

STEM – Sound Proof Hiding Places



Unit Overview

This STEM unit presents students with the challenge of designing a safe and comfortable hiding place for a cat to retreat to when they are feeling afraid or stressed, particularly by loud noises. Looking after a cat's welfare by ensuring they can follow their behavioural instincts and have a safe place to hide in their environment in stressful situations gives students a real life context to engage in the technological design process, using science and mathematics concepts to inform their technological outcomes.

At a basic level, this unit introduces students to the physical phenomenon of sound and the idea that materials allow sound to move through them in different ways. Students will then use this knowledge to help them determine what materials would be suitable to use to reduce the impact of loud noise on cats. Students will also be introduced to simple measurement concepts that will support them to create a hiding place that is practically suitable with regard to size.

As this unit covers Level 1 and Level 2 achievement objectives, a range of learning experiences have been suggested that begin at a basic level; teachers can adapt the learning experiences to suit the prior knowledge and needs of their students.

Unit Timeframe

The suggested learning experiences in this unit plan are designed to be a starting point and framework for your inquiry unit. Given the open-ended nature of a project which has multiple potential outcomes, you may find your students have other needs which need to be addressed throughout the process to support them to achieve a successful outcome. This is not intended to be a comprehensive unit to be followed prescriptively, as students may go in a variety of directions with this project.

Animal Welfare Achievement Objectives

- > Gain knowledge and develop an understanding of the Five Domains.
- > Describe animal sentience.
- > Identify and describe the needs of a specific animal species.
- > Explain the responsibilities that animal guardians (owners) have with regard to caring for their animals.

STEM Sound Proof Hiding Places Learning Experiences

Below is a brief outline of each of the learning experiences covered in this unit plan. To see the full details of any of the learning experiences, click on the orange headings.

Learning Experience 1: Animal Sentience

Students will be introduced to animal sentience to understand why it is important to provide for an animal's needs. They will look at a selection of images of animals to consider how the animal may be feeling or what they might be thinking in each situation.

Learning Experience 2: The Five Domains

Students will first consider what the basic needs of humans are and then be introduced to the Five Domains Model of animal welfare. They will look at images of a variety of animals and determine which domain each image relates to, to provide examples of all of the different aspects that contribute to each domain and support their understanding that all animals have different needs under each of the domains.

Learning Experience 3: The Five Domains for Specific Animals

Students will further investigate the concept that different animals have different needs under each of the domains by researching an animal and then pairing up with another student to discuss the differences in the needs of the two animals. Adaptations are offered for students who need support with research.

Learning Experience 4: The Problem and Design Brief

Students will be designing a technological outcome in response to the need for cats to have a safe place to hide if there are loud noises which are causing them stress. Their technological outcome will be a hiding place for a cat that will make the loud noises quieter. This problem will be introduced to students and a design brief will begin to be established.

Learning Experience 5: Investigation

The 5 sub-learning experiences are designed to be completed in response to student needs, this means they may be condensed, or need further work so that students can successfully progress through the technological design process.

Learning Experience 5A: Measuring Lengths

Students will practise using either non-standard or standard units of measurement by measuring objects around the classroom so that they will be able to ensure their hiding place will be the appropriate size for a cat.

Learning Experience 5B: Sound Introduction

Students will share their prior knowledge about sound and share their ideas about different types of sounds, different words associated with sound and what makes different sounds.

Learning Experience 5C: What is sound and how does it travel?

Students will be introduced some scientific concepts around sound in terms of how it made and how we hear sounds. They will then complete some simple experiments (feeling their throats as they speak, making guitars and observing rice or beads on drums) to feel and see vibrations that are created when sounds are made.

Learning Experience 5D: Measuring Sound

Students will learn about decibels as the measurement used to measure sound and then experiment with using a tool for measure decibels to measure a variety of different sounds around the classroom.

Learning Experience 5E: Sound absorbing and blocking qualities of different materials

Students will be introduced to the idea that some materials can block and absorb sounds. They will carry out an experiment whereby they shield a device to measure sound with a variety of different materials to determine how effectively different materials can be used for sound proofing.

Learning Experience 6: Developing Solutions

Students will now work in groups to brainstorm a range of ideas for a possible technological outcome to meet the need.

Learning Experience 7: Choosing A Solution

Students will review all of their ideas and develop a final outcome they would like to proceed with. They will fill in an action plan to help scaffold them through the process of creating a prototype of their outcome.

Learning Experience 8: Models and Prototypes

Students will work through creating a prototype of their outcome.

Learning Experience 9: Testing and Evaluation

Students will test their prototype by using the sound measuring tool to determine how much sound is reduced inside it. They will also refer back to the design brief to assess how fit for purpose their outcome is.

Learning Experience 10: Reflection

Students will reflect on what they have learnt over the course of the unit.

New Zealand Curriculum Links

Key Competencies

Thinking

- > Students will be required to think creatively to develop an outcome that addresses the need to provide cats with a safe and comfortable hiding place.
- > Students will be required to synthesise the knowledge they have gained from all of the learning experiences and use this to inform the development of their outcome.

Using language, symbols and texts

- > Students will expand their language and vocabulary as they begin to be exposed to content specific scientific, technological, mathematical and animal welfare language.
- > As students will be working collaboratively for many of the learning experiences, they will be developing their oral language skills.

Managing self

- > When working as part of a group during the various learning experiences, students will be required to manage themselves to ensure they are contributing as an effective team member.
- > When working on independent tasks, students will be required to ensure that they are managing their time effectively, asking questions when they need support and using their initiative to successfully complete tasks in the given timeframes.

Relating to others

- > Students will be working in groups to develop their technological outcomes. In order to be successful they will have to develop their skills of listening to others, contributing their ideas, justifying their ideas, negotiating and sharing roles among group members.

Participating and contributing

- > This unit gives students the opportunity to think about and generate a solution to a real world need or opportunity. By beginning to expose students to these opportunities they will come to see that they have the power to take action and respond to needs or opportunities in their wider communities.

Learning Areas Levels 1-2

Science

Level 1-2

Nature of Science

Investigating in Science

- > Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models.

Participating and Contributing

- > Explore and act on issues and questions that link their science learning to their daily living.

Living World

Life Processes

- > Recognise that all living things have certain requirements so they can stay alive.

Physical World

Physical Inquiry and Physics Concepts

- > Explore everyday examples of physical phenomenon such as movement, forces, electricity, magnetism, light, sound, waves, and heat.

Material World

Properties and Changes of Matter

- > Observe, describe, and compare physical and chemical properties of common materials and changes that occur when materials are mixed, heated, or cooled.

Chemistry and Society

- > Find out about the uses of common materials and relate these to their observed properties.

Technology

Level 1

Technological Practice

Planning for Practice

- > Outline a general plan to support the development of an outcome, identifying appropriate steps and resources.

Brief Development

- > Describe the outcome they are developing and identify the attributes it should have, taking account of the need or opportunity and the resources available.

Outcome Development and Evaluation

- > Investigate a context to communicate potential outcomes. Evaluate these against attributes; select and develop an outcome in keeping with the identified attributes.

Technological Knowledge

Technological Products

- > Understand that technological products are made from materials that have performance properties.

