**Properties of Electromagnetic Waves**

When we drop a stone in a pond, we see waves or ripples spreading out from the point where the stone was dropped. These waves are referred to as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ waves. When you watch TV, listen to radio, or cook in a microwave, you are experiencing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ waves called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ waves.

We know electricity can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, meaning without movement. If we rub a balloon with a silk cloth and hold it to a wall, the balloon will stick to the wall because of static electricity. We also know that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can also be static, like refrigerator magnets.

When both electricity and magnetism move \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, they cause \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ waves. Electromagnetic waves are made of both electric and magnetic waves. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, shown in blue color, moves perpendicular to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, shown in red color.



Both waves also move \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the direction of the wave. So electromagnetic waves are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ waves. Like mechanical waves, electromagnetic waves also have peaks called \_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ called troughs. The distance between two crests or two troughs is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Unlike mechanical waves, electromagnetic waves don’t require a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to travel through. Electromagnetic waves can travel through a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

X-rays, ultraviolet rays, visible light, infrared, microwaves, and radio waves are all electromagnetic waves. All of these electromagnetic waves together are referred to as electromagnetic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, that comes from outer space. Although all of the electromagnetic waves travel at the same \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will differ. For example, ultraviolet rays have shorter wavelengths than radio waves. So more ultraviolet waves will pass a point in a given time than radio waves.



Summary:

* Electromagnetic waves are the combined movement of electricity and magnetism.
* Electromagnetic waves are transverse waves, and can travel through a vacuum.
* X-rays, light rays, radio waves, and microwaves are examples of electromagnetic waves.