

Answer Key

Waves Worksheet

1. Place the following electromagnetic waves in ascending order according to:

a) Frequency (1 to 6)		b) Wavelength (1 to 6)	
<i>Low to high</i>	4	Ultraviolet rays	3
	3	Visible light	4
	6	Gamma rays	1
	1	Radio waves	6
	2	Infrared rays	5
	5	X-rays	2

*Shortest λ
to
Longest λ*

2. What conclusions can be drawn about the characteristics of electromagnetic waves—that is, their frequency and their wavelength—based on results obtained in the previous exercise? Circle each statement that applies.

- (a) The two characteristics vary in opposite ways.
- (b) The two characteristics vary in the same way.
- (c) The greater the wavelength, the smaller is the frequency.
- (d) Wavelength and frequency vary proportionally.

A+C

3. True or false?

TRUE FALSE

a) When a wave propagates, it transports the medium in which it moves. *(energy)*

b) When a wave propagates, it transports energy from one point to another.

c) A wave always needs a medium in which to move. *(sound - yes)
(light - no)*

4. For each of the following examples, describe the type of wave.

a) Bread is browned in a toaster with heat emitted by its filaments.

radio waves

b) Televisions capture waves transmitted by various stations.

radio waves

c) Some people believe that cellular telephones are harmful to our health.

radio waves

d) It is possible to see a rainbow as it forms.

visible

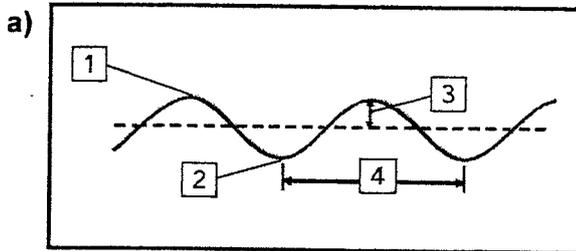
e) Some people believe that tanning salons should be off-limits to anyone under 18.

ultraviolet (uv)

f) Doctors order X-rays when they think a bone may be broken.