Level 2**Technological Practice****Planning for Practice**

- > Develop a plan that identifies the key stages and the resources required to complete an outcome.

Brief Development

- > Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available.

Outcome Development and Evaluation

- > Investigate a context to develop ideas for potential outcomes. Evaluate these against the identified attributes; select and develop an outcome. Evaluate the outcome in terms of the need or opportunity.

Technological Knowledge**Technological Products**

- > Understand that there is a relationship between a material used and its performance properties in a technological product.

Mathematics

Level 1**Measurement**

- > Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole number of units.

Level 2**Measurement**

- > Create and use appropriate units and devices to measure length, area, volume and capacity, weight (mass), turn (angle), temperature, and time.

Resources and Materials

Supporting Resources

- > [SPCA Kids' Portal](#)
- > [SPCA Kids' Portal - Animal Care](#)
- > [Caring for Animals](#)
- > [NZ Maths - Teddy Bears and Friends](#)
- > [NZ Maths](#)
- > [SciShow Kids - What is sound?](#)
- > [Kids Academy - What makes a sound?](#)
- > Sounds All Around – Wendy Pfeffer

Downloadable Resources

- > [Needs of Animals](#)
- > [Which Domain?](#)
- > [Five Domains Comparison](#)
- > [Animal Sentience Images](#)
- > [Bigger and Smaller \(Non-Standard Units\)](#)
- > [Bigger and Smaller \(Standard Units\)](#)
- > [How Loud is that Sound?](#)
- > [Sound Blocking Materials Experiment](#)
- > [Action Plan](#)
- > [Reflection](#)

Learning Experiences

Throughout the unit you will see these iPad icons. Each of these offers a suggestion on how you can incorporate the use of digital technology or the creation of a digital outcome into the learning experience. You may choose to incorporate all, some, or none of these, it is up to you! You may want to add in learning intentions and focus on particular digital skills in addition to the learning intentions included. Depending on your students' prior experiences with digital technology, it may also be necessary to spend time teaching them how to use the various digital tools so that they can do so effectively to complete the activities suggested.



Learning Experience 1: Animal Sentience

Learning Intention

We are learning to...

- > Describe animal sentience.

Introduce the unit by explaining that you are going to be learning about animals and what they need. Tell students that it is important that anyone who is an animal guardian (owner), or is caring for an animal, needs to make sure they are giving the animal what they need to be happy and healthy. This is very important because animals are sentient. This means that, just like us, animals can think and feel and are aware of their thoughts and feelings. These can be positive or negative feelings and there are lots of different things which can affect how an animal is feeling, just like there are lots of things that can make people feel good or bad.

Download the [Animal Sentience Images](#). Either as a whole class or in small groups, ask students to consider how the animal might be feeling in each of the images or how the animal is responding to their surroundings. Also ask them to justify their reasoning. Students could link to their own feelings and how they would feel in similar situations.

Learning Experience 2: The Five Domains

Learning Intentions

We are learning to...

- > Gain knowledge and develop an understanding of the Five Domains.
- > Identify and describe the needs of a specific animal species.
- > Explain the responsibilities that animal guardians (owners) have with regard to caring for their animals.

Remind students of the discussion from the previous learning experience. Ask students, 'We know that animals have feelings, so what can animal guardians do for or give to their animals that will give them what they need to be happy and healthy?' Encourage students to share their suggestions.

Display the following diagram on the board from the [Caring for Animals](#) PowerPoint.



Explain that this diagram is one way to represent something called The Five Domains Model and it is used by SPCA to guide the way they care for the animals. It is a group of five things which help to make sure that animals have good welfare and it can help us to think about what animals need to be happy and healthy.

Explain that mental wellbeing down the bottom is all about feelings and helping animals to have lots of positive feelings. There are four other groups of things which are at the top and they are about what animal guardians can do for or give to their animals to help give them experiences that will allow them to feel positive feelings, which is what they have just discussed. They are nutrition (good food and water), environment (a good place to live), health and behaviour (ability to express their natural behaviours).

Use the [Needs of Animals](#) and/or [Caring for Animals](#) resources to explain what each of these domains encompasses.

Once students have been introduced to the Five Domains, download and complete the [Which Domain?](#) sheet. This activity requires students to look at a series of images and determine which of the top four domains they think is being illustrated in each. They can cut out the heading for each of the domains and then cut out the pictures and place them under the relevant heading. This activity can be completed in small groups to allow students to discuss the images.

Some of the images are more challenging than others and are designed to promote discussion that will allow students to understand that there are many things to consider within each domain and that different animal species have different needs with regard to the domains i.e. a natural behaviour for a pig is wallowing in mud whereas a natural behaviour for a rat is gnawing on a chew toy. After students have had a go at classifying each of the pictures independently in their groups, the class could complete a set together, discussing any of the challenging ones and also selecting some to discuss in terms of how what is illustrated in the picture would have a positive impact on the fifth domain, mental wellbeing.

Learning Experience 3: The Five Domains for Specific Animals

Learning Intentions

We are learning to...

- > Gain knowledge and develop an understanding of the Five Domains.
- > Identify and describe the needs of a specific animal species.
- > Explain the responsibilities that animal guardians (owners) have with regard to caring for their animals.

Now that students have had an introduction to the Five Domains and what this model of welfare generally means for all animals, they will investigate what it looks like to ensure that a specific animal's needs are met in relation to each of the domains.

Students will use the information on the [SPCA Kids' Portal - Animal Care](#) section to research an animal and what they need to be provided with in relation to nutrition, environment, health and behaviour. They will then compare these needs with the needs of another animal that someone else in the class has researched. Depending on the level and abilities of the students you are teaching, this activity could be facilitated in the following ways:

- > The whole class could research the same two animals (chosen from dogs, cats, rabbits and guinea pigs) by viewing the [SPCA Kids' Videos](#) as a class and taking notes for each domain using pictures or key words. They will then pair up with someone else and discuss what was different about the needs of the two animals. Since the problem to be investigated later in the unit relates to cats, it would be beneficial for cats to be one of the chosen animals.
- > Students could choose which animal they would like to research (chosen from dogs, cats, rabbits and guinea pigs), view the [SPCA Kids' Videos](#) about that animal independently and take notes for each domain using pictures or key words. They will then pair up with someone else who chose a different animal to them and they will discuss what is different about the needs of the two animals. Encourage some students to choose cats so that there are some students who can share their knowledge of cats when you begin investigating the problem later in the unit.
- > Students could choose which animal they would like to research (any animals listed in the animal care section), read through the [SPCA Kids'](#) written information provided about that animal and each of the domains and take notes for each domain. They will then pair up with someone else who chose a different animal to them and they will discuss what is different about the needs of the two animals. It may also suit your students to carry out the initial research in pairs and then join with another pair for the discussion. Encourage some students to choose cats so that there are some students who can share their knowledge of cats when you begin investigating the problem later in the unit.

Download the [Five Domains Comparison](#) sheets and use the one that will facilitate the option that best suits the needs and abilities of your students. We recommend printing these sheets in A3 so that students have plenty of space for their pictures or written notes.

Learning Experience 4: The Problem and Design Brief

Learning Intentions

We are learning to...

