

**TRANSMISSION, ABSORPTION, AND REFLECTION: How Waves Interact With Materials**

Show what you know! Answer the questions below. **Sample Answers**

1. Explain why sound waves are mechanical waves rather than electromagnetic waves.  
**Sound waves are mechanical waves because they travel through matter. Electromagnetic waves do not need to travel through matter.**
2. Cathy yells in a tunnel and hears her voice echo. Is this an example of transmission, absorption, or reflection? Explain.  
**This is an example of reflection. An echo is heard when a sound wave bounces off matter.**
3. When Gordon jumps into the pool, he creates waves that travel from one end of the pool to the other. Is this an example of transmission, absorption, or reflection? Explain.  
**This is an example of transmission. The wave travels through the water from one end of the pool to the other.**
4. Justin has a brother named Nick. Nick's bedroom is directly above Justin's bedroom. Before Nick had carpet installed in his bedroom, Justin could hear the sound of Nick singing as he practiced for chorus class each night. Once Nick's room was carpeted, Justin could no longer hear Nick singing. Why?  
**Carpet does a better job of absorbing sound waves than the bare floor. So, sound waves that are transmitted through a carpeted floor and into Justin's room have a smaller amplitude and less energy than waves transmitted through a bare floor.**
5. Justin also shares a bedroom wall with his sister Jennifer. From his bedroom, he can hear that Jennifer is playing the guitar, but the sound is muffled. Describe the interactions occurring between the sound waves and the wall.  
**When Jennifer plays guitar, sound waves travel from her guitar to the walls of her bedroom. Some of the waves are transmitted through the wall, which is why Justin can hear the music from his bedroom. But some of the energy from those transmitted waves is absorbed by the wall, which decreases the amplitude. Other waves are reflected by the wall. So, the sound that reaches Justin's room is muffled.**
6. There is a giant oak tree in Justin's backyard. On a sunny day, the leaves of the tree look green. Describe the interactions occurring between the light waves and the leaves of the tree.  
**When white light from the sun reaches the leaves of the oak tree, green light is reflected by the leaves. All the other colors of light are absorbed by the leaves. So, the leaves look green.**
7. Justin's bedroom window is divided into four parts. In the afternoon, he notices that the sunlight creates a pattern of light and dark areas on the wall. Describe the interactions occurring between the light waves and the window.  
**When light waves reach the panes of glass on the window, they are transmitted through the glass. When they reach the wall, they are reflected and absorbed by the wall. When light waves reach the material that divides the window into four parts, they are reflected and absorbed by the material. So, a shadow is cast on the wall. This creates the pattern.**

