

## Reverberation

You stand on a mountain top and yell “Hello!” into the distance. Soon you hear yourself yelling back from your surroundings. The sound bounces back to you and you hear an echo. Sometimes you hear echoes in large indoor spaces as well, but not in smaller spaces. Why not? Don’t sound waves bounce around in smaller spaces? In fact, shouldn’t sound be reflected back and forth all around a room by walls, floor, and ceiling? It is! But echoes need to be separated by at least 0.1 s in order to be heard as separate sounds. Indoors, the reflecting surfaces are usually too close together to enable a large enough time difference to hear the separate echoes. Instead, these echoes blend together to produce a richer sound. These blended, repeated echoes of sound are called **reverberation**. Some reverberation can make sound bright and lively. Too little reverberation can make sound flat and lifeless. Too much reverberation can produce a confusing mess of noise. Acoustical engineers use soft materials to reduce echoes and panels to reflect sound towards an audience in concert halls in order to get it just right.



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

1. What is reverberation? \_\_\_\_\_  
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2. What are the effects of the amount of reverberation? \_\_\_\_\_  
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3. What is the difference between an echo and reverberation? \_\_\_\_\_  
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4. What kind of places are more likely to have true echoes, and which are more likely to have reverberation? \_\_\_\_\_  
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