- > Explain the need that we are going to develop an outcome for.
- > Describe the outcome that we are going to develop.
- > Identify what attributes our outcome needs to have so that it meets the need.

Students now have a broad understanding of the idea that animals are sentient beings with their own specific needs which need catering for to ensure that they can live happy and healthy lives.

Ask students, 'How might a cat respond if they were to hear a loud noise, such as fireworks?' 'Why do you think the cat would behave in this way?' 'What should cat guardians make sure they provide for their cats in their homes so that the cats can express their natural behaviour and reduce their feelings of fear and stress?'

Explain to students that they will be working to design a solution, or technological outcome, to meet a cat's need for an appropriate hiding spot if they were to hear loud noises that made them feel stressed or afraid. Depending on your students' level of prior knowledge or exposure to the technological design process, you may want to spend additional time explaining what technological outcomes are and the idea that they come about as a result of there being a need to fill or a problem to solve.

Once students have an understanding of the need they will be designing their outcome in response to, you can co-construct the design brief with them. Again, depending on your students' prior knowledge, you may want to spend time discussing what a design brief is and what the purpose of having a design brief is with them first.

Explain to students that if one trigger for fear and distress in cats is loud noises the hiding place is going to need to be designed so that when they are inside the hiding place loud noises will sound quieter. Let them know that they will be doing some learning about sound and different types of materials to help them with this.

Other attributes that will need to be considered in the design brief are:

- > The hiding place needs to be an appropriate size for the cat - once inside, the cat will be able to comfortably stand at full height and turn around (average cat measurements are provided further along in the unit).
- > The opening needs to be large enough for the cat to fit through (students can use the average cat measurements but may also take into account that they can crouch lower than their standing height to enter the hiding place).
- > The hiding place needs to be comfortable for the cat to sit/lie in.
- > The hiding place needs to have a big enough opening and be able to get enough air in for the cat to have fresh air to breathe and not get too hot.
- > The hiding place needs to be able to be kept clean.
- > The materials used need to be safe for cats and the overall construction of the hiding place needs to be safe for cats.

- > You may wish to include an attribute on how much the sound should be reduced by in decibels. Complete sound proofing will not be possible as the hiding place must remain open for adequate ventilation and temperature control so some level of sound reduction will indicate success in meeting the outcome.

This design brief will be a starting point and may need to be revisited throughout the technological design process.

Learning Experience 5: Investigation

The following learning experiences are designed to be used flexibly by teachers. A series of activities has been suggested to help introduce important scientific and mathematical concepts as part of the investigation phase of the technological design process that will support students to be successful in developing their outcomes. Determine your students' level of prior knowledge of these concepts to decide whether these need to be used in full and whether further instruction needs to be provided beyond these.

Learning Experience 5A: Measuring Lengths

Learning Intentions

We are learning to...

- > Create appropriate units to measure lengths.
- > Use standard units to measure lengths.

One attribute on the design brief is that the hiding spot needs to be an appropriate size for the cat. In order to determine what the appropriate size will be students will need some knowledge and skills around measurement. Depending on the level of your students you can either focus on measurement of length, height and width with non-standard units of measurement or standard units of measurement.

Non-Standard Units of Measurement

Begin by completing the [NZ Maths - Teddy Bears and Friends](#) activity, if measurement using non-standard units is a new concept for your students.

Once students have an understanding that multi-link cubes, as a non-standard unit, can be used to measure lengths, they can practise these skills using the context of cats. Cats will vary in size but for the purposes of this activity use the average measurements for a cat - 24cm high and 46cm long (head and body only to the base of the tail). Make these measurements up as closely as possible with multi-link cubes.

Tell your students that it is not possible to bring a cat into the classroom to see if they will fit into the hiding places so we will have to use some measurements to help us. Show them the two strips of multi-link cubes, explaining that one strip represents the height of the cat and the other represents the length from nose to the end of the body before the tail. Ensure that students understand that not all cats are this size, but this is near the size that most cats would be. Get students to count the number of cubes.

Download the [Bigger and Smaller \(Non-Standard Units\)](#) sheet for students to complete to practise measuring objects around the classroom with the multi-link cubes.

Standard Units of Measurement

Ask students to share their prior knowledge of measurement by writing the word ‘measurement’ up on board and getting them to share any ideas they might have in response to this prompt. As they begin sharing their ideas it may be useful to guide the discussion by asking questions such as, what tools can we use to measure things, what words can we use to describe how long or high something is, etc.

Introduce centimetres as one standard unit to measure length, width and height. Share the cat measurements given above with your students and get them to use rulers to draw lines of these measurements. Depending on you students’ prior knowledge of measurement, provide the appropriate scaffolding and instruction on the basics of measurement for them to be able to measure these measurements and then move around the classroom measuring classroom objects. Download the [Bigger and Smaller \(Standard Units\)](#) sheet for students to complete and practise measuring objects using centimetres as a standard unit of measurement.

If your students are new to measurement, either using non-standard or standard units, it may be necessary to work through further activities to build their understanding of these concepts. [NZ Maths](#) has a variety of lesson plans and resources to teach measurement.

Learning Experience 5B: Sound Introduction

Learning Intention

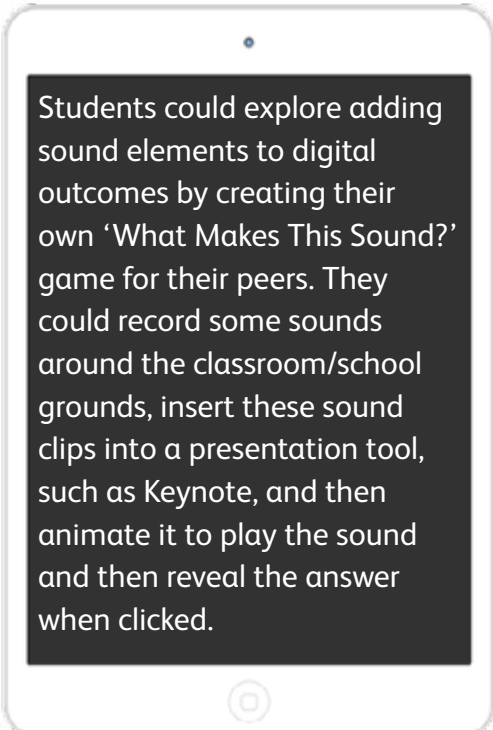
We are learning to...

- > Explore what sound is and different sounds.

Begin by asking the students ‘what do you know about sound?’ Get them to share any prior knowledge they have about sound. These ideas can be recorded and referred back to later for reflection.

Work through some or all of the following activities to get students thinking about sounds:

- > Sound Words – get students to brainstorm all of the different words they could use to describe different sounds i.e. crunching, popping, banging, scratching, etc. If students need some inspiration there are a range of sound clips on YouTube that you could search and play for students to respond to.
- > Making Sounds – get students to make a range of sounds in response to a series of prompts i.e. make a quiet sound, make a loud sound, make an animal sound, make a vehicle sound, etc.
- > What Makes This Sound? – find a series of sound clips on YouTube to play for students and ask students to guess what is making the sound. Try searching for things such as vacuum cleaner sound, rain sound, popcorn popping sound, etc.
- > Sound Types – place a series of prompts around the classroom and do a bus stop activity where students go around in small groups and write sounds in response to the prompts i.e. one sheet of paper could say loud sounds and they might brainstorm ideas such as sirens, thunder, drums, etc. Other prompts could include ideas such as sounds you hear inside, sounds you hear outside, etc.



