MINISTRY OF EDUCATION
TE TĀHUHU O TE MĀTAURANGA

A learning from home pack

For learners in years 9–10

Theme: Sustainability

Context 1: Environmental Sustainability

Context 2: Cultural Sustainability

Layout of the resource

This pack is filled with learning activities that can be used at school or at home. All activities are framed around the theme of sustainability | toitū.

Suggestions are provided for starting the day with a karakia (see p. 8), check in with the teacher, and setting up the learning environment. You can replace these with how you want your learner to start their day.

The activities follow an inquiry learning model (figure 1) exploring one big idea through two contexts. Each day the learner will work through one part of the model culminating with sharing their learning on days five and ten.

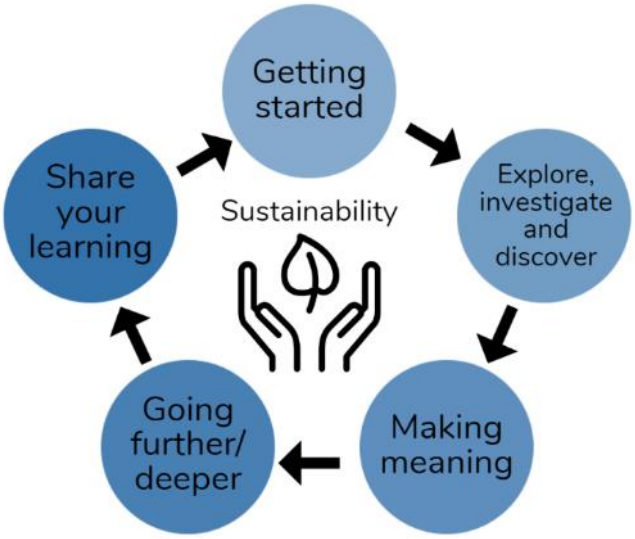


Figure 1 Inquiry learning model

Realities

You know your learners and have a good understanding of their learning situations. Many learners will be sharing space and materials. Some may have access to the internet and devices, and others may not. Learners will also have varying levels of adult support. This pack contains a mix of activities using materials found in most homes. Some activities will need support while others can be managed independently.

Resources

The pack uses books from the School Journal series. **You might want to send these home with the learner**, along with a "my home learning" exercise book. Learners can bring their notebook back to class to share. All images have been sourced with permissions for use in this pack. If your learners do not have reliable access to the internet, here are the resources to print and send home to create a paper-based pack.

Resources to send home

- https://instructionalseries.tki.org.nz/Instructional-Series/School-Journal/School-Journal-Level-3-May-2019/Unwanted-Visitors
- https://instructionalseries.tki.org.nz/Instructional-Series/School-Journal/School-Journal-Level-2-August-2017/The-Mysterious-Stones-of-Tonga
- https://docs.google.com/presentation/d/1F0hyjQHUhDMaoyxWeD1QCA27pO4PyVeKYzkBXODULSw/present?slide=id.p
- https://www.teaomaori.news/hui-across-country-help-maori-protect-manuka-honey
- A photocopied map of the local area.

Setting up the learning environment

Encourage whānau to support learners to set up a space for learning at home. Learners might like to design their own space as a separate learning activity. Some materials they may need could include pen, pencils, paper, a notebook, colouring pencils, glue, scissors, and a device to access the internet.

Many of the suggested activities and experiences include the optional use of online resources which can be accessed and viewed using a Smartphone.

Overview of the learning in this pack

The theme of **sustainability | toitū** will be explored through two contexts.

- Days 1–5 look at this idea through the context of **environmental sustainability.**
- Days 6–10 look at this idea through the context of **cultural sustainability.**

Learners will explore, investigate, discover, and make meaning as they go through each task. There are times where they look a little deeper into the topic. Some of the tasks may be independent hands-on tasks while some may involve connecting and sharing with others.

Day 1	Day 2	Day 3	Day 4	Day 5
Getting started: Learners will establish an understanding of what sustainability is and is not.	**Explore, investigate, and discover:** Learners will take a close look at the impact populations densities have on the environment	**Making meaning:** Learners will take a look at the way humans are using designs inspired by animals to address sustainability issues face today	**Going further/deeper:** Learners will take a closer look at the concept of biodiversity and its relationship to sustainability	**Sharing my learning:** Learners will design and implement a product or system to encourage sustainable living.
Day 6	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Getting started: Learners will establish a foundation to build on for the rest of the week's activities.	**Explore, investigate and discover:** Learners will explore different ways cultural identity can be expressed.	**Making meaning:** Learners will explore different ways communities, keep their heritage, traditions and cultures alive.	**Going further/deeper:** Learners will explore ways that traditional knowledge and practice work alongside modern innovation and scientific thinking.	**Sharing my learning:** Learners will engage in activities designed to share aspects of their cultural identity with others.

Daily timetable

Below is a possible daily timetable. We have allocated 30 minutes for each activity; your learner may take more or less time than this for an activity. We suggest your learner takes the time they need to complete an activity. This may mean they choose which activities they will complete for the day, rather than complete them all.

At the start of each day the learner will draw up their timetable for learning. You can adjust the timing to suit the other activities that might be happening the day, such as Zooming with the class/teacher.

Time	Activity
9:00 am	Starting the day
9:30 am	Activity 1
10:00 am	Break
10:30 am	Activity 2
11:00 am	Fitness break
11:30 am	Activity 3
12:00 pm	Lunch time
1:00 pm	Activity 4
1:30 pm	Reflection time
2:00 pm	End of the school day

Daily fitness – Choose something each day

Please ensure that your learner includes fitness in their daily timetable. If possible, it would be great to do the fitness activity with your learner or have them complete it with others. Below are activities to choose from – or you can make up your own ideas!

> Tama Tū, Tama Ora; Tama Noho, Tama Mate.
> Through physical activity we thrive. Through inactivity we languish.

Your learner may prefer to go for a walk or run around your house. They could time themselves for fun! Maybe they'd like to go for a bike ride? Play a game with whānau? Have a boogie to a favourite song? Or do some yoga? It is up to you just get active!

Please note you can change or modify the exercises (in addition to those suggested) if you are not able to do the ones we have suggested, get creative and change it up

Skipping - Toru + Tekau + Rima Fitness Challenge:

Can you do this? Tekau tāruarua (10 reps), e rima ngā huinga (5 sets) – let's go!

These are our toru (3) exercises

1. Freestyle skipping (30 seconds), rest (30 seconds)
2. Backwards skipping (30 seconds), rest (30 seconds)
3. Speed skipping (30 seconds), rest (30 seconds)

Tekau tāruarua – do each exercise 10 times. E rima ngā huinga – do each set of toru (3) exercises rima (5) times. *Hōngai tō puku – remember to brace your abs.*

Ka pai!? Here we go! Haere mai? Good? Let's go!

Fitness countdown

You don't need anything for this activity but a positive attitude and a water bottle!

- tekau (10) jumping jacks **modify: right leg step out to the side then left leg
- iwa (9) forward lunges (on each leg) **modify: us a box and step up and down
- waru (8) squats (don't let your knees go past your toes) **modify: sit in chair, stand up
- whitu (7) donkey kicks (each leg) – *can do standing or sitting*
- ono (6) sit ups **modify: touch knees
- rima (5) high knees **modify: lift knees up while laying down on back
- whā (4) push-ups **modify: do on your knees
- toru (3) star kicks (right leg – kick forward, side, back; then left leg)
- rua (2) burpees **modify: walk outs – walk out with your hands and walk back
- tahi (1) superman pose or high plank for as long as you can hold! **modify: on knees

Take a rest and repeat. Tumeke!

Online option: Māori Movement

Start with a warmup: http://www.Māorimovement.co.nz/warm-up

TŪMATAUENGA is the Māori God of War. Māori Movement is Manu waewae - focusing on isometrics and balance through 'peruperu'. You will use your waewae (leg/feet) to build your understanding of 'ihi' which is your essential force and builds self-control by holding the position of Tū Tane (known as the war stance).

1. You will practice 3 levels of 'peruperu'.
2. The challenge is to hold the position of Tū Tane for 30 seconds.

Challenge: http://www.Māorimovement.co.nz/courses/ruaumoko/level-1-ruaumoko

Tahi-rua-toru Fitness challenge - Crabwalk-superman-bear crawl

You will need a water bottle and your ‘can do’ attitude!

Tahi – Crab walk. Start sitting down on the floor and then use your legs and arms to lift your torso and walk around like this for as long as you can.

