

9 PS Electromagnetic Spectrum

Name _____

1. In each of the following pairs, circle the form of radiation with the LONGER WAVELENGTH:
 - a. red light **or** blue light
 - b. microwaves **or** radio waves
 - c. infrared radiation **or** red light
 - d. gamma rays **or** UV radiation

2. In each of the following pairs, circle the form of radiation with the GREATER FREQUENCY:
 - a. yellow light **or** green light
 - b. x-rays **or** gamma rays
 - c. UV radiation **or** violet light
 - d. AM radio waves **or** FM radio waves

3. In each of the following pairs, circle the form of radiation with the LOWER ENERGY:
 - a. red light **or** blue light
 - b. microwaves **or** radio waves
 - c. infrared radiation **or** red light
 - d. gamma rays **or** UV radiation
 - e. yellow light **or** green light
 - f. x-rays **or** gamma rays
 - g. UV radiation **or** violet light
 - h. AM radio waves **or** FM radio waves

4. Rank the following series from low frequency to high frequency. *Circle the low - and - underline the high*
 - a. infrared light, radio waves, x-rays
 - b. black light, nuclear energy, cell phone
 - c. visible light, television waves, gamma rays

5. Rank the following series from high energy to low energy. *Circle the low - and - underline the high*
 - a. x-rays, gamma rays, visible light
 - b. heat lamp, wireless network, sterilizer
 - c. visible light, ultraviolet light, radio waves

6. Rank the following series from short wavelength to long wavelength. *Circle the low - and - underline the high*
 - a. Sterilization, cooking, tv remote control
 - b. Television wave, x-ray, microwave
 - c. ultraviolet light, gamma rays, visible light

Match each kind of wave with one item from column one and one item from column two.

COLUMN 1	WAVE	COLUMN 2
A. used in remote controls for TVs and VCRs	RADIO	H. used to detect illegal plane carry-on
B. goes through most matter except bone and lead	MICROWAVE	I. used to kill bacteria on food
C. highest frequency and energy	INFRARED	J. R O Y G B I V
D. can cause skin cancer or promote vitamin D production	VISIBLE	K. lowest frequency
E. longest wavelength	ULTRAVIOLET	L. most dangerous waves
F. used to transmit cellular phone calls	X-RAY	M. Warming food with a heat lamp
G. wavelengths and frequencies that can be seen by the human eye	GAMMA	N. radiant rays used in cooking

15. As you go from across the electromagnetic spectrum from radio to gamma, what happens to the frequency and energy of the waves? _____

16. As you go from across the electromagnetic spectrum from radio to gamma, what happens to the wavelength of the waves? _____

17. What happens to the speed of light as it enters a different *medium*? _____

18. Which color of the visible light portion of the electromagnetic spectrum has the highest frequency and the most energy? _____

19. Which color of the visible light portion of the electromagnetic spectrum has the shortest wavelength? _____

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- a. red light or blue light
- b. microwaves or radio waves
- c. infrared radiation or red light
- d. gamma rays or UV radiation

2. In each of the following pairs, circle the form of radiation with the GREATER FREQUENCY:

- a. yellow light or green light
- b. x-rays or gamma rays
- c. UV radiation or violet light
- d. AM radio waves or FM radio waves

↑ higher frequency

3. In each of the following pairs, circle the form of radiation with the LOWER ENERGY:

- a. red light or blue light
- b. microwaves or radio waves
- c. infrared radiation or red light
- d. gamma rays or UV radiation
- e. yellow light or green light
- f. x-rays or gamma rays
- g. UV radiation or violet light
- h. AM radio waves or FM radio waves

4. Rank the following series from low frequency to high frequency.

Circle the low - and - underline the high

- a. infrared light, radio waves, x-rays
- b. black light, nuclear energy, cell phone
- c. visible light, television waves, gamma rays

uv gamma micro

5. Rank the following series from high energy to low energy.

Circle the low - and - underline the high

- a. x-rays, gamma rays, visible light
- b. heat lamp, wireless network, sterilizer
- c. visible light, ultraviolet light, radio waves

in m uv

6. Rank the following series from short wavelength to long wavelength.

short

Long

- a. Sterilization, cooking, tv remote control
- b. Television wave, x-ray, microwave
- c. ultraviolet light, gamma rays, visible light

Match each kind of wave with one item from column one and one item from column two.

COLUMN 1		WAVE		COLUMN 2
A. used in remote controls for TVs and VCRs	<u>E</u>	RADIO	<u>lowest frequency</u>	H. used to find a broken bone or illegal plane carry-on
B. goes through most matter except bone and lead	<u>F</u>	MICROWAVE	<u>N</u>	I. used to kill bacteria on food
C. highest frequency and energy	<u>A</u>	INFRARED	<u>M</u>	J. ROY G.BIV
D. can cause skin cancer or promote vitamin D production	<u>G</u>	VISIBLE	<u>J</u>	K. shortest wavelength
E. longest wavelength	<u>D</u>	ULTRAVIOLET	<u>I</u>	L. most dangerous waves
F. used to transmit cellular phone calls	<u>B</u>	X-RAY	<u>H</u>	M. TV signals, and used in remote control devices like car alarms and garage door openers
G. wavelengths and frequencies that can be seen by the human eye	<u>C</u>	GAMMA	<u>K L</u>	N. radiant heat rays

15. As you go from left to right across the electromagnetic spectrum what happens to the frequency and energy of the waves? the frequency increases
and the energy increases
- direct relationship
16. What happens to the speed of light as it enters a different medium? speed changes
as a result the light refracts or bends
17. Which color of the visible light portion of the electromagnetic spectrum has the highest frequency and the most energy? ROY G BIV
violet has highest frequency
18. Which color of the visible light portion of the electromagnetic spectrum has the lowest frequency and the least energy? ROY G BIV - Red has lowest frequency
19. What type of wave is a radio wave? transverse an infrared wave? transverse
* all EM waves are transverse