Students could explore adding sound elements to digital outcomes by creating their own ‘What Makes This Sound?’ game for their peers. They could record some sounds around the classroom/school grounds, insert these sound clips into a presentation tool, such as Keynote, and then animate it to play the sound and then reveal the answer when clicked.

Learning Experience 5C: What is sound and how does it travel?

Learning Intentions

We are learning to...

- > Explain how sounds are made.
- > Explain how sound travels in waves from whatever is making the sound to us.

Read 'Sounds All Around' – Wendy Pfeffer to begin introducing your students to the scientific concepts around what makes sound and how sound travels. Depending on the level of your students, you may wish to just read sections of this book at a time so that they are able to process the information they are hearing. Pages 5-8 are the relevant pages to read for this activity.

After reading pages 5-8 of this text, have a discussion with students based on the following questions:

- > What does the word vibrate mean?
- > When something is vibrating, or shaking back and forth very fast, what happens to the air around it?
- > What are these vibrations that move through the air called?
- > What happens when the sound waves reach our ears that allow us to hear the sound?

The concept that sound is made by objects vibrating may be challenging for students at this level to understand because very often we cannot actually see these vibrations. Carry out all or some of the following three activities to support students to understand this concept:

- > Vocal cords (activity described in the text) – Get students to place their fingertips gently on their throat and speak. Ask them what they can feel. Get them to repeat this but without making any noise this time. What did they notice was different about how their throat felt when they were speaking and when they were silent?
- > Guitars (activity can be seen in the [SciShow Kids - What is sound?](#) video below too, if you are not able to carry this out as a practical exercise) – Depending on the resources available, either as a class or in small groups, get students to make a guitar style instrument by stretching a rubber band over the top of a cup or container. Have them pluck the rubber band and observe what happens to it. What can they hear? What can they see? What happens if they pluck the rubber band gently? What happens if they pluck the rubber band harder?
- > Drums – If your school has musical instruments available you could use drums for this activity or get students to make their own by stretching a balloon (with the end cut off) over a sturdy plastic or paper cup and fastening the edges with rubber bands and/or tape. Place a small amount of rice or beads on top of the drum and then beat it and ask them to observe what happens? What can they hear? What can they see? Why did the beads or rice move? If the rice or beads were moved by the vibrating of the drum, what do you think is happening to the air near the surface of the drum? Focus the discussion so that students come away with the understanding that although we might not be able to see the top of the drum vibrating, the rice or beads are moving because of the small vibrations that are happening on the top of the drum. The way the rice or beads

As students carry out the second two activities, ask them to record them and experiment with using the slow motion feature of the camera to capture a video of the vibrations. You could discuss how video footage like this can be used in other contexts to develop their understanding of how this can be a useful and practical digital outcome.

are moved by the drum moving is similar to how the air near the drum gets shaken by the movement of the drum and when the air vibrates the invisible sound waves enter your ears.

Extra: The following YouTube clips may be useful to show your students to expose them to further explanations of sound and soundwaves:

- > [SciShow Kids - What is sound?](#)
- > [Kids Academy - What makes a sound?](#)

Learning Experience 5D: Measuring Sound

Learning Intention

We are learning to...

- > Explain how we can measure how loud a sound is.

Refer back to the activities you completed in the introductory lesson on sound where students began to explore the variety of sounds around us. Remind students that not all sounds are the same and that some are loud and some are quiet.

Play a series of sounds to students at different volumes – these could be the same sounds at different volume levels or a range of sounds at different volumes. Ask them to discuss with a buddy how they would describe the loudness of each of the sounds if they were telling someone about them who hadn't heard them. If they do not begin using comparative language introduce them to using terms like louder and loudest.

Explain to students that words like quiet, quieter, quietest, loud, louder, loudest are useful but they don't tell us exactly how loud the sound was, so we do have a tool that we can use to measure the loudness of sound. Link this to the idea of measurement of lengths and heights that have already been explored. For example, we can discuss length using words like long, longer, longest, short, shorter and shortest but if we want to be precise we can measure using a ruler and explain length using centimetres, metres, etc. Centimetres, metres, etc. are units of measurement for length and height and the unit of measurement we can use to measure sound is decibels.

Read (or re-read) pages 22-24 of 'Sounds All Around' for further information on how sound is measured. Page 23 uses imperial measurements so you may want to change these to metric measurements as you read this so that students are not confused.

Either as a whole class, or with students working in small groups, experiment with measuring sounds. There is a selection of apps, both free and paid, that can be downloaded onto an iPad to measure decibels. You can either provide a list of sounds for students to investigate or let them choose a range of sounds around the classroom that they would like to investigate. You may wish to download the [How Loud is that Sound?](#) sheet for students to fill out as they complete this activity.

Learning Experience 5E: Sound absorbing and blocking qualities of different materials

Learning Intentions

We are learning to...

- > Explore the sound absorbing and blocking properties of some common materials.
- > Understand why different materials are used for different technological outcomes.
- > Describe how we can do a 'fair test' to explore the sound absorbing properties of common materials.

Ask students what they think will happen to the sound waves that are travelling through the air if they come into contact with something like a window or a wall. What would happen to how we would hear a sound outside of the classroom if we closed all of the doors and windows? Would we hear the sound in the same way if we had the doors and windows open?

Explain that sound waves are able to travel through objects and even through water, by making those objects vibrate too, but depending on the object they will move through them differently and affect how we hear the sound. Link this to the idea that if we were to close the doors and windows the sound wouldn't be as loud inside the classroom anymore because the soundwaves now have to pass through the walls, windows and doors. Sound waves can move very easily through some objects but not so easily through others.

Note: The science around sound proofing, sound reflection and sound absorption can get quite technical. There are differences between the properties of materials that effectively absorb sound to stop echoes and those that effectively block sound. For the purposes of this unit and when working with students at this level, it will be sufficient to explain that while sound waves can move through lots of different mediums, they do not move through them all in the same way and that we can use materials that will reduce the amount of sound we hear.

For this experiment students will be investigating how effectively a range of materials are able to effectively block sound. Co-construct a list of materials with your students that will be suitable to investigate. Depending on the resources available, either as a whole class or in small groups, have students carry out a test whereby a device to measure the decibels is contained or partially shielded by the material, a sound is played near the test subject and the decibels are measured and recorded. Measure the decibels of the volume of the sound prior to containing it or shielding it in any material to see the level of difference that is made by each of the materials.

This is a good opportunity to discuss fair testing when carrying out an investigation of this nature. Discuss the importance of each of the following elements that should be considered when carrying out the test:

- > The sound volume should be the same when testing each of the materials.
- > The same sound should be used when testing each of the materials.
- > The distance between the source of the sound and the device measuring the decibels should remain the same when testing each of the materials.
- > The coverage of the device measuring the decibels should be the same with each material i.e. it wouldn't be fair to completely enclose the device with one material but only partially shield the device with another.