Rua – Superman. Lay down on the floor with your face towards the floor, relax. Now lift your legs slightly off the floor and put your arms out like superman. How long can you remain in this position?

Toru – Bear crawl. Start the bear crawl in a push up position. Your hands should be beneath your shoulders, your back is strong, and your core is engaged. Your feet should be hip distance apart with heels off the floor.

- Move forward by simultaneously (at the same time) moving the right hand and the left leg in a crawling motion. *Your knees never touch the ground.
- Switch sides immediately after placing weight on the right hand and left leg, moving the left hand and right leg forward.
- Continue in a crawling motion, moving forward for as long as you can.

Repeat the three sets of exercises three times. Can you beat yourself? Great efforts!

Create your own fitness circuit:

Select 5 or more of these exercises (or other exercises that you like) and create your own fitness circuit in your home or outside. Remember every exercise can be modified to suit your physical ability and fitness level. Have a look at some of the suggestions here.

High knees, running on the spot or brisk walking or shuttle runs/line sprints. Skipping or galloping. Slip stepping or marching on the spot. Skis – stepping side to side as if you are skiing, step wider if this is too easy for you.	Hops – on the spot – forward and back or tap your toes out in the front of you and aback. Jumping, astride jumps/straddle jumps. Knee lifts. Heel to bottom kicks. Squats –vary how wide apart you place your legs or go lower if you need a challenge.	Abdominal crunchies - tap your knees as you move up or tap your ankles. Push-ups – either on your feet or on your knees. Lunges or step-ups. Double foot jumps – side to side – forward and back. Leg lifts – lie on the ground on your back and lift your legs up and down.

Daily wellbeing – Choose something each day

These activities are good to do at the beginning and end of the day but can be done anytime. They can help you get ready for learning, calm your mind and body, and can help you to reflect on your learning:

Mandala Colouring

Colouring is an activity where you can be fully immersed in what you are doing and lose track of time. We call this going with the flow.

Going with the flow means being in the present, people who keep mindful of the present usually experience happiness on many levels. See what colourful patterns you can create whilst completing some mandala patterns.

Mindfulness in Nature

Being in a natural environment can cause a lot of positive feelings such as wonderment and awe. If you feel these feelings when you are outside, it is a clever idea to spend lots of time in that environment. Go outside and sit in a comfortable place:

- Notice 5 natural things you can see
- Notice 4 different colours in these things
- Notice 3 different textures (close your eyes and feel around if that helps) e.g. rugged bark, pointed grass
- Notice 2 things you can smell
- Notice 1 favourite thing from any part of today

Stay a moment outside and check how you are feeling. If you wanted to take your observations further, go inside and write some things that stood out for you. You can turn these into a poem.

Bodyscan

While sitting or lying, check in with your body to see how you are feeling physically without judging yourself or asking “why”. You could check in on the following:

- “How is my breath, shallow or deep?
- “Where do I feel sore or tense?
- “How does my back, neck, face, leg muscles feel?

Attitude of Gratitude

Choose one or more of the prompts below and write the reason why you are grateful.

- I am grateful for my family because...
- Something good that happened this week...
- I am grateful for my friendship with _____ because...
- I am grateful for who I am because...
- Something silly that I’m grateful for...
- Something else I am grateful for...

I love your SMILE

Think about something that makes you smile. Is talking to friends or family members? Is it playing an instrument, singing, or dancing? Is it spending quiet time in nature? Is it cooking or baking? Is it being creative and making things with your hands?

Choose one of these things and put a smile on your dial!

Starting each day

Notes for teachers and whānau:

Starting the same way each day helps create a structure for your learner. Your school might have your own way to do this, for example starting the day together as a class on Zoom. In this pack we provide a karakia to settle into the day. Saying the karakia with your ***learner*** *a few times will help them be able to do this more independently tomorrow and beyond. As part of the start of the day and setting up the learning environment, help your learner look through the activities suggested for that day* ***and choose a fitness and wellbeing activity****. They could fill out their daily timetable and think of other activities they might like to do, like reading****.***

Remind your learner of when and how to check in with the teacher/you.

Karakia

Here is a karakia to welcome in the day

Mauri oho | karakia timatanga Mauri oho Mauri tū Mauri ora ki a tātou Haumi e, Hui e Tāiki e!	Life force awaken Life force stand tall Life force all wellness, good health for all Join together, unite, the group is ready to progress for the purpose of coming together

Planning my day

- Have you chosen which activities you will do today and in which order?
- Remember to choose a fitness activity (see p. 4)
- Have you chosen a wellbeing activity? (see p. 6)
- Have you done a 'Wellbeing check-in'?
    - How are you feeling today?
    - How do you feel about your readiness to learn this morning?
    - What do you need extra assistance with today? Who could you get to help you? What strategies could you use to help make your learning more effective?
    - What would you like to do as a quiet time activity to end your day?
- Remember to do your Reflection at the end of the day (see p. 8)

Ending each day

Please ensure your learner does this at the end of each day.

Reflection can be challenging for all learners, but it can also provide them with rich opportunities to think about how their learning is progressing. Use the questions below as prompts to encourage your learner to think about what they have learned so far and help them to plan out their next steps. If you have concerns with their learning or find that your learner is needing more help, contact their teacher for more support.

I am learning to: reflect on my learning, my day and myself

What do I need?

- A notebook or online doc that you can use each day for your reflection activity. We will call this your "reflective journal"
- Materials for your quiet time activity

Option 1: Reflections about my learning

Take time to think about how you are feeling after today's learning. Reflect on 2 or 3 of the following prompts in your reflective journal.

- What did you enjoy most about today?
- What is one thing you feel you learnt today?
- What is one strategy that helped you with your learning?
- Is there anything you need extra help with? Who can you ask to help?
- Is there anything you want to catch up on tomorrow?

Option 2: Reflections about my day

Choose 2 or 3 questions to respond to in your reflective journal:

- What is something kind you did for someone else today?
- What made you laugh today?
- What is something that frustrated you today?
- What is something you wish you had done differently today?
- On a scale of 1–10, with 10 being the best day ever, how does today rate? Why?
- Were you able to finish all of your work today? Why or why not?

Option 3: Reflections about myself

Choose 2 or 3 questions to respond to in your reflective journal:

- What are your greatest strengths?
- If you could live anywhere in the world, where would it be? Why?
- Who do you talk to when you have a problem? How do they help?
- What do you like to do for fun?
- If you could have one wish, what would it be?
- What are you grateful for?
- What do you like about yourself?

Remember to finish with a wellbeing activity and/or your chosen quiet time activity.

Context 1: Environmental Sustainability

In the first five days we will investigate the theme of sustainability by looking at how we understand and work towards environmental sustainability.

Environmental sustainability

Sustainability | Toitū

Day 1 activity 1: Inquiry getting started

Notes for teachers and whānau

Today's activities will be focused around helping learners to establish a foundation and direction on which the rest of the learning for the week will take place. This first activity looks at defining what sustainability means and how it is different from conservation.

I am learning to: know the difference between sustainability and conservation.

What do I need?

- 30 minutes
- Materials to engage in written activities in books or online
- A dictionary (can be online)

Remember to start your day right (see p. 7).

Your task:

Jarel was given a short task to complete before his next class.

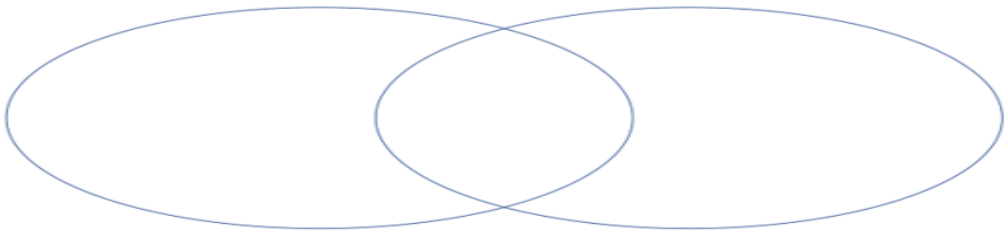
1. Use a dictionary to check Jarel's assumptions, the write each definition in your own words. Try and find a definition that doesn't just use the same root word in its definition.

