

Unit title: Sound and Music

Curriculum Level(s) L1/2

Content strand(s): Physical World

Nature of Science / Capabilities focus(es):

Gathering and interpreting data

- to observe carefully using all senses.
- Introducing Fair Testing

Use evidence

- Identifying evidence that will support an idea or explanation

Engage with Science

- How does this science link to my world or everyday life.
- Explore and act on issues and questions that link their science learning to their daily living.

Why we are doing this unit? Exploring sound (linking to Production, History, Celebrations)

Brief summary of unit and broad learning intentions: The focus of this unit is about how sound travels and how we communicate through sound.

Prior knowledge / Pre-unit scaffolding required:

Check students' understanding of sound.

Identify their 5 senses and what they are used for.

Hook/Ignition activit(ies): Exploration session using a variety of materials. Set up stations around the room to allow students time to explore the equipment and a possible purpose.

Equipment

- Cups and string
- Bottles and water
- Pipes
- Coat hanger and string
- Paper and comb
- Paper, elastic bands, paper, balloon
- Tuning fork
- Blades of grass
- Balloons and rice
- Plastic cups/paper cups

Key hands-on teaching and learning activities

Activity 1 : Sound Detectives - Locate where a sound has come from.

Equipment:

- 12 sound generators that produce a constant sound (such as a tuning fork, bell, clicker)
- Blindfold
- One sound location record sheet per subject
- Follow instructions on Sound Detectives link (above)

Key questions:

- Why was the subject blindfolded?
- Are there any other clues that helped the subject locate the sound?
- How could you make it easier for the subject to locate these sounds?
- How can you display the data so that there is a pattern of sound location when individual subjects' responses are not identified?
- Why would this be important?

Extension activities

- Repeat the experiment using different volumes or frequencies.
Try the experiment with the subject having one ear blocked.
- Carry out the experiment again with ambient (background) sound in the room.

What to Look for:

Are students able to collect and interpret the data on the sound location map?

Specific NoS learning intention(s): Gather and Interpret Data - observe carefully using their senses (hearing) Design and Implement an experiment. Collect and interpret data into a sound location map.

Specific Content learning intention(s): PW - Explore the physical phenomena of sound

Teacher support: Two things help people locate where a sound comes from:

1. The sound will reach your right and your left ear at slightly different times because of the different distances the sound waves travel. This time difference is called the interaural time difference (ITD).
2. The sound will have a slightly different volume because the sound wave is spreading out and weakening as it moves through the air, and your head absorbs and reflects a little bit of the sound. This difference in volume is called the interaural level difference (ILD).

These time and volume differences provide your brain with clues about where the sound is coming from.

It is harder to detect where sound is coming from if you are deaf in one ear, but all is not lost, as the brain can use clues about how the sound is being reflected off your body.

Activity 2 : Vibration - For sounds to be produced, something needs to move.

- Get the students to suggest ways to make sounds using their body (clapping, stamping, finger clicking, humming). You could include sounds made with clothing (zips, Velcro). (When you clap, your hands are moving the air from between your hands)
- Challenge students to try to make a sound without moving in any way. Students may hum or make a sound in their throat. Ask them to gently feel their throat and the very small movements of their vocal chords.
- Share how a speaker can vibrate rice on a drum and/or tuning fork with water.

Key questions:

- How is the sound being made?
- How could you show sound vibrations?

Challenge:

- In groups of 3/4 students explore sound vibration possibilities with given equipment.
- Students to share their findings.

What to look for:

- Do students connect the relationship between sound and movement, or do they need more experiences of this?

Specific NoS learning intention(s): Investigating in Science - Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models.

Specific Content learning intention(s): PW - Explore the physical phenomena of sound

Activity 3 : Sound Waves

Key questions: Does the substance that the sound travels through alter the sound?

Specific NoS learning intention(s): Gather and Interpret data - Introducing Fair Testing

Specific Content learning intention(s): Learning that the properties of sound alter when they travel through various substances, such as gas, solid object,

Process:

- Discuss how sound travels in waves, refer back to Activity 2.
- Music box (wood as the conductor) - What is happening to the sound?
- Demonstrate with a balloon the amplification of sound. Students to explore this idea using a balloon in groups of 3.

Teacher Support:

Despite only tapping lightly on the balloon, ears can hear the noise loudly. When a balloon is blown up, air molecules are forced inside the balloon closer to each other.

Because the air molecules inside the balloon are closer together, they become a better conductor of sound waves than the ordinary air around you.

Equipment:

- Cups - paper, plastic
- String - plastic, cotton
- Wool
- Wire
- Tape

Experiment/Challenge:

Students create a fair test to explore how sound is conducted through different substances. Use cup phone to experiment with different materials - string, wire, plastic, wool, etc

- Do paper cups/plastic cups make a difference?
- Does length of string/wire make a difference?

Activity 4: [Pūrerehua](#) – link between movement and sound.

Additional activities:

- Exploring different receivers to pick up sound.

Mātauranga Māori:

- Mana Aotūroa strand in Te Whāriki
- [Pūrerehua – link between movement and sound](#)

Cross-curriculum: The Arts - Through movement, sound, and image, the arts transform people's creative ideas into expressive works that communicate layered meanings. English - communicating orally for a range of purposes. Reading, Writing, Maths

Localised: Identifying how sound travels is beneficial for the real-life context of a schoolwide production. Observing and exploring how sound is produced both now and in the past will enable students to begin to understand how relevant music is to the community and society.

Targeted Assessment(s) (Formative): Ability to verbally discuss and demonstrate understanding in how vibration is how sound occurs through fair testing, observations and exploring.

Unit evaluation: Leave blank, but for future reference.

Websites/YouTube/Digital/Books:

Science Learning Hub <https://www.sciencelearn.org.nz/resources/578-sound-detectives>

Science Learning Hub <https://www.sciencelearn.org.nz/resources/3066-investigating-sound>

Cup phones https://www.youtube.com/watch?v=JWB_-wevjSY

String phones vs tubes <https://www.youtube.com/watch?v=iKKX9HAAtxQ>

Blueman Group - Drums <https://www.youtube.com/watch?v=dOLBn8GKBIA>

TKI

<https://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Science/Achievement-objective>
[s](#)

Paul Callaghan Science Academy