If your students are already familiar with fair testing when carrying out investigations of this nature, they may be able to take more of a role in the design of the experiment and be able to identify what

elements will require controls themselves.

You can download the [Sound Blocking Materials Experiment](#) sheet for students to record the results of this experiment if you wish.

You may wish to carry out further investigations with your students depending on questions or discussion points that are raised during this experiment. For example, some students may be interested in inquiring into whether two layers of the material is more effective than one and how much of a difference this actually makes. You may also wish to carry out more focused investigations on the materials identified as being those that blocked the sound most effectively. For example, some students may be interested in inquiring into how much space can be left open around the device measuring the decibels before the material doesn't effectively block the sound anymore i.e. does it need to be fully concealed to be effective or can there be an opening.

Depending on the prior knowledge and level of your students you may also wish to carry out some investigations into other materials that will be used in their outcomes that are not related to sound. For example, students may need time to explore what materials will be comfortable for the cat to lie on inside the hiding place.

We recommend that teachers be guided by the needs and questions of their students and plan investigations, using these prompts as inspiration, to allow their students to gain the knowledge and understandings that will support them to successfully design their technological outcomes.

Learning Experience 6: Developing Solutions

Learning Intentions

We are learning to...

- > Use our science learning to help us develop possible outcomes for the need.
- > Use the design brief to help us develop possible outcomes for the need.

Refer back to the design brief and help students make connections between their new learning and some of the attributes that the outcome should have. This will also be an appropriate time to expand on some of these attributes. For example, the opening needed to be large enough for the cat to fit through; now that we know a bit more about measurement we can get the measurements of a cat and then use our measurement skills to make sure the opening will be high enough and wide enough for the cat.

At this point students can be grouped into the small groups that they will be working with for the remainder of the design process. Teachers can determine what size groups will work best for their students and ensure that each group contains a mixture of strengths.

In their groups students can begin to brainstorm possible outcomes that they could create. At this point, all ideas should be recorded as there will be time to evaluate all potential options and select a final outcome in the next stage. Also explain to students that by considering all options they may be able to combine ideas from a few of the different potential ideas to create their final outcome.

Review the potential outcomes that your students have developed. At this point there may need to be some further investigation and testing depending on their prior knowledge. For example, some students

may have suggested using a soft material for the outer shell but not have considered what materials will be suitable to ensure that it is structurally sound. You may then need to generate a lesson that will allow them to explore materials that will make suitable frameworks. Look for any challenges that may be common to many students; if it is just one group who may need to carry out further investigation this can also be done during the models and prototypes stages when they create their outcome.

Learning Experience 7: Choosing A Solution

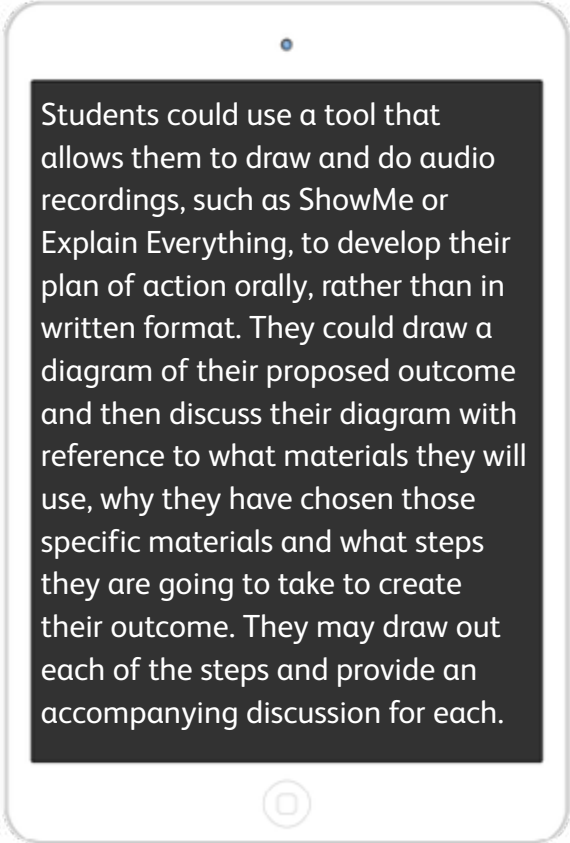
Learning Intentions

We are learning to...

- > Reflect on our ideas and the design brief to choose an appropriate outcome for the need.
- > Develop a plan to show how we will achieve our outcome.
- > Develop a plan to show what resources we will need to achieve our outcome.
- > Explain what materials we will be using to create our outcome and why we chose these.

Students will review all of their ideas they developed in the previous step to develop the final outcome they would like to proceed with.

Download the [Action Plan](#) sheet for students to fill out. This will scaffold them to develop a plan of the resources they will need and a rough outline of what steps they will need to take to create their prototype. This sheet also encourages them to think about what they will need to do as a team, to work together successfully to create their outcome, and asks them to identify any potential challenges they may need help with, which will help you to become aware of what each group may require in terms of extra scaffolding to successfully create their outcome.



Students could use a tool that allows them to draw and do audio recordings, such as ShowMe or Explain Everything, to develop their plan of action orally, rather than in written format. They could draw a diagram of their proposed outcome and then discuss their diagram with reference to what materials they will use, why they have chosen those specific materials and what steps they are going to take to create their outcome. They may draw out each of the steps and provide an accompanying discussion for each.

Learning Experience 8: Models and Prototypes

Learning Intention

We are learning to...

- > Create a prototype of our outcome.

Students will now create the prototype of their sound proof hiding place.

Again, there may be a need to revert back to the investigation stage and carry out some further learning if students encounter any unforeseen challenges while constructing their prototypes.

Learning Experience 9: Testing and Evaluation

Learning Intentions

We are learning to...

- > Test how effectively our outcome meets the attributes described in the design brief.
- > Reflect on whether or not our outcome meets all of the attributes in the design brief.

To test the effectiveness of their sound proof hiding place, the device measuring the decibels can be placed in the open and the volume of a sound clip can be measured. The device measuring the decibels can then be placed inside the sound proof hiding place (ensure that it remains the same distance away from the source of the sound) and the volume of the sound clip can be measured again. Refer back to how you and your students chose to benchmark the success of the sound reduction to determine whether the sound has been reduced enough to meet that attribute set out in the design brief.

Students can then be given a copy of the full design brief and self-assess against all of the attributes to determine if their sound proof hiding place effectively met all of the attributes it needed to to be considered an effective technological outcome in response to this need.

Learning Experience 10: Reflection

Learning Intention

We are learning to...

- > Reflect on and discuss what we have learned.

To conclude this unit, you may wish to provide students with the opportunity to reflect on what they have learnt over the course of the unit.

Download the [Reflection](#) sheet. Students could answer these questions orally as part of a whole class or small group discussion, or they could be provided with a copy of this sheet to record their answers.