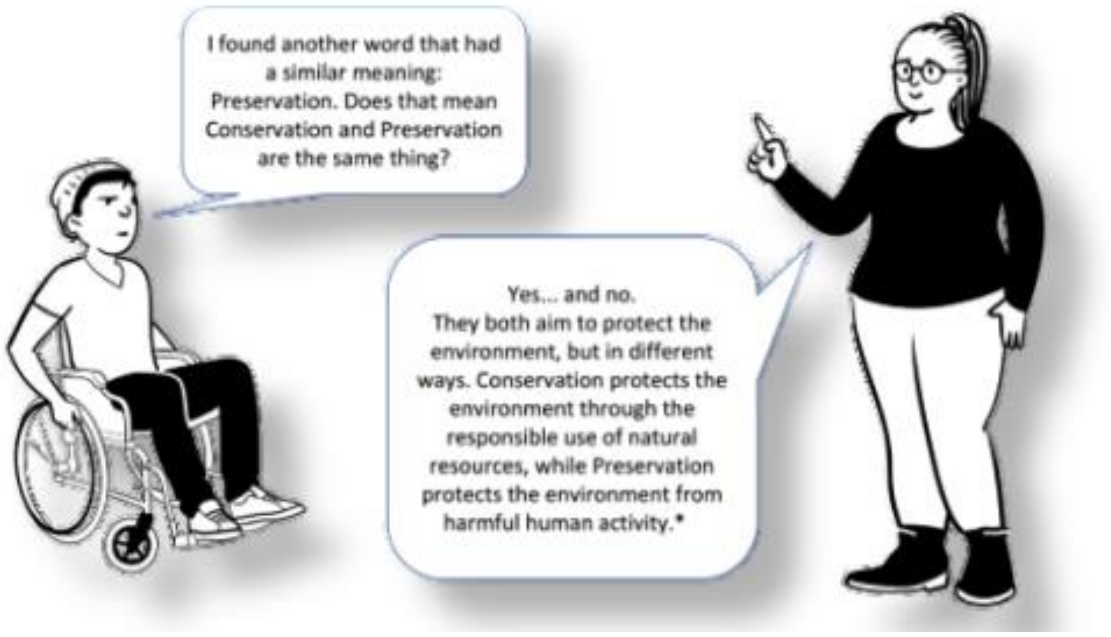
   Sustainability: _____

   Conservation: _____

2. Jarel made the statement that both terms are pretty similar. Is he right or wrong? Compare and contrast the two definitions using the Venn diagram below then state your answer and justify your it with an example.

Sustainability **Conservation**





*Definition adapted from https://www.nationalgeographic.org/encyclopedia/preservation/

Reflect on the list of actions/ideas below then tick whether they should be categorised as Sustainability, Conservation or Preservation. You may need to look some of these actions up to better understand what category they fit into.

Action/Idea	**Sustainability**	**Conservation**	**Preservation**
Driving electric cars			
Tiritiri Matangi Island Programme			
The Kauri Dieback Programme			

Day 1 activity 2: Why is sustainability important?

Notes for teachers and whānau

In this activity learners will take a closer look at the issues facing our planet and ultimately our survival and make links between these and our actions.

I am learning what it means and why it's important to think and act sustainably.

What do I need?

- 30 minutes
- Video *Sustainability in 2 minutes – GMIC* (or transcript below) https://www.youtube.com/watch?v=Doeb6QWJ5kA&t=8s

Your task:

Watch *Sustainability in 2 minutes* or **read** transcript below

Sustainability means that things can keep going, can sustain themselves, can continue into the future and go on forever from a human perspective.

Sustainability for our planet means that it can continue to do what it was designed to do, provide fresh air, clean water, produce food, and allow us all a high quality of life forever.

Unsustainability means that it cannot, and that is where we are now. 32 years ago, scientists in Sweden developed a definition for sustainability with four basic principles. These can be seen as the care instructions for our planet. If we follow them, it is good for our planet and because we are part of the system that is our planet, it's good for us too!

The care instructions are as follows.

1. Reduce our dependence on **fossil fuels** and **heavy metals**.
2. Reduce our dependence on **synthetic chemicals** that persist in nature.
3. Reduce our destruction of nature.
4. Ensure we are not stopping people globally from meeting their needs.

Demand for the Earth services (clean air, water, food) increases as the population increases and living standards rise. But the Earth's ability to provide these services is declining because of the way we're living. In our search for prosperity, growth, and success, we are destroying the system that we as humans are completely dependent upon – Nature! We have become a threat to our own way of life. The Earth is a system, and everything is connected. Society, environment, and economy. To live sustainably, we need to follow the 4 care instructions and apply them to everything we do at home and at work. If we can follow these instructions, we can work together to be sustainable. We will all have a better quality of life. We'll waste less, we'll pollute less, and we'll create more things we value in society while improving our planet's chances of providing us with the very things we need to survive.

1. What are things that currently threaten ours or other's ability to access clean water, air, or food? Give at least one current example for each in the table below:

Access to clean water is threatened by…	Access to clean air is threatened by…	Access to food supplies is threatened by…

2. Why is it important that we reduce our dependence on fossil fuels? What are 2 ways we currently do that?
3. What do you feel are factors that are still preventing people from acting sustainably? List 2 and give reasons why.

Day 1 activity 3: Ecological footprints

Notes for teachers and whānau

Learners will either need access to the internet or a printout of the footprint calculator. This activity explores the amount of resources consumed by humans in our daily activities.

I am learning to: understand ecological footprints.

What do I need?

- 30 minutes
- Video *Operation Sustainability – a story on the world´s most important customer* https://www.youtube.com/watch?v=RMx3bcTlxqY OR
- Look in your pack for the sheet – *Personal Eco-Footprint Calculator* http://www.earthrangers.org/wp-content/uploads/2016/08/how_big_is_my_ecological_footprint.pdf

Your task:

Read this background information:

The Ecological Footprint Explained by Geert Coppens

Our human activities consume resources and produce waste, and nature needs to have the capacity to meet these demands. The ecological footprint is a way to measure our human demand on nature.

Every one of us has an ecological footprint.

The footprint represents the impact of a person, a household, a city, a business, or a country on nature. Things like food, energy, transportation, goods, and services all contribute to our ecological footprint. The footprint is expressed as the amount of land and water required to produce what we consume, and to absorb the waste we generate. By measuring the ecological footprint, we can assess the pressure our lifestyle puts on the planet. This helps us to manage our ecological assets more wisely. And to take personal and collective action.

Complete the *Personal Eco-Footprint Calculator* provided in your pack.

Challenge yourself – set a goal for yourself in each lifestyle category and choose a date in the future to recalculate your footprint.

If you have access, watch the video then complete this activity:

The video highlighted different attitudes and actions between the “haves” and the “have nots”. Fill in the table to highlight the cause and effects raised in the video. The first one is done for you as an example.

Cause (the why)	Effect (what)
Large commercial trawlers can drain coasts of fish.	Small scale fishermen are not able to catch enough fish to survive/make a living.
	The air quality in some cities is dangerous to the health of the very poor and young children.
Industrial farming and the use of pesticides.	
	62 million girls under the age of 16 are not in school.

Day 1 activity 4: Calculating our ecological footprints

Notes for teachers and whānau

Learners will require access to the internet for this activity.

I am learning to: consider the possible impact my lifestyle choices have on the Earth's resources

What do I need?

- 30 minutes
- A device to access a eco-footprint calculator such as www.earthday.net/footprints2/flash.html, Ecological Footprint Calculator, Climate Hero https://bit.ly/38JKk10, or learners could start with activity 2.

Your task:

Using Resources: Mathematics in science contexts, Levels 3+–4+

Ecological Footprints

You need ★ access to the Internet ★ a classmate

I think my eco-footprint must be pretty small. If everyone lived like me, there would be plenty of resources to go around!

Activity

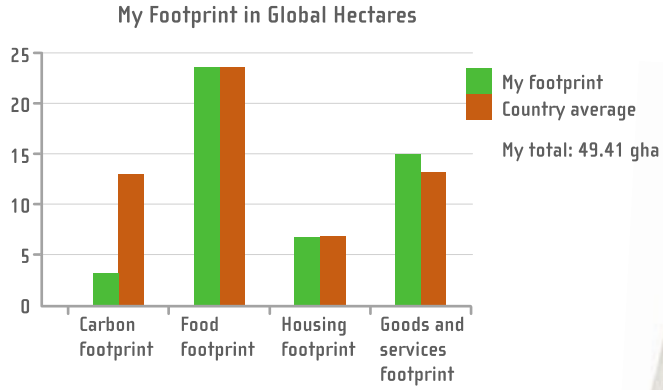
An ecological footprint is a measure of the amount of Earth's resources required to provide all the stuff we use, such as the food we eat and the house we live in, the fuel to keep us warm and run our car, and the energy to make all the things we buy.

There are websites where we can calculate our own ecological footprint.