x-ray

5. Name the numbered elements in the following diagrams.



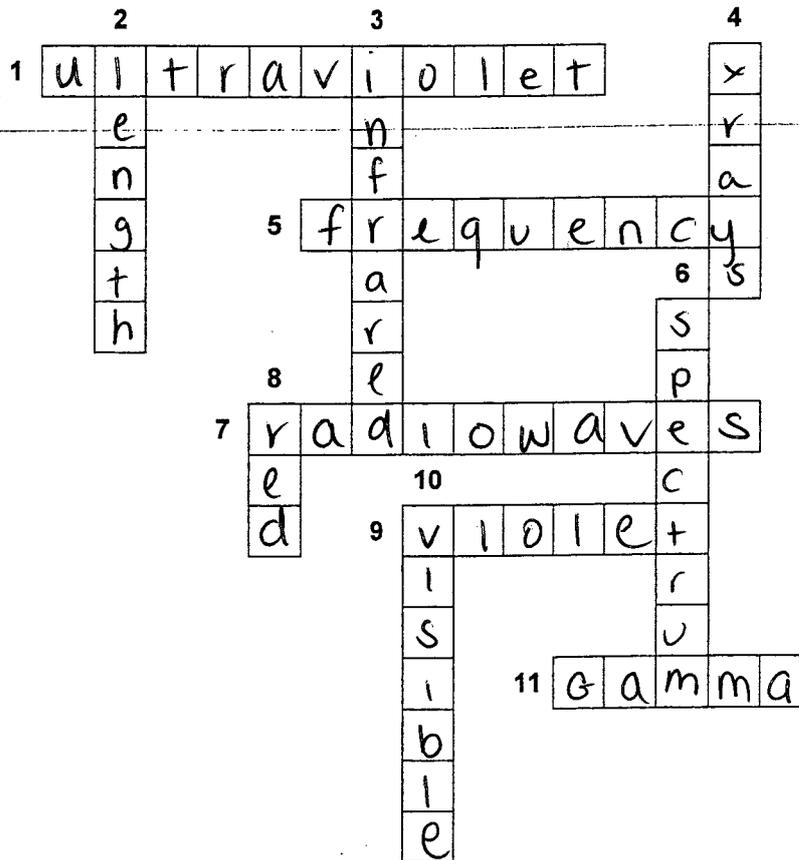
1 crest

2 trough

3 amplitude

4 wavelength

6. Complete the crossword puzzle.



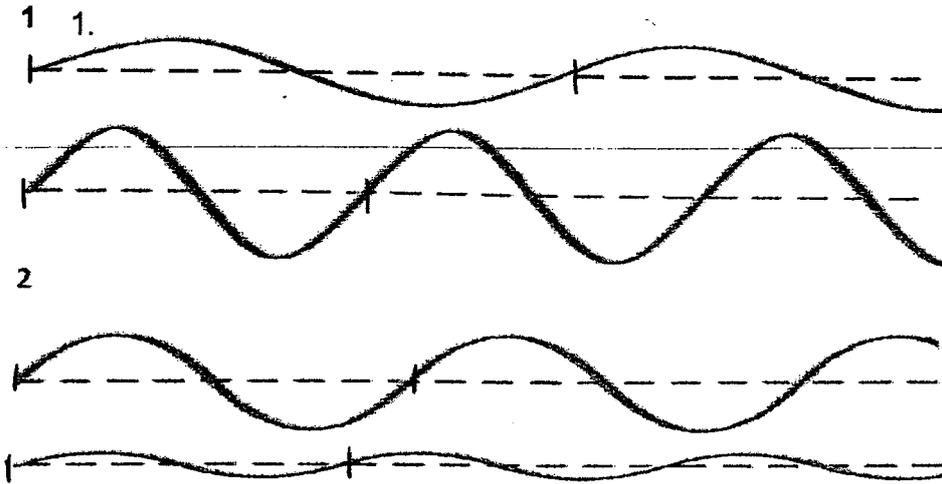
Across

1. Rays invisible to the human eye but visible to certain animals
5. High _____ corresponds to short wavelength.
7. Waves used by radar and cellphones (2 words)
9. Colour of light with the shortest wavelength
11. Rays that carry the most energy and can cause genetic mutations.

Down

2. Characteristic that helps classify electromagnetic waves: wave _____.
3. Invisible rays used in many remote control devices
4. Rays that can pass through a great number of substances.
6. Classification of waves according to their characteristics: electromagnetic _____
8. Colour of light with the lowest frequency
10. Type of electromagnetic wave that can be seen by the human eye: _____ light.

7. Look at the following diagrams of waves.

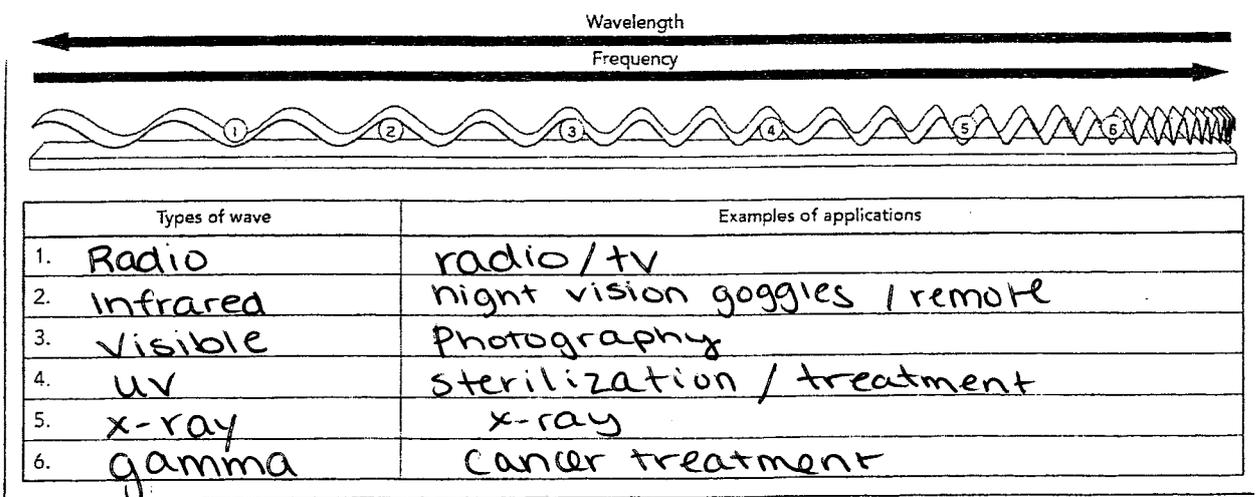


For each pair of diagrams, select the wave with:

- a) the greatest amplitude
- b) the highest wavelength

	Wave with the greatest amplitude	Wave with the (longer) highest wavelength
Pair 1	second wave	first wave
Pair 2	first wave	first wave

8. In the space below, fill in the electromagnetic spectrum table.



9. Answer the questions below using the table in the previous question.
- a- Which wave is the least dangerous? *radio*
 - b- Which wave is the most dangerous? *gamma*
 - c- Which wave is the only one we can see? *light*
 - d- Which type of wave do some animals use to catch their prey? *uv*
 - e- Which colour has the lowest frequency? *red*

10. True or false

- a- A short wavelength has a low frequency. *F*
- b- The higher the frequency the more energy the wave transports. *T*
- c- A person should not worry about having to take many X-rays. *F*
- d- All colours together make up the colour red. *F*
- e- A radio wave has a short wavelength and low frequency. *F*
- f- A wave only transports energy, not matter. *T*
- g- All waves need a medium to be transported. *F*

11. Explain why a wave with a long wavelength will have a low frequency.

Longer = not repeated often so lower frequency!