GREAT VIBRATIONS

Waves are rhythmic disturbances or vibrations that carry energy from one place to another. The diagram below shows many different waves that are all similar, except for one thing— their lengths. Their similarity starts all of them belonging to a group of electromagnetic waves. Fill in the blanks to reinforce what you've learned about waves.

1. All the waves shown are _______ waves. (transverse, compressional)
2. The energy produced by electromagnetic waves is _______.
3. Since the different kinds of waves have different lengths, they also have different _______.
4. All these waves make up the electromagnetic _______.
5. The only _______ waves are in the spectrum and in the middle (0.4–0.7 micrometers in length).
6. The kind of light produced by the sun or a "black light" comes from _______ rays.
7. What does it mean to say that a radio station has a frequency of 102 megahertz?
8. Which waves have shorter wavelengths: radio waves or X-rays?
9. Do gamma rays have a lower or higher frequency than microwaves?
10. Which waves have a lower frequency: TV or infrared?
11. Are X-rays visible?
12. Which waves would have a longer wavelength, those with 56 Hz frequency or 2 MHz frequency?
13. Which waves have a lower frequency: radar waves or visible light waves?
14. Which waves vibrate faster: radio waves or gamma rays?

Name
Facts About Light Energy

Light energy is also called radiant energy. This kind of energy includes infrared rays, radio waves, ultraviolet rays, and X-rays. Place a T before each true statement and an F before each false statement about light energy.

1. People can see the ultraviolet rays of the electromagnetic spectrum.  
2. Radar is an instrument that uses radio waves to detect objects.  
3. The longest wavelength of visible light is violet.  
4. Infrared lamps are used to keep food warm in a restaurant.  
5. Laser beams have one wavelength and travel in one direction.  
6. Ultraviolet rays help people produce vitamin D.  
7. X-rays are used to examine luggage at an airport.  
8. Microwaves are used to fastcook foods.  
9. The number of waves passing one point in a second is called a crest.  
10. Radio waves have the shortest wavelength.  
11. Radio waves are used to broadcast television programs.  
12. Cameras can record the infrared waves from people and animals.  
13. The shortest wavelength of visible light is violet.  
14. Gamma rays have the shortest wavelength and the highest energy.  
15. Visible light is made up of a spectrum of colors.  
16. Red-orange-yellow-green-blue-indigo-violet is the correct order of colors in the spectrum of visible light.  
17. The distance from one wave crest to the next is called the trough.  
18. A high-frequency wave has short wavelengths.  
19. Microwaves can be seen by people.  
20. Laser beams are often used at outdoor light shows.  
21. Gamma rays are emitted by radioactive elements.  
22. X-rays are used in medicine to locate broken bones.