1. Visit a site such as www.earthday.net/footprints2/flash.html or www.myfootprint.org, take the quiz, and find out how many Earths we would need if everyone in the world lived like you. (You may have to select Australia rather than New Zealand, but you will still get a relevant result.)

1 hectare = 1 rugby field; 1 Earth = 13 billion global hectares (gha)

2. Here is Oromia's ecological footprint:

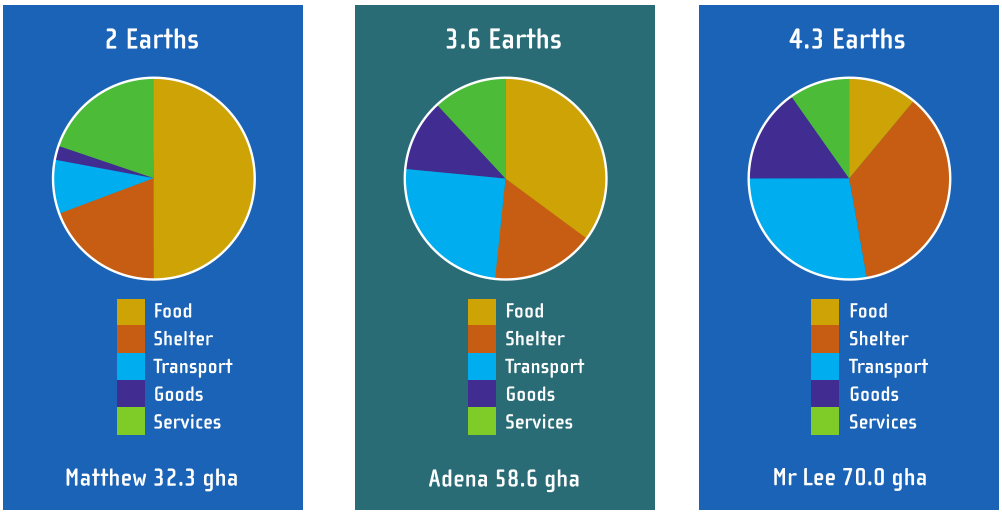


Wow! It takes 49 rugby fields to make enough resources just for me!

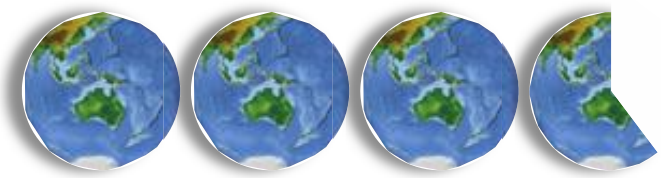
a. In 2009, New Zealanders consumed an average of 57.4 global hectares per person. How does your ecological footprint compare with this figure?

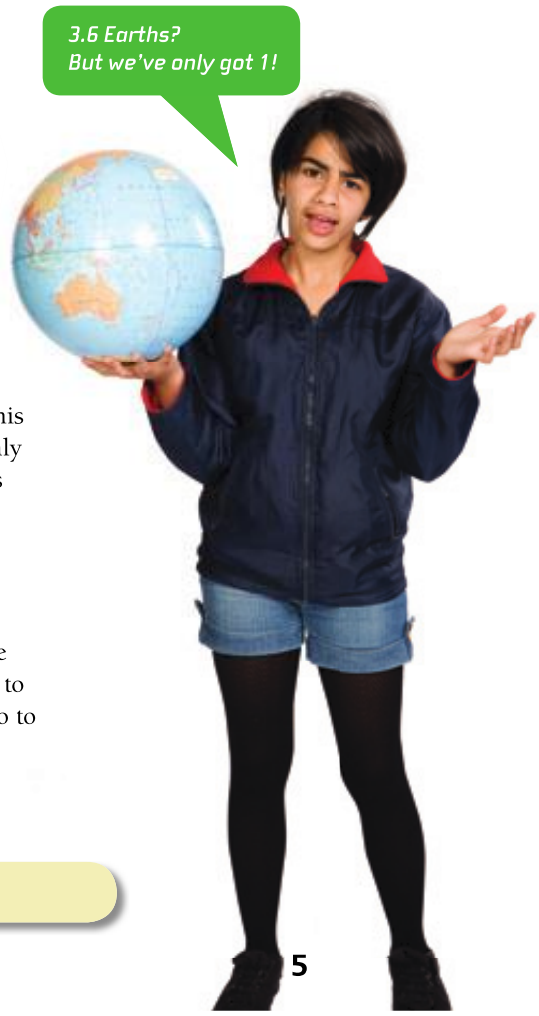
b. Suggest why a person's eco-footprint might be more or less than this average.

3. Matthew, Adena, and Mr Lee took a different quiz from Oromia. The graphs show how many Earths would be needed if everyone lived like them:



This is Adena's eco-footprint shown as Earths:





a. Discuss with a classmate how Adena might shrink her eco-footprint.

b. Repeat the quiz you did in question **1**, but this time, change 1 variable (for example, use only public transport). What difference does this make to your eco-footprint?

c. Set a target eco-footprint for yourself. How could you change your lifestyle to meet that target?

d. Take the quiz again, imagining that you have made these changes. How close did you get to your target? What else would you have to do to meet your target?

Focus Identifying the impact of different variables

5

Remember to do your end of day reflection and wellbeing activities (see p. 7&9).

Day 2 activity 1: No space to spare

Notes for teachers and whānau

Today's tasks will look more closely at the impact population densities have on the environment and the sustainable ideas people have come up with to minimise that impact.

Explore, investigate, discover

I am learning to: calculate and compare population densities.

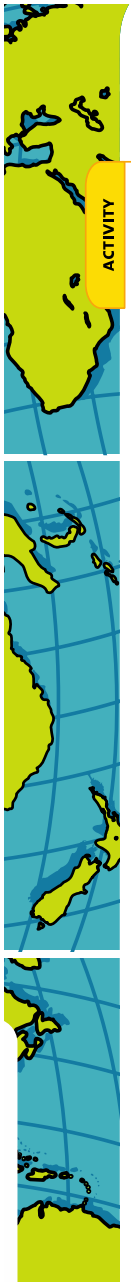
What do I need?

- 30 minutes
- A photocopy map of your local area
- A calculator

Remember to start your day right (see p. 7).

Your task:

Read through the worksheet carefully then complete the tasks.



Number Sense: Book Two, Level 4

No Space to Spare

ACTIVITY

You need: a photocopied map of your local area, a calculator

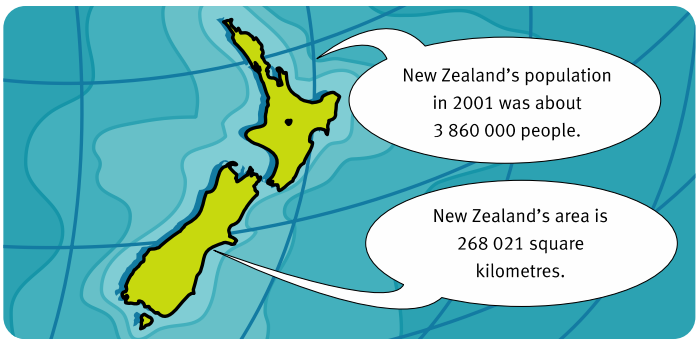
Population density is a way of measuring how closely packed the people of a country are. It can be measured by the average number of people living in 1 square kilometre.

1. a. On a map of your local area, draw a square, using a scale that represents 1 kilometre by 1 kilometre. Include the street or place where you live.
   b. Estimate from your own knowledge how many people live in that area.

2. Here are the average population densities of the world's most crowded nations:

Country	Macao	Monaco	Singapore	Hong Kong	Malta	Bahrain
Population density (people per square km)	55 815	44 000	16 706	16 649	3 076	2 489

   a. Work out the average population density of New Zealand to one decimal place:



   b. Compared with New Zealand, how many times more dense is the population of:
      i. Macao? ii. Hong Kong? iii. Malta?
   c. Which country has a population 3 000 times more dense than New Zealand's?

3. a. How many times would your classroom fit into 1 square kilometre?
   b. In Macao, on average, how many people would live in the same area as your classroom?
   c. How do densely populated countries house their people to make life more comfortable?

Day 2 activity 2: Farms of the future

Notes for teachers and whānau

This activity is designed to help students develop awareness of the issues around food sustainability and highlight the innovative solutions being used to address it.

I am learning to: understand the importance of sustainability on our food supply.

What do I need?

