Additional video

Experiment

The students make a sound with guitar string.

You can also see a video:

Clicking play will redirect you to YouTube website.

Observing

The students learn what happens when they use their voice.

Explanation:
Ask the students:
What did you feel under your fingers when you made a sound?
What did you feel in your mouths when you did the exercise with the cling wrap?
Why does this happen?

Ask the students whether they have heard about sound waves. What they felt under their fingers during the exercise were actually sound waves. Ask the students to imagine to themselves the waves of the sea – sound looks similar to these waves. However, we cannot normally see sound, because it does not consist of undulating droplets of water but rather of air molecules. Like sea waves they also possess some force, which the students were able to feel under their fingers. If something begins to vibrate – like the rolling of sea waves - a sound occurs, which is carried to the human ear via the vibrating air. Ask the students what things can produce sounds. Explain to them that anything that vibrates can make a sound, e.g. vocal folds (known commonly as vocal cords).

Source: Waves by Grempz, flickr

Experiment

The students make a simple instrument out of glasses or tumblers.

The center of sound propagation are the sides of a glass. The less water in the glass the faster its sides vibrate – we get a higher frequency.

Experiment

The students make a sound with guitar string.

Explanation

A string has to be kept suitably tight for a sound to be heard. Our ear is adapted to hear sounds that are not too fast and not too slow. The tighter a string the faster it vibrates – the air molecules move faster and faster. Scientists describe the speed at which a sound vibrates with the help of frequency. Frequency refers to how quickly air molecules move. Ask the students to imagine a sea wave once more. If a wave rises, falls and then returns "to the middle" over the course of one second this means that it vibrates at a frequency of 1 Hertz – a special unit. Ask the students whether in their opinion a wave is fast when it makes 20 such cycles over the course of one second. Then ask them to try and imagine a wave which vibrates 20,000 times in one second. It is within precisely this range that a human ear is able to hear sound – between 20 and 20,000 Hz. Explain to the students that this is precisely the reason why we cannot hear everything that vibrates.

For the inquisitive:

Frequency is inversely proportional to the length of the string, i.e. the longer the string, the lower the sound is.

A string that is four times heavier will produce a sound two times lower.

If the string is stretched four times tighter, the sound will be twice as high (the sound will be one octave higher).