***WAVES TEST - Study Guide*  Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Due Date\_\_\_\_\_\_\_\_\_\_\_**

**Short Answer: Please use the following in all responses:**

*\_\_\_\_I proof read my response to make sure that I answered the question!*

*\_\_\_\_ I began each sentence with a capital letter, and ended with a period!*

*\_\_\_\_ I wrote in complete sentences!*

*\_\_\_\_ I proof read my answer to make sure that it made sense!*

*\_\_\_\_ I underlined the required terms used in my answers!*

**1. Compare and contrast a mechanical and electromagnetic wave.** (*energy, medium, vacuum, force, disturbance*)

**2. What is the relationship between amplitude and energy in a mechanical wave?** (*energy, amplitude)*

**Bonus: Why does this not apply to an EM wave?**

**3. What is the relationship between frequency and wavelength? (***wavelength, frequency, increase, decrease***)**

1. **Explain how we see colors such as grass green and a red fire truck? In your answer you must also explain what is happening when we see black and white colored objects. (***Color, absorb, reflect, visible light, wavelengths, primary colors of light)*

**Essential Vocabulary- Write definitions for all words!**

mechanical wave cornea

electromagnetic wave lens

amplitude iris

crest pupil

trough optic nerve

energy rods and cones

\_\_\_Wave   
­­­\_\_\_Medium

\_\_\_Diffraction

\_\_\_Refraction

\_\_\_Absorb

\_\_\_Transmit

\_\_\_**Electromagnetic** Spectrum  
\_\_\_Longitudinal Wave

\_\_\_Wavelength

\_\_\_Frequency  
\_\_\_Visible Spectrum  
\_\_\_Sound  
\_\_\_Retina

\_\_\_Cornea

\_\_\_Lens

\_\_\_Iris

\_\_\_Pupil

\_\_\_Optic nerve

\_\_\_Rods & cones

\_\_\_**Vibrations**

**\_\_\_Pitch & Frequency**

**\_\_\_Intensity & Loudness**

force/disturbance vibrations

vacuum

transverse pitch and frequency

reflection intensity and loudness

rarefaction electromagnetic spectrum

longitudinal wave Retina

wavelength sound

frequency diffraction

visible spectrum compression refraction

wave absorb

medium transmit

**Multiple Choice Questions**

1. Sound waves, water waves, and the waves made by a rope are all examples of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. In a longitudinal wave, energy travels \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. When a wave hits a barrier and cannot pass through it, the reaction force causes \_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Refraction occurs because waves \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Give an example of diffraction. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. If the crests of two waves join up exactly, their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

7. Forces can cause waves by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

8. At the beach, Paula measures how many wave crests reach the shore in a given time. She is finding the wave's \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. Martin wants to know the wavelength of the wave made when he dips his finger into a pond. What should he   
 measure? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. A wave has a wavelength of 20 m and a frequency of 4 waves/s. What is the wave's speed? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11. A scientist measures a wave that has a wavelength of 0.01 m and a frequency of 200 waves/s. What is the   
 wave's speed? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12. Will shouts "Hello!" in a canyon. The sound bounces back to him as an echo. This is an example of a wave \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

13. Ronda put two speakers in her room. In one place, the sound was much quieter than in the rest of the room.   
 What might cause this? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

14. When a wave’s energy moves across a pond, in what direction do the molecules of the pond move? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15. What color light will be transmitted through red tinted sunglasses?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16. In what direction does a transverse wave transfer energy? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17. Sean is using a rope to make waves. If he increases the speed with which he creates the disturbance, he will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18. Isaac puts a solid wood barrier completely across a tank full of water. What do you predict will happen to   
 waves in the tank when they reach the barrier? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19. Mika put one end of a stick into a pond. When she looked down at the stick, it appeared to be broken at the  
 point where the stick entered the water. This was caused by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. What does a prism or a rainbow do to visible light to make the colors separate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. If you increase the frequency you \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the wavelength. This is an \_\_\_\_\_\_\_\_\_\_\_ relationship.
3. What determines the energy in an EM wave? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What parts of your eye refract light? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What parts of your eye help you see color and black and white? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. What happens when light is absorbed into a medium?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. How is sound produced? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. In what medium does sound travel the fastest? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. Why does sound travel the fastest in this medium?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. What determines the pitch of a sound wave? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. What determines the loudness of a sound wave?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
12. What parts of the eye focuses light? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
13. What parts of the eye open and close to allow more or less light into the eye?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
14. How does your ear pick up sound waves?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
15. Most of the light that hits a transparent window is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Label the parts of the eye diagram.**