



Movement game

The students imitate a sound wave during a game that shows them how sound travels.

Ask the students if they know how waves move in the sea. Then ask them to begin imitating a wave: The students stand in a circle and hold hands. The first child leans towards the next until their arms are touching. Then the first student returns to his/her starting position and the second child does the same as the first – he/she leans over and touches the arm of the third student. Then the second student returns to the starting position and the third leans towards the fourth and touches him/her on the arm. The game ends when the last student has touched the arm of the first student.

After the game ask the students:

What role were you playing in this exercise?

Why were you moving like this?

What does this movement remind you of?

Explanation:

Sound travels (is propagated) in a similar way. The first student represented the source of the sound (perhaps an instrument or vocal folds). The next students in the sequence represented air molecules which “lean” towards the molecules next to them – their movements resemble the propagation of a soundwave.

The molecules (e.g. air molecules) bounce off each other, thereby transferring energy onward, after which they return to their original position. This is known as oscillation.



Experiment

The students learn how the volume of a sound can change.

The students stand in a circle and take turns to say their name in four different ways:

- very quietly
- as loud as possible
- after covering their mouth with their hands
- after cupping their hands over their mouth to form a “tube”.

The students assess whether their names were equally understandable in all cases.

Ask:

Which of these ways produce louder and clearer sounds?

How did the tube work?

When was it difficult to understand what was being said and why was this?

What does the volume of a sound depend on?

Show the students a film about the biggest waves on the planet and ask them:

What determines the force of sea waves when they strike against something?

What happens to waves during a storm?

If a sound wave is similar to a sea wave, what is it about this wave that can affect the volume of sound?

Clicking play will redirect you to YouTube website.



When the sea is choppy, waves are very high. The same happens with sound waves. When a sound is quiet, the molecules vibrate with little force. When it is loud, the air molecules reach very high levels and are very powerful. It is precisely for this reason that listening to very loud music is dangerous and harmful to our ears.

When we cover our mouths, sound is muffled. This is because the flow of air molecules is “blocked”. When we cup our hands around our mouth to form a “tube”, the sound is stronger, since the wave bounces against our hands. In this case we can hear the sound coming directly from our mouth as well as the sound that is being deflected.



Experiment

The students make a device for watching sound.

The materials you will need:

- a kitchen bowl (e.g. metal) – one for each group;
- cling wrap;
- sugar or some grain (amaranth, couscous or some other small, light grains);
- sheets of A4 paper for each student.

Instructions:

The plastic wrap should be stretched and placed over the bowl so that it is very taut. Then the students should pour the grains or sugar onto the cling wrap.



The students use the sheet of paper as an instrument (a tube) – they should use one end as the mouthpiece and place the other close to the bottom of the bowl. Then they should make loud noises through the tube for 5 seconds. They observe what happens to the grains. Make sure that the tubes do not touch the bowl.



Conclusions

After they have completed the experiment talk with the students:

What did you observe?

Why did the grains begin to move?

The taut cling wrap begins to vibrate under the influence of the sounds coming out of the tube. The grains are so light that they begin to jump up and down as a result of its movements.



Experiment

The students make a sound with guitar string.

The materials you will need:

guitar string or fishing line (ideally, two types of string/line and of different thickness), tables or chairs.

Instructions:

Divide children to 4 teams. Provide each team with 2 strings - thinner and thicker.

Each team, should attach one end of the two strings or fishing lines to legs of the tables or chairs, and leave the other end unattached. Two people pulls the unattached ends of strings (fishing lines) very tight, while the others strikes or pulls the strings with their index finger (as when playing the guitar) – so as to make a sound. They then change roles. During the experiment they observe whether the sounds produced on different strings differ from one another.

Ask the students:

What did you have to do to hear a sound?

Why did the string have to be tightened?

What sound was made when you didn't tighten the string enough?

Were the sounds produced on both strings (the thin one and the thick one) the same?

How did they differ?