**ACTIVITY: Investigating sound**

**Activity idea**

In this set of activities, students are introduced to basic Physical World concepts about sound through the use of play and exploration.

This activity provides opportunities for students to investigate:

* differences in sounds
* how sounds are made
* ideas about volume and pitch.

# For teachers

## Pedagogical information

Sound is a very accessible topic for young learners. The suggested experiences in this resource are designed for curriculum levels 1 and 2. They are underpinned by the NZC Nature of Science ‘Investigating in science’ aim: Students will extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. The suggested experiences also support the Exploration – Mana Aotūroa strand in Te Whāriki. Rather than set out prescribed instructions, this resource identifies key science concepts and ways in which students can explore, experience and build their understanding of sound.

***Recognising students’ alternative conceptions***

Children naturally and instinctively develop their own ideas about how things work. These self-developed concepts make sense to the individual but may be scientifically inaccurate. It is helpful to know some of the alternative conceptions students may hold. Awareness helps educators to identify them when they surface in discussions and provides an opportunity to scaffold change. It takes time to change alternative conceptions. Research shows that students can hold multiple conceptions – their own explanation and a school explanation – at the same time. Alternative conceptions children may hold are listed at the end of the article [Building Science Concepts: Exploring sound](https://www.sciencelearn.org.nz/resources/3068-building-science-concepts-exploring-sound) and in this [resource from Deakin University](https://blogs.deakin.edu.au/sci-enviro-ed/years-5-10/sound/).

***Engaging discussion and deepening understanding***

While students are exploring and making sounds with objects or musical instruments, use the opportunities to ask questions and engage in discussion to:

* check prior knowledge about how sounds are made, ideas about volume and pitch and thoughts about how they hear sounds
* check for (and challenge) alternative conceptions
* develop content vocabulary
* develop, consolidate or extend thinking
* encourage communication, comparison and analysis between individuals and groups
* look for opportunities for students to design simple investigations to answer questions.

***Building science knowledge requires multiple experiences over time***

Students will build their science understanding about sound from year to year. Concepts often build sequentially. The New Zealand Ministry of Education resource Building Science Concepts Book 18 [*Exploring Sound: Using Sound-makers and Musical Instruments*](https://scienceonline.tki.org.nz/Resources-and-teacher-support-material/Building-Science-Concepts/Titles-and-concept-overviews/Exploring-Sound) lists the likely sequence:

* Our ears can hear differences in sounds.
* For sounds to be produced, something needs to move.
* The larger the vibration, the louder the sound.

## Ideas for teaching key science concepts about sound

**Concepts:**

* **Our ears can hear differences in sounds.**
* **Sounds can be louder or softer, higher or lower.**

Find a space where you can make some noise.

*Exploring volume*

* Ask a student to demonstrate making a quiet sound with an item.
* Repeat this making a loud sound. Discuss words you might use to describe these sounds – soft, quiet, noisy, big, small.
* The scientific word for this change in sound is volume. Make a connection to volume on the TV, computer or radio.

What to look for:

* Can students differentiate between different volumes?

*Exploring pitch*

* Demonstrate or ask a student to demonstrate making a low sound.
* Repeat making a high sound.
* Make two different pitched sounds and ask students which sound is higher and which is lower.
* The scientific word for this change in sound is pitch.

What to look for:

* Can students differentiate between different pitches?

*Going further with volume and pitch*

* Get students to hum a long sound on one note (without changing it).
* Ask them to make the sound a high pitch, then a low pitch.
* Ask students to think of sounds that combine higher and lower pitches and share their ideas.
* Listen to sounds that combine high and low pitch. Can they think of any others? (Police sirens, computer games.)
* Listen again and ask whether the sound is louder, quieter or about the same when it is higher or lower in pitch. (The answer should be that it is about the same. Note the exception of wind instruments.)

What to look for:

* How well can students differentiate between different volumes and pitches?
* What language are they using?
* Can they identify patterns of pitch change in everyday sounds?

*Comparing volume and pitch*

* Ask students if they can make a quiet (soft), high-pitched sound then a loud, low-pitched sound.

What to look for:

* Can students describe the differences between sound and correctly identify volume and pitch using words like loud, quiet, high and low?

**Concept:**

* **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).
* Record suggestions.
* 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.
* Highlight the need for movement to create a sound.
* Ask students to identify the source of any sound they make and the movement causing the sound.
* Ask what needs to happen before a sound can be made.

What to look for:

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

**Concept:**

* **The larger the vibration, the louder the sound.**

Ask students to make a quiet clap then a loud clap.

* Ask students what they need to do to make the sound quiet (small movement).
* Ask students what they need to do to make the sound loud (big movement).
* Ask students whether the sound is higher, lower or about the same pitch when it is louder or quieter. (The answer should be that it is about the same. Volume does not usually affect pitch although it is common to link the two. Note, however, that wind instruments often have a much higher pitch when blown hard.)

What to look for:

* Do students recognise the relationship between the size of the movement and the volume of the sound produced?
* Can they differentiate between louder and quieter (softer) volume?