**Name:**

**Class:**

**The Nature of Electromagnetic Waves (page 574-577):**

**What is an Electromagnetic Wave?**

***Key Concept:* An electromagnetic wave consists of vibrating electric and magnetic fields that move through space at the speed of light.**

* An **electromagnetic wave** is a transverse wave that carries electrical and magnetic energy. The energy is called **electromagnetic radiation**. Light is an example of an electromagnetic wave.
* Electromagnetic waves do not need a medium to travel through. They can travel through empty space. For example, sunlight travels through empty space to reach Earth.
* All electromagnetic waves travel at the same speed. In empty space, they travel at about 300,000 km per second. This speed is called the speed of light.

*Answer the following questions. Use your textbook and ideas above to help you.*

1. Highlight the letter of the type of wave that is an electromagnetic wave.
2. Transverse wave
3. Longitudinal waves
4. Sound wave

2. Is the following sentence true or false? Electromagnetic waves need a medium to travel through. \_\_\_\_\_\_\_\_

3. The speed of light in empty space is \_\_\_\_\_\_\_\_\_\_\_\_.

**Models of Electromagnetic Waves (page 576-577):**

***Key Concept:* Many properties of electromagnetic waves can be explained by a wave model. However, some properties are best explained by a particle model.**

* Both a wave model and a particle model are needed to explain how light behaves.
* Sometimes light behaves like waves. The waves vibrate in all directions. You can use a special filter to block light waves that vibrate in every direction except one. Only light that vibrates in that one direction passes through the filter. This light is called **polarized light.**
* Sometimes light behaves like a stream of tiny particles of energy. A particle of light energy is called a **photon.**  When photons hit a material, they can knock other particles out of the material. When this happens, it is called the **photoelectric effect.**

*Answer the following questions. Use the textbook and your ideas above.*

4. Fill in the blanks in the table about models of light:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Models of Light**   |  |  | | --- | --- | | **Model** | **How Light Behaves** | | 1. \_\_\_\_\_\_\_\_\_\_\_ model | Like waves | | 1. \_\_\_\_\_\_\_\_\_\_\_ model | Like a stream of particles | |

5. Read the words in the box. In each sentence below, fill in one of the words.

|  |
| --- |
| Polarized photon interference photoelectric |

1. When light knocks particles out of a material, it is called the \_\_\_\_\_\_\_\_ effect.
2. A particle of light energy is known as a(n) \_\_\_\_\_\_\_\_\_\_\_\_.
3. Light that vibrates in just one direction after passing through a special filter is called \_\_\_\_\_\_\_\_\_\_\_ light.