- 30 minutes
- Video: *The Futuristic Farms That Will Feed the World | Freethink | Future of Food*" https://www.youtube.com/watch?v=KfB2sx9uCkI&t=10s

Your task:

Watch the video "The Futuristic Farms That Will Feed the World | Freethink | Future of Food" or read the video transcript below, then **complete** the tasks that follow.

The futuristic farms that will feed the world (video transcript)

> *"If you want to feed the world in 2050, then we need to produce the same amount of food the next 40 years as we did over the last 8000, and that gives an indication of the pressure on the food system. We face a huge challenge with a growing population, with the changing consumption behaviour, with the climate crisis. How do you secure your food production? The real secret is the sustainable production. It should be with less inputs, less fertilizer, less pesticides, less water. It needs to be sustainable, otherwise we will destroy our planet."* ***Ernst van den Ende: WUR Head of Plant Sciences***

The security of the food system is one of the world's most pressing challenges. Consider this. If everyone on Earth ate the diet of the average American that would require all the habitable land to be used for agriculture, and we'd still be 38% short, and that's right now. What do we do when there are 2 billion more people?

Well, the key is efficiency. Basically, how do we produce a lot more on the land we're already using and do it using a lot fewer natural resources. When it comes to sustainable agriculture, one country has seemed to have cracked the code. Bolstered by a national commitment to produce twice the amount of food with half the resources, the Netherlands has become the world #2 food exporter.

> *"There was a very close collaboration between the government, science organizations and the industry and they started out of a common interest. So, they say, OK, yeah, we want to go for sustainable production, but everybody was aligned. Everyone involved in the system was aligned and embraced innovation to reach that shared goal - and that has driven efficiency on a level unmatched anywhere else in the world. If there's one place that approach is most clear, it's in their unrivalled greenhouse growing operation.*
>
> *"There's a very nice example about tomato, which really gives a good insight into how we want to produce our food in a sustainable way. So if you produced tomatoes in an open field situation in Spain, then you will end up at the end of the growing season with four kilograms per square meter. If you do this in a high-tech greenhouse, in the Netherlands at the moment, you'll end up with 80 kilograms per square meter, which is 20 times more. But the best part of the story is that the 80 kilograms of tomatoes we do it with four times less water compared to an outfield situation, and water is one of the big challenges that we face. Just had a cup of coffee. Do you know how many litres of water were needed to produce that cup of coffee - rough guess." 150! So high technology offers really a possibility of producing a lot of food per square meter in a sustainable way."* ***Ernst van den Ende: WUR Head of Plant Sciences***

The Dutch lead the world in tomato yield while using a fraction of the water of other countries. They're also the world leader in the production of chilies, green peppers, and cucumbers. #5 for potatoes, onions, and carrots. The list goes on, but the bottom line is they've been able to get so much out of so little.

> *If we are able to produce 80 times more with four times less water. That's great. That's great news I think.* ***Ernst van den Ende: WUR Head of Plant Sciences***

Most people know that greenhouses allow a grower to tweak every little thing, but the Netherlands is taking it to the next level. They've perfected the greenhouse as the ideal environment to continuously test and implement all kinds of ways to optimize growth. From things as simple as testing what hues of LED lights can increase pest resistance and improve nutritional value, to things as crazy as moth killing drones.

> *"So we're at the moment we don't have any products who can control actually the moths and then finally they will produce caterpillars and those caterpillars can do a lot of harm to many different crops. A drone is able to detect the moth, also to see how it's flying and then with its wings, propellers, it will just crush actually the moth."* ***Jeroen Sanders: World Horti Center Researcher***

There's a relentless drive towards innovation to create better and more efficient growing techniques. They've even started taking the human touch completely out of it. Some of the latest tech relies on AI to learn plant behaviour and constantly adjust conditions without any input from a farmer.

> *"For example, what we're testing in this compartment is a climate computer, so we have different sensors, and essentially we measure the plant activity. Based on the plant activity, the computer is actually controlling the whole climate by itself."* ***Jeroen Sanders: World Horti Center Researcher***

Ultimately, the key to solving our global food challenge isn't just in relying on super-efficient food producers to carry the weight for everyone else, it's learning from and adopting that technology. At the World Horti Center you see that effort first-hand in an ongoing experiment.

They've built basically a greenhouse within a greenhouse. Inside the larger structure, they're able to replicate any climate on Earth to figure out what modifications need to be made to realize the same yields they're getting in the Netherlands in any other country on Earth.

> *"We have a cooperative project going on with Colombia and we can in fact mimic, we can emulate the climate, the current climate conditions in in Colombia, put their crop in and see how the crop behaves under circumstances that we have in in Colombia. We can totally flip the seasons around. We can make it a sunny day on Christmas. We can close the curtains on a sunny day and make it completely dark. I think in the long run the future of the Netherlands should not be to be a producer for the rest of the world - we should be a developer for the rest of the world. We are the country that will export our knowledge on creating production facilities all over the world."* ***Erwin Cardol: World Horti Center CEO***

Innovations start really by bringing all these networks together. In the world we live nowadays you need to link up with other people you can't do it on your own.

We need to produce more we need to do it with less inputs and we need to do it better.

1. In 100 words or less, summarise the issue the video is highlighting about the world's food supply and the main factors that are contributing to it.
2. What are 2 man made innovations that are enabling these farms to manage some aspects themselves?
3. Why do you think the issue of **sustainable** food production is an important one that countries need urgently consider?

Day 2 activity 3: Zero waste living

Notes for teachers and whānau

This activity is designed to further highlight innovative solutions being used by individuals to live sustainably and create less waste.

I am learning to: understand how individuals can minimise their impact on resources and reduce waste.

What do I need?

- 30 minutes
- Video: *Greenhouse by Joost Bakker*
  https://www.youtube.com/watch?v=QOwfAR1KI7c

Your task:

Watch the "Greenhouse by Joost Bakker" video then **complete** the tasks below.

> "Our food system is the most destructive human activity on Earth. It doesn't need to be…" Joost Bakker – Innovator of the "Greenhouse"

1. Thinking back on the activity you just completed (Day 2 Activity 2), how true do you think Joost Bakker's statement is? Explain your thinking and give examples to support your argument.
2. Joost claims to have created a living space that produces zero waste. What are the ways he:
   a. Saves water
   b. Has no food wastage (rubbish)
3. How realistic do you think his project is to have all homes produce zero waste? What are some factors that could influence people's ability to live this way?

Think about things in your home that usually make their way to your rubbish bin.

1. Make a quick list of the types of rubbish that regularly make their way into your family's rubbish bin.
2. Categorise your list into lists under the headings: Compostable, Recyclable, Landfill, Reusable.
3. Draw a rubbish bin and then draw layers to demonstrate what the average weekly items that make up the rubbish in your bin. This does not have to be exact. You can estimate amounts. Categorise the layers as:
   a. Food scraps
   b. Paper
   c. Plastic
   d. Glass
   e. Other (composite materials like disposable nappies, electronics, etc)

4. On average, how many bags of rubbish does your family put out every week?
5. Which of these categories of rubbish in your bin could you reduce? How could you do this? Who would you need to get to help with this change and why?

Day 2 activity 4: There was an old lady who lived in a shoe…

Notes for teachers and whānau

This activity is designed to get learners to explore ways in which humans are attempting to reduce their eco footprints through minimising their living spaces.

I am learning to: think critically about the Tiny House concept.

What do I need?

- 30 minutes

Your task:

Read the text below then complete the tasks that follow.

The Tiny Home Movement *by Lynette Hay*

Have you ever heard the nursery rhyme *"There was an old woman who lived in a shoe"*? If it were possible, that would have to be one whopper of a shoe! However, the idea of living in an object that is usually considered tiny may not be that fanciful.

Over the last decade, more and more people around the globe and here at home in Aotearoa New Zealand, have decided to get on board with the Tiny Home movement. But what is the Tiny Home movement and why does it matter?

Put simply, the tiny house movement is just as it says. It's living, but in a smaller space with less stuff. While there is no formal definition for a tiny home, there are some specifications that can be applied. A tiny home has the character and functionality of a permanent house and on be 37.16 m² or less in size.

To put the size of a tiny home into perspective let's compare it to some things we are familiar with. The average size of a regular New Zealand classroom for Year 9–13 students is 70 m². If we compare it to another well-known Kiwi icon, the rugby field, which is 7000 m². We could fit over 180 tiny homes onto one! But why, you might ask, would people want to live in such a small space? Isn't bigger, better? For some people the motivation behind the movement is one that seeks to live a more minimal existence, by reducing waste and clutter. For others, it's an answer to the ever-growing housing crisis affect large cities around the world.

