Physics: Form WS8.3.2A Name _____

SOUND Date _____ Period _____

Echoes

You're walking down a long, dark, empty hallway. You hear someone walking behind you. You walk faster. The other person walks faster. You turn to see who's following you. There's nobody there. You begin walking again. You hear footsteps again. You stop. The footsteps stop. There's still nobody there. The footsteps are an echo of your own footsteps. It's the nature of long hallways–long, tile floors and empty walls–that make echoes arise. Sound is a wave. Like other waves it can bounce off surfaces and be reflected. A reflected sound wave is an **echo**. Echoes are sound waves. They travel at the same speed as other sound waves. This is helpful in making use of echoes. **Sonar** uses sound waves to map objects under water by sending out sound pulses, and tracking the echoes. The amount of time it takes an echo to return depends on the distance of the reflecting surface. Measuring the time between an emitted pulse of sound and detecting the echo tells the distance to the ocean floor or object reflecting the sonar sound pulse. Some animals use echoes to navigate and hunt. This is called **echolocation**. For example, bats emit high pitched squeaks and use echoes to locate insects.

Answer the questions below based on your reading above and on your knowledge of physics.

1. What is an echo? _____

2. Why are echoes more likely in the hall of an empty office building than in your bedroom? _____

3. What is sonar? _____

4. A ship mapping the bottom of a lake sailed north and measured the time it took to receive return sonar signals. As the ship sailed the time decreased steadily from 0.75 s to 0.50 s. What does this tell you about the depth of the lake as you head north? _____

5. How do bats hunt? _____