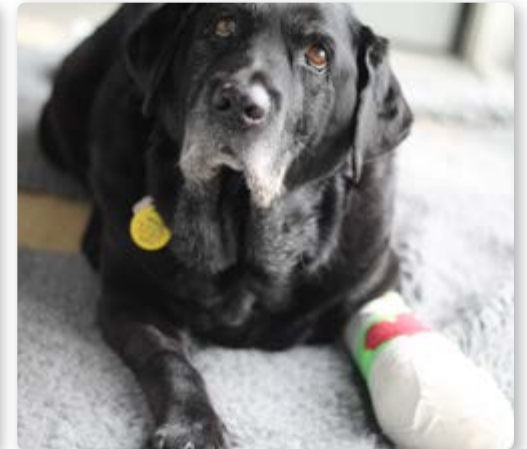
Action Plan

As a group you are going to decide what type of sound proof hiding place you are going to make. Discuss all of the ideas your group came up with and think about what outcome will best meet the attributes of the design brief. Are there parts you could take from a few of your different ideas and put them together to create the best outcome for this need? In the space below draw a diagram that shows what your technological outcome is going to look like. Label the different parts with what materials you are going to use. You may need to draw more than one diagram if there are things on the inside which cannot be seen from the outside or if the back looks very different to the front.

What materials are you going to use to make your technological outcome? Make a list and next to each material write why you have chosen to use this material.	
What steps are you going to take to create your technological outcome? Think about what you will need to do first and what you will need to do next, all the way through to the last thing you will need to do. Write a list of what you will do in order.	
What are some things everyone in your team will have to do to make sure that they do so that you can all work together to successfully create your technological outcome?	
Is there anything your group is unsure about that you might need some help with?	

Animal Sentience Images

Look at the animals in each of the following pictures. How do you think the animal might be feeling or what do you think they might be thinking? Why do you think the animal might be feeling this way or acting in this way?



Potential discussion points:

Students may interpret the images differently to the below discussion points, ask them to justify their reasoning.

1. The dog in this image is likely to be feeling content. The dog is running off leash and is playing with a toy which is allowing him or her to express their natural behaviours. Getting exercise and playing with toys helps to keep dogs' bodies feeling physically healthy and their brains mentally active.
2. The horse in this image is drinking water which indicates the horse was likely to have been feeling thirsty, which is why he or she is now drinking. After having a drink the horse will feel satisfied that they are not thirsty anymore. This may seem obvious but it is important for students to understand that animals feel thirst and will respond to that feeling in their body to relieve it, just as humans do.
3. The sheep in this image are resting in the shade of a tree which indicates that they may have been feeling hot and have chosen the shade as a comfortable place to rest and cool down. Choosing different places to sit or rest is one way that animals think and respond to their surroundings. Animals will choose a spot that allows them to feel comfortable based on the current conditions they are experiencing.
4. The cat in this image is in a hiding spot. This could be interpreted as the cat is feeling stressed or afraid and thus has chosen to hide or that the cat is feeling comfortable and safe as they are now in a spot that is hidden. Hiding is a natural behaviour for cats so being able to express this behaviour will help them to feel calm.
5. The rabbits in this image are eating food which indicates they were likely to have been feeling hungry. After eating the rabbits will feel satisfied that they are not hungry anymore. As with the image of the horse, this may seem obvious, but it provides another discussion point around animals thinking and responding to the needs of their bodies. The rabbits may also feel that they are enjoying what they are eating as there is a variety of foods for them to choose from.
6. The pigs in this image are likely to be feeling relaxed and content. They have been provided with a sleeping area that has the appropriate nesting material which will help them to feel warm and comfortable as they rest.
7. The cat in this image is likely to be feeling relaxed and content. The positioning of the cat, laying back with relaxed legs and his or her eyes closed indicates that they are enjoying being patted by the person. Animals will not always want to be touched by people and it is important for students to understand that we need to be aware of how the animal is responding to our touch and that while sometimes they will enjoy it, sometimes it may make the animal feel anxious or annoyed.
8. The dog in this image is likely to be feeling like resting. The bandage on his or her foot indicates that they have had some kind of medical treatment and just like humans, animals can feel pain and discomfort if they are injured or unwell. Since it appears to have been treated the dog is not necessarily in pain anymore, which some students may initially respond with. As a result of this injury, the dog is more likely to want to rest and not be as active, thus responding to how their body feels at the time.

Bigger and Smaller

How many multi-link cubes high is a cat? _____

How many multi-link cubes long is a cat (not including their tail)? _____

Use the multi-link cubes and explore your classroom to find things to answer each of the questions below. For each thing you find also write down how many multi-link cubes its length or height was.

1. What is something in the classroom that is longer than a cat?
2. What is something in the classroom that is the same length (or very close to) as a cat?
3. What is something in the classroom that is shorter (length) than a cat?
4. What is something in the classroom that is taller than a cat?
5. What is something in the classroom that is the same height (or very close to) as a cat?
6. What is something in the classroom that is shorter (height) than a cat?
7. What is something in the classroom that is 5 multi-link cubes longer than a cat?
8. What is something in the classroom that is 5 multi-link cubes taller than a cat?
9. What is something in the classroom that is 10 multi-link cubes longer than a cat?
10. What is something in the classroom that is 10 multi-link cubes taller than a cat?

Bigger and Smaller

How many centimetres high is a cat? _____

How many centimetres long is a cat (not including their tail)? _____

Use a ruler and explore your classroom to find things to answer each of the questions below. For each thing you find also write down how many centimetres its length or height was.

1. What is something in the classroom that is longer than a cat?
2. What is something in the classroom that is the same length (or very close to) as a cat?
3. What is something in the classroom that is shorter (length) than a cat?
4. What is something in the classroom that is taller than a cat?
5. What is something in the classroom that is the same height (or very close to) as a cat?
6. What is something in the classroom that is shorter (height) than a cat?
7. What is something in the classroom that is 5 centimetres longer than a cat?
8. What is something in the classroom that is 5 centimetres taller than a cat?
9. What is something in the classroom that is 10 centimetres longer than a cat?
10. What is something in the classroom that is 10 centimetres taller than a cat?

Five Domains Comparison

Your class is going to watch some videos that will tell you about what animal guardians (owners) need to do to care for that type of animal. After watching each of the videos, draw pictures or write down key words in the box next to the domain, for that animal, that will show what that animal needs.

	Write the name of the first animal here: _____	Write the name of the second animal here: _____
 Nutrition		
 Environment		
 Health		
 Behaviour		
 Mental Wellbeing (Feelings)		

What are some of the similarities and differences between what these two animals need to be happy and healthy?

Five Domains Comparison

You are going to choose an animal (dog, cat, rabbit or guinea pig) to research. Go to [SPCA Kids' Portal - Animal Care](#), find the animal you have chosen and watch the video under the domains nutrition, health, environment and behaviour. After watching each of the videos, draw pictures or write down key words in the first column next to the domain that will show what their guardian needs to do to help give that animal positive experiences for that domain.

	The animal I chose: _____	The animal my buddy chose: _____
 Nutrition		
 Environment		
 Health		
 Behaviour		

After you have found out about what your animal needs to live a happy and healthy life, pair up with somebody who chose a different animal to you. Share what you found out about your animal with them and listen to them share what they found out about their animal. In the second column, for each of the domains, draw or write down one thing that their animal needs that was different to the needs of the animal you chose. Did you notice anything that was similar about their needs?

