Name: _____ Date: _____

The Echo in the Empty Gym

Circle group

Go into a big, empty gym. Clap your hands. You hear the clap. Then you hear it again, but softer. The second sound is an echo.

Sound moves in waves through the air. A wave can hit a hard wall. Then much of it bounces back. Your ears hear the sound two times. They hear it when you clap. They hear it again when it comes back from the wall.

The wall must be far away for an echo. If it is close, the sound comes back too fast. It blends with the first sound. In a small room, you hear just one clap.

Soft things do not bounce sound well. Curtains, rugs and cushions soak up sound. A bedroom with a rug is quiet. A bare gym rings. Builders of music halls plan the walls so music sounds clear.

Questions

1. What is an echo?

_____

_____

2. What happens when a sound wave hits a hard wall?

_____

_____

3. Why do you hear just one clap in a small room?

_____

_____

4. What soaks up sound?

_____

_____

5. Why is a bedroom with a rug quiet?

_____

_____

6. Why do builders of music halls plan the walls?

_____

_____

Words to know

echo: a sound you hear again after it bounces off a surface
waves: repeating motions that carry energy, like sound moving through air
soak up: to take in and hold instead of letting go

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

The Echo in the Empty Gym

Triangle group

Walk into a big, empty gym and clap your hands. You will hear the clap, and then a moment later you will hear it again, a little softer. That second sound is an echo.

Sound travels in waves through the air. When a wave hits a hard, smooth surface, such as a gym wall, much of it bounces back. Your ears catch the sound twice. The first time is when it leaves your hands. The second time is when it returns from the wall.

For you to hear an echo, the wall must be far enough away. If it is too close, the bounced sound comes back so fast that it blends with the original. In a small room you hear one clap, not two.

Soft things do not bounce sound well. Curtains, rugs and cushions soak up much of a sound wave. That is why a bedroom with a thick rug sounds quiet and cozy, while a bare gym sounds big and ringing. Builders of music halls think about this carefully. They choose walls and ceilings that shape how sound bounces, so that music sounds clear.

Questions

1. What is an echo?

_____

_____

2. What happens when a sound wave hits a hard, smooth wall?

_____

_____

3. Why do you hear only one clap in a small room?

_____

_____

4. Which things soak up sound instead of bouncing it?

_____

_____

5. Why does a bedroom with a thick rug sound quiet?

_____

_____

6. Why do builders of music halls think about how sound bounces?

_____

_____

Words to know

echo: a sound you hear again after it bounces off a surface
waves: repeating motions that carry energy, like sound moving through air
surface: the outside or top part of something
soak up: to take in and hold instead of letting go

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

The Echo in the Empty Gym

Square group

Step into a large, empty gymnasium and clap your hands once. You will hear the clap itself, and then, a moment afterward, you will hear it again, somewhat softer. That second sound is called an echo.

Sound travels through the air in waves. When a wave strikes a hard, smooth surface such as a gym wall, much of its energy bounces back toward you. Your ears therefore catch the sound twice: once as it leaves your hands, and once as it returns from the wall.

To hear a distinct echo, the wall has to be far enough away. If the wall is too close, the reflected sound returns so quickly that it merges with the original, and in a small room you notice only a single clap.

Soft materials do not reflect sound well. Curtains, rugs and cushions absorb a great deal of a sound wave. That is why a bedroom with a thick rug feels quiet and cozy, whereas a bare gym sounds large and ringing. Designers of music halls consider this carefully, choosing walls and ceilings that shape how sound bounces so that music can be heard clearly.

Questions

1. What do we call the second, softer sound you hear after a clap in a big gym?

_____

_____

2. What happens to a sound wave when it strikes a hard, smooth wall?

_____

_____

3. Why do you hear only a single clap in a small room?

_____

_____

4. Which materials absorb sound rather than reflecting it?

_____

_____

5. Why does a bedroom with a thick rug feel quiet?

_____

_____

6. Why do designers of music halls think about how sound bounces?

_____

_____

Words to know

echo: a sound you hear again after it bounces off a surface
waves: repeating motions that carry energy, like sound moving through air
surface: the outside or top part of something

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: The Echo in the Empty Gym

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: The Echo in the Empty Gym

Easier · 140 words · Flesch-Kincaid grade 0.5

1. A sound that bounces back and is heard again.
2. Much of it bounces back.
3. The sound comes back too fast and blends with the first sound.
4. Curtains, rugs and cushions.
5. The rug soaks up the sound, so less of it bounces around.
6. So the music sounds clear.

Triangle: The Echo in the Empty Gym

This passage · 187 words · Flesch-Kincaid grade 3.1

1. A sound that bounces back and is heard again.
2. Much of it bounces back.
3. The bounced sound comes back so fast that it blends with the first sound.
4. Curtains, rugs and cushions.
5. The rug soaks up much of the sound waves, so less sound bounces around.
6. They want the music to sound clear.

Square: The Echo in the Empty Gym

Harder · 190 words · Flesch-Kincaid grade 6.4

1. An echo.
2. Much of it bounces back toward you.
3. The reflected sound returns so quickly that it merges with the original.
4. Curtains, rugs and cushions.
5. The rug absorbs much of the sound waves, so less sound bounces around the room.
6. They want the music to be heard clearly.