

The Science of Sound

THE SCIENCE OF SOUND - Year 1 Unit Plan

Learning intentions - for students to develop:

- an understanding of what causes sounds to be produced, how they travel and how they are sensed (ACSU020);
- skills of scientific inquiry by responding to and posing questions, making predictions and active engagement in investigations (AC SIS024, AC SIS025);
- the ability to represent and communicate their observations in different ways (AC SIS029)
- an understanding of how people can use this knowledge in their daily lives (AC SHE022)

LESSON 1: Engaging student interest

Activity 1: Listen...listen...what can you hear?

Seat students in a peaceful outdoor environment and instruct them to close their eyes and listen for any sounds. Encourage active listening by expecting stillness and removing access to visual cues.

Focus students on the listening task and use open ended questions to guide their observations. Introduce appropriate words to describe differences in sounds.

Questions

- Count how many different sounds you can hear.
- What words would you use to describe the sounds?
- What do you think made the sounds? Why do you think that?

Optional activities

1. Ask students to point in the direction they think each sound is coming from and to hold their hand close or far from their ear to show whether they think the source of the sound is far away or close.
2. Play a listening game in which the children sit in a circle and close their eyes. One child moves around the outside of the circle and claps; the other children point to the direction of the clapping sound.



Activity 2

Lead an interactive discussion about the listening activity and help students to make links between their observations and the questions. Ensure students have time to think before accepting a response to the questions. Reinforce new vocabulary and create a **Word wall** to make new words visible and accessible.

Questions could include

- What did you hear?
- How do you know that the sound was made by that thing?
- I noticed that you all pointed the same way to the direction the sound was coming from. What made you think that was the direction?



Direct students to construct a visual representation in their journal of one of the sounds they remember hearing in their listening activity.

They are to include:

- how they think the sound was made
- how they were able to hear that sound
- the direction the sound travelled (from-to)

Activity 3: I wonder....?

Ask students to think of a question they are curious about, to write it down and attach it to the class **Wonder wall**. At appropriate times during the course of the unit, refer to the questions. When the question is answered move it to the 'Things we have learned about sound' section of the Wonder wall.



Develop teaching programs that show understanding of the underlying principles, skills, content and core concepts of the learning area

Teacher Reflection

The drawing shows the student has an understanding of different objects that produce sounds and that the ear and eardrum are associated with hearing the sounds.

Teacher Reflection

This student demonstrates understanding that tapping produces a sound. It could be inferred from her drawing that she can hear it at a distance though ears are not shown.

LESSON 2: Exploring ideas

Activity 1: Making sound effects

Select and pause appropriate segments from a YouTube video (10 min) about how sound effects are made for movies and animations ://www.youtube.com/watch?v=8A6z8QkVHk4&feature=

Focus questions could include:

- Which parts of the video did you like best? Why?
- What kinds of sounds were made?
- What kinds of things were used to create sounds?
- How was the thunder sound made? How was the rain sound made?
- Can you make some sound effects? How would you make a sound of a trotting horse/ moving car/ fire engine siren...?

Ask students in their groups to contribute their own ideas for creating different sounds and to describe how they could use the sounds as effects.

Introduce an appropriate vocabulary to describe different ways of making sound, such as, banging, scraping, hitting, scratching, blowing, rustling paper etc. Put the words on the Word wall.

Activity 2: Making sound pictures

Help students to use a familiar audio-visual software program such as **KidPix** to make a sound picture. Direct them to draw or insert a picture of something that makes a familiar sound, such as an animal or vehicle, using the KidPix tools, graphics and/or animations, then devise how to make a sound to go with the main object in their picture. They then record their sound using a microphone and the microphone tool.

Provide assistance as required (see KidPix tutorial for help).
://www.youtube.com/watch?v=KA-R-

Provide students with the opportunity to interact with other students and share their ideas about their picture and the sound they have attached. Invite students to give feedback to each other about how appropriate they think the sounds are.

In individual or class interactions, questions to promote thinking and clarity of communication could include:

- What did you do to make that sound?
- Why did you choose to make that sound to go with that picture?
- What might be another way of making that same sound?
- What other kind of sound could you choose to go with the object?
- Here's a sound. What object does it make you think of?

When students are satisfied with the sound and the picture, they save it in their folder. Students who are familiar with the program could create a slideshow of several pictures and sounds.

See ://www.youtube.com/watch?v=

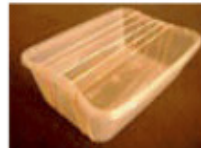
Select teaching strategies that encourage active thought about the meaning and application of what is being learnt.

LESSON 3

Activity 1: Making sounds

Resources

Assorted elastic bands
A variety of containers such as plastic fast food containers, small cardboard boxes.



Have students make an elastic band guitar by stretching 4 different elastic bands round a container.

High and low: Direct the students to make predictions about how they could make high and low notes or sounds, then to test their predictions by arranging the elastic bands in order from one that makes the lowest sound to one that makes the highest.

Ask them to describe what causes an elastic band to make a high note (high pitch) and what causes an elastic band to make a low note (low pitch). They adjust their band guitars accordingly.



Add 'pitch' to the **Word wall**.

Test your ideas

Ask students the following questions about their predictions and observations to identify misconceptions. Modify the questions according to the responses given and the guidance needed.

- Was your prediction a good one?
- What do you notice about how tight or loose the elastic band is and the pitch of the sound it makes when plucked?
- Choose one elastic band. Predict what you would have to do to change the sound that it makes.
- Test your prediction.

LESSON 3

Activity 1: Making sounds

Loud and soft:

- How would you make the sound louder?
- How would you make the sound softer?

What makes a sound?