1. What are possible dimensions that a tiny home could have if the total footprint is between 30–37 m². Draw 4 diagrams to show surface areas (footprint) that fall between the total dimensions given.
2. In the text, it mentioned that a tiny home needed to have the character and functionality of a permanent house. Make a list of the types of rooms that a standard home has – ones that a standard can't do without.
3. Reflect back on your list and consider which rooms could be merged to have multiple functions. For example, some homes don't have laundry's but have their washing machine in their kitchen or a hallway cupboard to save space. Choose one "merged" room and sketch what it might look like and how it might function. Label each piece that is significant to the design and describe how it functions.
4. What do you see as being benefits of living in a tiny home? List 2.
5. What do you see could be challenges of living in a tiny home? List 2.

Optional digital: Watch some creative ways some people have brought their tiny home idea to life. https://www.youtube.com/channel/UCoNTMWgGuXtGPLv9UeJZwBw

Remember to do your end of day reflection and wellbeing activities (see p. 6 & 8).

Day 3 activity 1: Animal ingenuity – Air conditioning

Making meaning

Notes for teachers and whānau

Today's activities will take a look at the way the humans are using outside the box thinking and inspiration from the animal world to address some of the issues facing our societies nowadays.

I am learning about how insect engineering can inspire sustainable designs.

What do I need?

- 30 minutes
- Video: *How Some Animals Engineered Air Conditioning* (or transcript below) https://www.youtube.com/watch?v=5W3_H01nCsM&t=19s

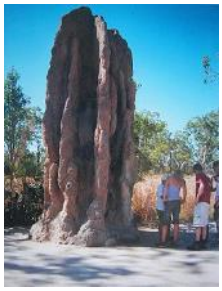
Remember to start your day right (see p. 7).

Your task:

Watch the video *How Some Animals Engineered Air Conditioning* or **read** the transcript below, then **complete** the tasks that follow.

How Some Animals Engineered Air Conditioning (transcript)

Termites, Prairie dogs, and people are all great builders, each in their own way, and all share one crucial problem. Put a bunch of us in a closed space, breathing oxygen in and CO2 out and it doesn't end well. Our tallest skyscrapers and deepest mines are almost completely cut off from outside air. To keep those inside from suffocating, human engineers use giant machines to bring in fresh air and pump stale air out.



Termite mounds have the same problem. The largest are more than 10 meters high. On a human scale that's like a skyscraper 3.5 km tall. Only instead of condos and offices, it holds one big farm. The termites collect wood which grows fungus that the termites eat. All that fungus and the millions of termites that tend to it, create a ton of CO2 which would suffocate the colony and their crops if it builds up.

(Image source https://upload.wikimedia.org/wikipedia/commons/4/4a/Termite_mound_NT.jpg)

To keep the air fresh, the mound acts like a big lung. During the day, the sun heats the outer chambers more rapidly than the core moving air up the outside and down the middle. During the night, this current reverses as the outer chambers lose heat to the cool night air. The whole time CO2 and oxygen are exchanged through tiny holes in the outer walls. What's amazing is this is all constructed without a boss, just instinct and cooperation lets termites build huge ventilation engines, powered by nothing but daily temperature.

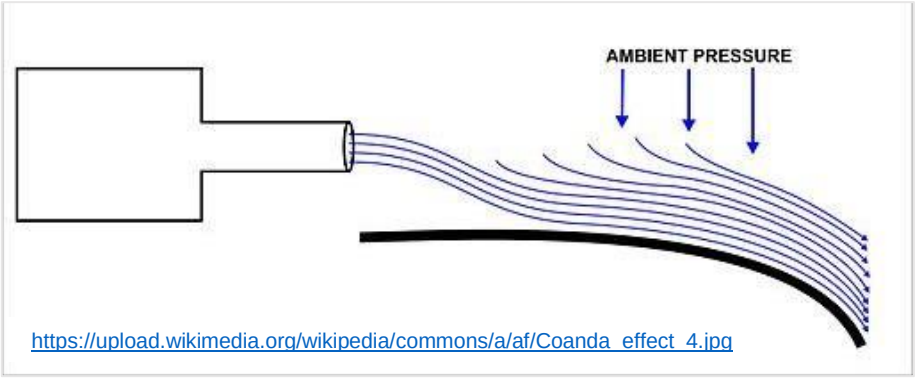
Leafcutter ants farm fungus on massive scales too. One colony in South America covered nearly 50 square meters and was home to over 8,000,000 ants. But unlike those towering termites, the ant labyrinth reached 8 meters underground. So how do they ventilate their agricultural city?

(Image source https://upload.wikimedia.org/wikipedia/commons/2/21/Leafcutter_ant_02.jpg)

Before we answer that, I want you to try something. Take a piece of paper, hold it under your lips, and let the other end curl down. If you blow only across the top of the paper, what do you think will happen?

The force of the air hitting the paper should push it down, right?

Well, watch this.



https://upload.wikimedia.org/wikipedia/commons/a/af/Coanda_effect_4.jpg

Here's what's happening. Air is a fluid. When I force air across the top of the paper, that stream pulls other air along due to viscosity, which is like the friction of fluids. This leaves an area of low pressure behind, and the paper is pulled up to fill it. It's called the Coanda effect.

So, what does that have to do with ants?

Check this out. When a breeze flows over a hill, the air is deflected over the top.

This pulls air along too, just like when I blew over the paper, drawing air out of the ant hill along the way. The ants build lower entrances nearby, where air is drawn in to replace it, ventilating the whole colony with a little breeze.

1. Passive ventilation is one way to keep fresh air running through a home without the need to use energy to keep a house cool. If we use the principle that hot air rises and cold air is heavier, what mechanisms or designs do you think could be incorporated into a home design to encourage passive air flow? Sketch a design and include labels and descriptions of how your design works. (Hint – think about how air can get into and leave a house).

Optional digital: Curious to see how big cities keep cool? Watch *How Singapore Uses Science to Stay Cool* https://www.youtube.com/watch?v=PM101DvvG4Q&t=237s

Day 3 activity 2: Water everywhere and not a drop to drink!

Notes for teachers and whānau

This activity takes another look at efforts being made to increase food and water security for countries with very little fresh water supply.

I am learning to: think about ways in which countries in desert regions are using sustainable ways to increase food production.

What do I need?

- 30 minutes
- Video *Growing crops in the Desert with Seawater* https://www.youtube.com/watch?v=PvV-iPdORLc&t=33s

Your task:

Watch *Growing Crops in the Desert with Seawater* or **read** the Seawater Agriculture text below then **complete** the tasks that follow.

Have you heard the phrase *"water, water everywhere and not a drop to drink"?* It's a line from a poem called the Rime of the Ancient Mariner (1834) by Samuel Taylor Coleridge. But what does it actually mean and what has it got to do with sustainability? While the poem has very little to do with sustainability, the line in the poem that speaks about water actually refers to the character being surrounded by seawater. As most of us know seawater is undrinkable for humans and can't be used to water plants or grow crops… or can it?

What follows is a story about a man who is on a mission to do just that.

Growing crops in the Desert with Seawater (transcript)

You'll read no end of the stories about water wars and how the world is running out of water, and we're all doomed. Drought left right and center. Half the planet's on fire. But actually, we're not short. It's just that most of it is too salty and it's in the wrong place.

For the last 50 to 100 years, we've been using irrigation to increase the amount of food that's available. It might get you out of a problem for a year or 10, but it doesn't solve the problem of needing more water to grow more food for this growing population. The real problem that the seawater greenhouse addresses is enabling the world to grow more food. Unlike a conventional greenhouse, which you might think of as a hothouse, the seawater greenhouse is the opposite, it's a cool house. Designed to cool, humidify, and create a climate suited to temperate type crops in hot, arid regions. Africa is the world centre for water insecurity, which in turn makes it the world's center for food insecurity. And there's absolutely no need for it at all.

You can reduce the amount of water that crop needs tenfold, even 100-fold, depending on what the conditions are like. You will hear people say that you can't use desalination to grow crops because the water has a higher value than the crop. But it depends how much water you need. If we're reducing the amount of water that it needs, then the cost of that water becomes a fairly insignificant component.

Somaliland has a population of 4 million. You would need something like 10 square miles of this kind of structure to feed the country. The cost of that would be of the order of $400 million which sounds like a lot of money, but actually it's only 1% of the annual aid budget that goes to the sub-Sahara.