Five Domains Comparison

Go to [SPCA Kids' Portal - Animal Care](#) and choose an animal that you would like to research. Read the information about nutrition, environment, health and behaviour for that animal. Take notes in the first column next to the domain that will explain what their guardian needs to do to help give that animal positive experiences for that domain.

	The animal I chose: _____	The animal my buddy chose: _____
 Nutrition		
 Environment		
 Health		
 Behaviour		

After you have found out about what your animal needs to live a happy and healthy life, pair up with somebody who chose a different animal to you. Share what you found out about your animal with them and listen to them share what they found out about their animal. In the second column, for each of the domains, write down what needs their animal has that were different to the needs of the animal you chose. Did you notice anything that was similar about their needs?

How Loud is that Sound?

Fill in the table with the sounds you have measured and how loud they were in decibels.

Sound	Decibels (dB)

1. What was the loudest sound you measured and how many decibels was it?
2. What was the quietest sound you measured and how many decibels was it?
3. Put the sounds in order from quietest to loudest.
4. Which two sounds had the biggest difference between how loud they were? What was the difference, in decibels, between these two sounds?
5. Which two sounds had the least difference between how loud they were? What was the difference, in decibels, between these two sounds?

Reflection

Think about all of the learning activities you have done during this unit and use what you have learned to help you answer each of the questions.

1. What did you learn about how people need to care for animals so that they can live happy, healthy lives?
2. What did you learn about how sounds are made and heard?
3. What did you learn about how we can measure the size of objects?
4. What do you think your team did well that helped you to make your sound proof hiding place?
5. Do you think there is anything your team could do differently next time to work together more successfully?
6. What was a challenge your team had while you were designing and making your sound proof hiding place? How did you overcome this challenge?

Sound Blocking Materials Experiment

Fill in the table with the results of your investigation into how well different materials blocked the sound.

How loud was the sound clip before the device measuring the decibels was covered by any materials?

Material being tested	Decibels measured when the device was shielded by the material

1. Which material blocked the sound the most?
2. How much quieter, in decibels, was the sound compared to how loud it was when it was first measured without the material covering it?
3. Which material blocked the sound the least?
4. Place the materials in order from the one that blocked the sound the most through to the one that blocked the sound the least?
5. What was the difference, in decibels, between the loudness of the sound when the device measuring the decibels was covered by the material that blocked the sound the most and the material the blocked the sound the least?

The Needs of Animals

The Five Domains are five groups of things animal guardians need to consider when thinking about good animal welfare. These consist of:



Nutrition

Just like it is for us, a complete and balanced diet is one of the most important factors in ensuring healthy growth and development and maintaining overall good health of your animals.

Food

The proper amount of food and balance of nutrients is essential when feeding your animals. Just like us, animals need a certain combination of protein, carbohydrates, fats, vitamins, minerals and water every day in order to grow, develop and stay healthy and strong.

Eating should be an enjoyable experience for animals, this includes offering a variety of textures, tastes and smells.

If animals are being fed processed food such as dry food or pellets, it is important to follow the recommended daily amounts provided on the packet labels. Just as there are underweight animals, there are many overweight animals whose bodies work extra hard to stay alive. Deposits of fat make it hard for the animals' blood to flow efficiently. As a result, the supply of oxygen to the animals' muscles and organs is reduced and their bodies no longer function well. The animals live in pain and discomfort and their life expectancy is shortened.

Keeping your animals active and at a healthy weight will increase their lifespan and the time you get to spend together. Different animals have different nutritional requirements. It's always wise to discuss the best diet for each of your animals with your veterinarian. Ensuring you are giving your animals the right food, in the right amounts will help to keep your animals in good health.

Water

Just like us, animals need fresh water available at all times. Water allows an animal's body to function properly and to deliver important nutrients throughout their system.

Water helps an animal stay hydrated and controls their body temperature, especially on hot days. Water must be fresh. If it has been sitting around for a while, water gathers germs and parasites that may be harmful. Remember to refresh animals' water bowls at least twice a day. Never allow water bowls to remain empty, freeze or get too hot.

Don't forget to also clean your animal's water containers every day.



Environment

All animals should live in an appropriate environment. The conditions and surroundings given to an animal contribute to their overall wellbeing. By providing an animal with shelter, a comfortable resting area and a large, safe space to express natural behaviours, you are helping that animal to remain healthy and happy.

Shelter

Just like people, animals need places where they are sheltered from wind, rain and hot sun. Some animals, such as guinea pigs and rabbits, also need shelter to protect them from predators like cats and dogs. Enclosures, kennels, hutches, houses and aviaries provide shelter for our pets while barns, stables and sheds protect farm animals.

If an animal's shelter is also their home, it must be as comfortable as possible. It must also be as large as possible, with attached areas for exercise and opportunities to express natural behaviours. Bedding within the shelter should always be soft, warm, dry and cleaned regularly. An animal's environment needs to be interesting, enriched, and safe.



Health

All animals should be entitled to immediate veterinary attention when they are sick or injured. To avoid unnecessary suffering, animals should be taken to a veterinary clinic when sick or injured and treated accordingly. In most cases, unnecessary pain and injury can be prevented through regular visits to a veterinarian.

Medical (Veterinary) Care

Just like when we visit the hospital or dentist, for many animals, a visit to a veterinary clinic can sometimes be a little bit scary. Regardless of how enjoyable or not the experience is, animals should visit a veterinarian at least once a year for a health check-up and vaccinations against a range of infectious diseases. Ensuring your companion receives preventative medical care is part of being a responsible animal guardian. It is essential to ensuring your animal has good health.

Good health means gentle, careful handling, the rapid diagnoses of disease and injury, space and opportunity to enjoy physical activity and natural behaviours, and keeping a healthy weight.

If animals show any signs of pain, injury or ill health, it is important they receive veterinary care immediately. An indication that an animal may be ill could include:

- > loss of appetite
- > sluggish behaviour/difficulty moving around

- > rapid weight loss
- > vomiting
- > diarrhoea
- > discharge from ears, eyes or nose
- > lumps or bumps

Vets can also advise on how to prevent and rid animals of fleas and worms. Fleas are small, biting, blood sucking insects that cause animals to scratch. If they are not removed, the animals may suffer from an irritating skin condition. Very young animals such as puppies and kittens, and elderly pets can become anemic and even die from flea infestations that are left untreated.

Roundworms, tapeworms and hookworms are parasites that live in the digestive system, arteries and heart of an animal. Infestations of worms can be fatal. A number of treatments are available; a veterinarian will recommend the most suitable treatment for your companion animal and give you advice on scheduling these treatments regularly so these parasites don't become a problem.



Behaviour

All animals should be able to express their natural behaviours. Behaviour refers to the way an animal acts. An important type of behaviour that an animal expresses are those that are instinctive (what they would typically do in the wild). Enough space, proper shelter and housing, as well as company of the animal's own kind, encourages the expression of natural behaviours.

Exercise

Exercise keeps animals healthy and alert, just like it does for you. Blood flow is increased during exercise, clearing arteries and veins and transporting oxygen and nutrients around the body.