- Watch carefully what happens when you pluck the band. What does this tell you about how sounds are made?
- What happens to the elastic band when you touch it when it is moving to and fro (vibrating)? What happens to the sound?

Review the term 'pitch' (describes how high or low the sound is), add 'volume' (how loud or soft the sound is) and introduce and add the terms 'vibrating' and 'vibration' to the Word wall.

LESSON 4

Activity 1: What do we know about the science of sound?

Review comments from previous discussions and provide opportunities to demonstrate and compare sounds made by the elastic band guitar and a vibrating ruler.

Ask students to observe a ruler made to vibrate (move to and fro) by the end being flicked or twanged when it is laid at the edge of a table. Consolidate students' understanding by teaching them explicitly about the link between vibrations of an object and sounds being made.

View: Changing the length of a ruler

[://www.youtube.com/watch?v=dEh1oxZj5Eg&feature=](https://www.youtube.com/watch?v=dEh1oxZj5Eg&feature=)

OR

Ruler music: Jingle bells

[://www.youtube.com/watch?v=hU6](https://www.youtube.com/watch?v=hU6)

Students compare the sounds made by different lengths of overhang of the ruler. Scaffold their understanding of the connection between:

- the length of the ruler made to vibrate and the pitch of the sound, and
- the volume of the sound by how hard the ruler is flicked or twanged.

Provide informal assessment and feedback for learning by asking questions that probe their understanding, identify misconceptions and guide their learning.

Possible questions

- What do you observe about the ruler when it is 'twanged'?
- What do you notice if the length is changed while being 'twanged'?
- When the ruler is shorter, is the sound it makes high or low?

Help students to compare how sounds are made by the ruler and the elastic band guitar.

Activity 2: How do different instruments make sounds?

Resources

A variety of different made or commercially produced musical instruments eg guitar, flute, drum, shakers, triangles, castanets, xylophone...

Engage students in the exploration of how different instruments make sounds. This could be done in part by a demonstration or by small groups of students working together. Discuss with students how they can apply their knowledge of how sound is produced by making something vibrate, to how musical instruments make sounds.

Some exploratory questions could include:

- When I do this...what kind of sound do you think it will make?
- Do you think it would be a high sound or a low sound?
- Can you play this so it makes a soft sound?
- Can you play it so it makes a louder sound? What did you change?
- What is vibrating to make the sound?
- What happens when you.... (eg hold the metal of the triangle, block the holes in the recorder, hold the strings in a different place when plucking etc)
- What else can you discover?

LESSON 5

Activity 1: How do sounds reach our ears?

Guide students in developing an understanding that sound vibrations must travel through the air from their source to the ear for us to hear them.

Ask students if they think sound can travel through solids and liquids, and to justify their answers. They could suggest being able to hear under water, whale sounds, galloping horses, hearing sounds from the next room...

Pose questions and provide demonstrations to help students develop an understanding that sounds can travel through solids, liquids and gases (air).

Activities for students to investigate sound travelling through other materials include:

- putting their index finger in their ear and tapping the elbow with their finger bone, and
- the 'coathanger bell'

[://ten.com.au/video-player.htm?movideo_p=41450&movideo_m=](https://ten.com.au/video-player.htm?movideo_p=41450&movideo_m=)

Or [://www.fizzicseducation.com.au/experiments/light%20and%20sound/Coathanger%20Gong,](https://www.fizzicseducation.com.au/experiments/light%20and%20sound/Coathanger%20Gong)

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Activity 2: Hearing in action

Organise the class as a whole, or into several groups, to role-play the way the parts of the ear work with each other to detect and transmit sound vibrations to the brain. They could use different scenarios such as a whistle, a heartbeat or thunder as the source of sound, or another source of their choosing.

Their role-plays can be captured on a mobile device for a future presentation and to help assess their understanding.

LESSON 6

Activity 1: Too much noise!

Ask the students what they think is the difference between sound and noise. Record their responses without explanations or discussion.

To set the scene, show the animation (4min) or read a story or poem.

- **Water Dripping** Bert and Ernie ://www.youtube.com/watch?v=Zv04EDe4Dsg&feature=
- **Too Much Noise** by Ann McGovern
- **Bear Snores On** by Karma Wilson

Help students to develop an understanding that sounds can be pleasant or unpleasant (noise) and that what is noise to one person may not be noise to another.

- What do pleasant sounds make you feel? What are the words you could use to describe pleasant sounds?
- What does noise make you feel? What are the words you could use to describe unpleasant sounds (noise)?

Record their responses.

Activity 2:

In an interactive discussion ask students to think of ways that noise could be reduced or blocked.

Ask them to draw a pictorial representation in their journal of something making a noise and how it could be blocked or reduced. Students could add annotations as part of their description.



Assessment

Use the work samples to assess development in students' understanding: of how sounds are produced by something vibrating, that sound can travel through the air and that our ears would sense the sound unless the sound were obstructed. Compare Student work samples produced at the end of the unit with work samples produced earlier in the unit by the same students to assess achievement gain.

Activity 3: Check the Word wall and the Wonder wall to find out if the students' questions have been answered. Develop a strategy for dealing with unanswered questions.

Teacher reflection

This student indicates an understanding of the connectedness between an action (banging) and a sound being produced, and that the sound would be sensed by ears, (inferred from the suggestion to block the ears with ear muffs to obstruct sensing of the sound)

Teacher reflection

This student showed an understanding that a person caused the recorder to make a sound, and that the sound would travel in waves through the air. She has suggested that 'music to go to sleep' from a radio could stop the unwanted recorder noise from being heard. Although her drawing does not clearly show her understanding of how the sound is sensed, it was clear from conversation that she knew that people "heard with their ears."