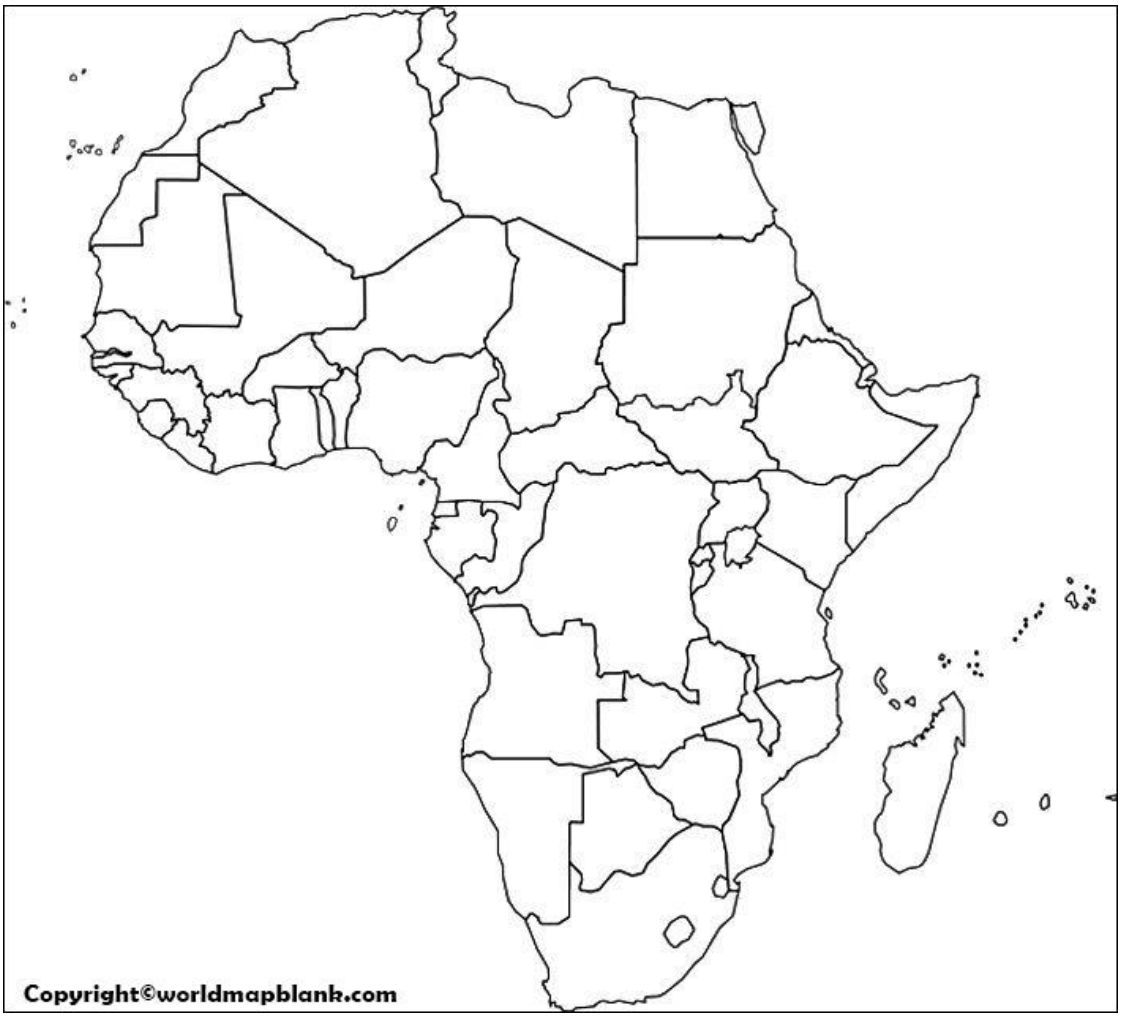
We're demonstrating that it is economically viable, practical, and not very difficult to use seawater to grow luscious temporal crops. It is exciting to be able to work on solutions to those kinds of problems.

1. Find the definitions for the following words and record them in your glossary.

irrigation	conventional
desalination	humidify
viable	trivial

2. Locate and mark Somaliland on the map of Africa. Be precise.

3. Convert 10 square miles into square kilometres. If a rugby field is 7000 square meters, what would be the equivalent number of rugby fields that it would take to feed the population of Somaliland using Seawater Greenhouse technology?



Day 3 activity 3: Sustainable energy vs. Renewable energy – what's the difference?

Notes for teachers and whānau

In this activity, learners will think critically about what factors need to be considered in order for renewable energy to be considered sustainable.

I am learning to: understand what makes renewable energy sustainable energy.

What do I need?

- 30 minutes
- Video: *What Is the Difference Between Renewable Energy and Sustainable Energy?* https://www.youtube.com/watch?v=TsmNA0yrQbU&t=24s

Your task:

Watch the video *What Is the Difference Between Renewable Energy and Sustainable Energy?* and **complete** the tasks below.

1. What is the main factor that influences whether renewable energy is sustainable energy?
2. Wood is considered an infinitely renewable energy source. However, what are they factors that must considered when using this energy source to ensure it is a *sustainable* energy source? List two factors.

Wind turbines

From Wind Power – Science Learning Hub
https://www.sciencelearn.org.nz/resources/1565-wind-power

There are many benefits to using wind power. It is a green renewable resource because we will not run out of wind, and wind produces no harmful wastes. Wind farms have little running cost once built compared to traditional electricity producers, and the time taken to build a wind farm is usually short. Plus, once built, additional turbines can be added as supply grows. One of the biggest problems facing wind powered generation is that they are considered to be an eyesore. While we may want the electricity generated by a wind turbine, few of us want one in our back yard! Some people living in the vicinity of wind farms also find the noise the blades generate can be problematic. Another problem associated with wind farms is the possibility that they may be detrimental to wildlife. Studies continue to be carried out to see if wind turbines interfere with the sonar of bats and the migration pathways of birds. Both of these problems are taken into consideration when resource consents are being sought. This process allows people near proposed sites to argue for or against wind farms.

3. Consider wind farms (wind turbines). What factors need to be considered in order to ensure they are a renewable energy source AND a sustainable energy source. List two factors.

Day 3 activity 4: Clean water & fresh air

Notes for teachers and whānau

These maths activities encourage learners to engage in problem solving.

I am learning to: engage in maths problem solving in science contexts.

What do I need?

- 30 minutes
- Extra materials as listed in the tasks.

Your task:

There are 2 tasks to complete for this session. Read through each task carefully.

Task 1: The air we breathe

You need: a candle, a mirror or smooth ceramic mug, a hand lens or microscope, string, a map of the school, cardboard, cling film, Vaseline.

1. Light a candle and carefully hold a mirror or smooth ceramic mug over it for a few seconds. What do you notice?
2. Use the following information to answer the questions that follow:

Every day we breath an average of 11,000 litres of air. If this air contains pollutants, chemicals can get into our bodies and poison us or give us asthma.

Health officials predict that 1100 people will die each year in NZ from illnesses relating to air pollution, with 58% of these due to motor vehicle emissions.

Auckland has one of the highest rates of asthma in the world. In Auckland about 8% of all adults and 13% of all children are asthmatic (of course not all cases of asthma are caused by pollution.)

   a. How much air do we typically inhale in an hour?
   b. Out of 1100 NZ deaths from illness related to air pollution`, how many may be due to pollution from vehicles?
   c. In an Auckland school of 450 students, how many are likely to have asthma?

Task 2: Clean enough to drink?

You need: the internet, plastic cups, 5 litre bucket(s), scientific calculator

Water is all around us, for example, sea water, river water, rainwater, and artesian water. Earth's surface is mostly water, but only a small fraction is drinkable. The rest is either salty or polluted.

1. List sources of water that are available in or near your school or home. Highlight those that are safe to drink.
2. About 70% of the worlds fresh water is in Antarctica. What might prevent that water being used for drinking?
3. If 97.5% of Earth's water is salty and 70% of fresh water is in Antarctica, approximately what percentage of Earth's water is potentially available for drinking?
4. Using your answers from 2 and 3 above and the facts below, approximately how much drinking water is potentially available for each person on Earth?

There is an estimated 1,433,854,549 million cubic kilometres of water on Earth (1 cubic kilometre = 1,000,000,000,000 litres). The world's population in 2009 was 6,778,070,000

Remember to do your end of day reflection and wellbeing activities (see p. 6 & 8).

Day 4 activity 1: Biodiversity

Going further/ deeper

Notes for teachers and whānau

In today's activities learners will be taking a closer look at how the actions we take to protect our borders contribute to the sustainability of our unique local environment.

I am learning to: understand what biodiversity is and what it has to do with sustainability.

What do I need?