Exercise keeps muscles strong, allows better digestion of food and heightens an animal's senses. Energy that has been stored as fat can also be used up during exercise - this helps to prevent animals from becoming overweight.

Expressing natural behaviour is not only about an animal exercising their body, it is also about an animal exercising their mind. During exercise, new sights, sounds, smells and tastes can be discovered; unknown paths, trees and tunnels can be explored and new animals may be encountered - these experiences are very important for an animal's physical and mental well-being.

Enrichment

Imagine if you spent your entire life alone, locked in a big room. You had food, water, a warm cosy bed and once a day you were let out for 30 minutes to run around, but that was all. You had no friends, no toys, no TV, no books, no phone, no internet. What would or could you do for the rest of the day? How do you think you would feel?

Most people would experience loneliness, boredom, frustration, sadness, anger and depression. Animals are likely to feel the same way too. Animal guardians must meet their companion animal's environmental and behavioural needs – this includes providing mental and physical enrichment.

Animal enrichment is about designing and creating interesting enclosures, and providing activities that create a more stimulating environment for an animal. Enrichment should enable them to express as many of their natural behaviours, such as exploration, foraging, locomotion (movement), social interaction, manipulating objects or simply playing, as often as they choose.

Good enrichment is safe, fun, challenging and time consuming.

Be sure to check out the [Things to Make or Do](#) section for examples of some awesome DIY enrichment toys!

Companionship

There are many natural behaviours that animals will express when they have companions of their own kind such as grooming, playing, and cuddling. Even with lots of human contact, many animals need to live with a compatible companion. Without a friend to carry-out these natural behaviours, an animal can become frustrated, bored, and lonely. They can even develop abnormal behaviours if left without company and nothing to do for long periods.

No one understands an animal quite like a member of their own species! When animals have companions of their own kind with which they can express these natural behaviours, it helps them to feel safe, happy, and content.

Get to know your animal and their companionship needs so that you can help them express their natural behaviours.



Mental Wellbeing

Positive mental experiences means having positive feelings and experiences. These include experiences of comfort, pleasure, interest, confidence and a sense of control.

The four domains of health, behaviour, nutrition and environment all impact on the overall mental wellbeing (feelings) of an animal. For example:

Nurition

Experiencing tasty, varied food and fresh water

Feeling full and satisfied because of good food and water

Environment

Experiencing fresh air, comfortable bedding

Feeling warm and comfortable in their environment

Health

Experiencing good fitness

Feeling healthy and energetic because of good health

Behaviour

Experiencing appropriate social interactions

Feeling affection, joy because of appropriate behaviour

Which Domain?

In your groups discuss each of the pictures. Which of the domains do you think it shows and what is it showing that links to that domain? Cut out each picture and each heading and put each picture under the matching heading.



Nutrition



Environment



Health



Behaviour











Answers and potential discussion points for teachers:

Students may reasonably classify some of the images differently depending on their interpretation of the photos; ask them to justify their reasoning behind their classifications. Notes have also been included on how mental wellbeing may be affected.

	Chickens eating pellets. This will help the chickens to feel full and satisfied.		Horse drinking water. This will help to ensure the horse does not feel thirsty and is satisfied.
	Dog drinking water. This will help to ensure the dog does not feel thirsty and is satisfied.		Guinea pigs eating pellets. This will help the guinea pigs to feel full and satisfied.
	Goats eating hay. Food needs to be supplied and stored in a way that will allow it to remain clean. This hay has been placed in a hay rack so that it is up off the ground and not being trodden on. This is important with regard to ensuring that animal food and water dispensers are regularly cleaned and food and water is not left in them to grow bacteria. It also ensures that the food and water will be palatable for the animals so that eating is an enjoyable experience.		Mouse eating a tomato. Animals should be provided with variation in their diet to improve how enjoyable their eating experiences are by providing a variety of tastes and textures. For example, mice can be fed some fruits and vegetables, in addition to mouse pellets, provided that all foods given are part of a nutritionally balanced diet and are safe for the particular animal they are being fed to. Always check with your animal's veterinarian what foods are suitable.
	Guinea pig enclosure. This enclosure is suitable and will support the guinea pigs who live there to have positive experiences due to the fact that it is spacious enough for them to move around and it provides a variety of materials for them to nest, sleep and hide in.		Dog being provided with an appropriate outdoor shelter to protect them from rain, wind and sunshine. This will help to ensure they will be able to feel a pleasant and comfortable temperature.
	Pig being provided with hay as suitable bedding/nesting material. This will help to provide them with warmth and comfort as they sleep.		Rats being provided with hay as suitable bedding/nesting material. This will help to provide them with warmth and comfort as they sleep.

	Goat being provided with an appropriate outdoor shelter to protect them from rain, wind and sunshine. This will help to ensure they will be able to feel a pleasant and comfortable temperature.		Chicken being examined by a veterinarian. Regular check ups are important to ensure the animal is healthy. This will help to diagnose and treat any medical issues that may arise and cause pain or discomfort if they were to do so.
	Cow being administered a vaccination. Providing preventative medication helps to reduce the risk of certain health problems arising that may cause pain or discomfort if they were to do so.		A sheep that has been shorn. Shearing sheep is part of maintaining their overall health. If sheep are not shorn at the appropriate times, they will struggle to regulate their temperature and feel uncomfortable if they are too hot.
	Rabbit being examined by a veterinarian. Regular check ups are important to ensure the animal is healthy. This will help to diagnose and treat any medical issues that may arise and cause pain or discomfort if they were to do so.		The mouse is being held using the 'cupped hand' technique which is an example of gentle, careful handling. Gentle, careful handling helps to ensure animals will feel safe and secure and not fear being handled.
	Horse running. Running is a natural behaviour for horses. Being allowed to move their bodies freely will help the horse get exercise so their body feels strong, fit and healthy.		Cow grooming another cow. Grooming one another is a natural behaviour for a variety of animals and it is important that they live with companions of their own species to be able to carry out this behaviour. Cows will feel happier when they can express their natural behaviours. Being clean will also help cows to feel comfortable.

	Rat with a chew toy. Chewing is a natural behaviour for rats as their teeth grow continuously and chewing keeps them at an appropriate size. Chewing will also provide an enjoyable experience for a rat.		Cat playing with a toy. Giving cats toys gives them more opportunities to express their natural behaviours. This will allow the cat to have fun and experience as sense of enjoyment as they play.
	Numerous sheep are together in a flock. Sheep are prey animals who need to live together in groups. Being with others in the group helps to allow sheep to feel safe and calm.		Pig wallowing in mud. Wallowing in the mud is a natural behaviour for pigs because pigs do not sweat and wallowing in mud helps them to cool down. This image could also be classified under environment as pigs need to have an area in their environment to wallow. Pigs will feel happy and comfortable when they are able to cool themselves down.
	Cat in a hiding place. Cats often choose to hide if they are feeling stressed or afraid in a situation. This could also relate to environment as providing hiding places as part of a cat's environment is also important. Hiding will help the cat to feel calm again.		Rabbits being kept in a pair. Rabbits are a social species of animals and need social interaction with another rabbit to express their natural behaviours. Rabbits who are kept without a companion can feel lonely and distressed.