____.

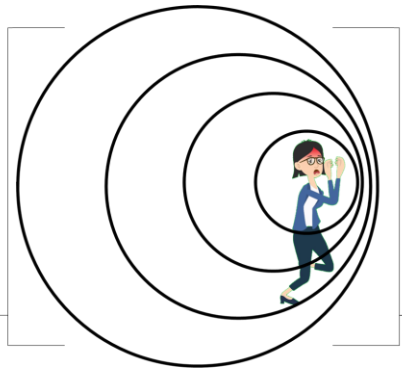
18) a) Label the SOURCE of the waves

b) Draw an arrow showing the direction she is running

19) a) In BOX 1, label this as HIGH frequency or LOW frequency

b) In Box 2, label this as HIGH frequency or LOW frequency

20) Are the observers hearing a LOWER pitch or a HIGHER pitch? Explain.



BOX 1

BOX 2