- 30 minutes
- Video: *Varroa Mites | Why Bees are Dying* https://youtu.be/6Y2t81Y8I2Q.

Remember to start your day right (see p. 7).

Your task:

Read the information below about biodiversity from the Ministry for the Environment. Then **complete** the tasks that follow.

Why biodiversity matters

What is biodiversity?

Biodiversity is short for biological diversity. It describes the variety and diversity of all life on land, in fresh water and the sea. This includes ecosystems and the genes they contain. It includes:

- individual birds
- plants
- fish
- insects
- other species that are special to New Zealand, our indigenous biodiversity. There are many examples, such as kiwi, tui, inanga (whitebait), weta, and ti kouka.

Why is biodiversity important?

Our biodiversity provides the life supporting systems that enable all organisms, including humans, to survive. Our wetlands purify water and help prevent flooding and drought. Indigenous forests provide carbon sinks and purify the air we breathe as well as providing recreation and amenity values. Forests provide products such as timber, fuel, food, and medicines. Our farming, forestry and horticulture depend on the resources and services provided by biological systems.

Indigenous biodiversity is often found **nowhere else in the world**. It is important to New Zealand's environment, culture, society, and economy. For Māori, the connection with nature is one of whakapapa (kinship).

What is the current state of New Zealand's biodiversity?

Our use of our land combined with invasive pests and diseases have caused our indigenous ecosystems and species to be in a state of rapid decline.

According to publications such as our report series Our Land 2018 and Environment Aotearoa 2019 we have around 4000 species threatened or at risk of becoming extinct.

This means we could lose more than 80 per cent of our reptiles, frogs, bats, and birds. 59 of our bird species have disappeared since humans first arrived here.

We continue to lose fundamental ecosystems and habitats like tussock grasslands, sand dunes, indigenous scrubland, and indigenous forests.

How is biodiversity related to sustainability?

Biodiversity is essential for life on earth. It provides us with clean water, helps clean our air and provides us with food. Biodiversity also supports human health by providing jobs in sectors like fisheries, forestry, and agriculture. Without biodiversity humans would find it extremely difficult to sustain their way of life.

Some of you may remember seeing the Bee Movie (2007). A story about Barry B. Benson who causes a bit of chaos when he successfully sues the human race for exploiting bees and selling their honey. In the movie, Barry eventually finds out his actions have dire consequences when the world's flowers are almost completely wiped out due to a lack of pollination.

While this may be considered to just be another movie plot, the fact is that bees are actually vital to our food security. Not only because they provide us with delicious, healthy honey products, but also because they pollinate our plants which helps them produce crops. Without bees plants would be in trouble and so would we.

Recently however, our bees have been under attack from a nasty little invader called the varroa mite. This mite is recorded as being found in the country in April 2000 and has been wreaking havoc on our bee populations ever since. The varroa mite spreads viruses by moving from bee to bee, eventually causing the colony to collapse and die within a year. According to Dr Mark Goodwin, all our wild colonies in trees have died from the varroa mite. Currently, beekeepers and scientist around the world are using chemicals to treat the varroa mite problem, however the mites are becoming resistant to these chemicals.

Choose one of the activities below to add to the efforts of looking after our bee population.

1. Research what bee friendly plants flower in autumn and create a small bee feeding garden outside for our furry friends.
2. Create a bee hotel out of recycled materials. There are plenty of different ideas on the web, but here's one you could start with https://friendsoftheearth.uk/bees/make-a-bee-house.

Optional digital: To find out more about the threat of the varroa mite watch the video Varroa Mites | Why Bees are Dying https://youtu.be/6Y2t81Y8I2Q.

Day 4 activity 2: What is biosecurity?

Notes for teachers and whānau

Learners will need access to a device to download the Find a Pest app.

This activity is designed to engage learners in exploring the concept of biosecurity and its role in keeping our country safe from plant and animal invaders.

I am learning to: understand the role that biosecurity plays in protecting our environment and unique wildlife.

What do I need?

- 30 minutes
- Look in your pack for a copy of *Unwanted Visitors* https://instructionalseries.tki.org.nz/Instructional-Series/School-Journal/School-Journal-Level-3-May-2019/Unwanted-Visitors
- A device to access the Find a Pest app https://www.findapest.nz/

Your task:

Read *Unwanted visitors* by Allan Burne then **complete** the tasks that follow.

UNWANTED VISITORS

by Allan Burne

You've been on holiday to Sāmoa. Now you're back in New Zealand, waiting to go through customs. You've filled in a passenger arrival card – and no, nothing to declare. One of the quarantine officers has a sniffer dog, a cute beagle, making its way down the queue. Eventually, the beagle reaches you. The dog seems interested in the pocket on your backpack, and that's when you remember ... yesterday's mango!

New Zealand has strict rules about what can be brought into the country. Some things, like that mango, are an obvious risk. It might be hiding fruit flies that could multiply and wipe out an entire crop – many kinds of crops, in fact. But unwanted stowaways can slip through the border in all kinds of ways. Tramping boots, dairy products, and even honey can hide species that might harm the environment, the economy, or people's health. Protecting a country against this risk is called biosecurity.

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What We Protect

New Zealand's environment is made up of forests, grasslands, rivers, lakes, coastlines, mountains, and wetlands. All these places contain plants and animals that are special to our country – but unwanted pests, weeds, and diseases endanger them. Some introduced pests feed on native plants and animals or compete for food and territory. Others spread disease, choke waterways, and damage forests. Without biosecurity, many of New Zealand's precious natural assets would be destroyed.

Kauri dieback disease is fatal for some our oldest and biggest trees.

Be a PEST Detective!

You will need a mobile digital device for this activity.

- Go to https://www.findapest.nz/
- Download the free Find-A-Pest app
- Read the Quick start guide
- Get out into your backyard or garden and start investigating!

Day 4 activity 3: Predator free NZ 2050

Notes for teachers and whānau

This activity engages learners in statistical tasks that focus on the effects of pests on our environment and DoC's goal of making New Zealand predator free by 2050.

I am learning to: interpret statistical data and make predictions

What do I need?

- 30 minutes

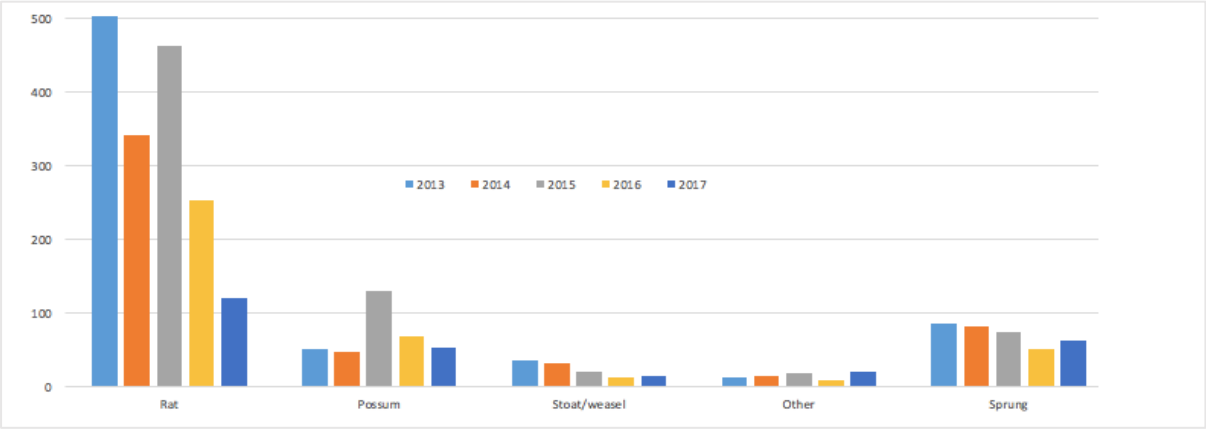
Your task

Read carefully through the datasets and answer the questions that relate to them.

The Department of Conservation is working to make New Zealand 'predator free' by 2050.

1. What does 'predator free' mean? Record your answer in your book or online doc.

A local bird sanctuary is protected from predators by good fencing and a trapping project run by volunteers. A record is kept of all the predators caught in the traps and when the traps are sprung (by a predator that 'got away'). Looking at the graph of the data for the first five years of the trapping programme as shown below:



1. Describe the overall trend in trapping success shown in this graph.
2. Which type of predator is the most prevalent in the traps?
3. In early 2016, the bird sanctuary operated a poison drop as well as the trapping programme. Use the data below to comment on the effectiveness of the poison drop in terms of predator control.

The table shows the raw data (number of animals caught per calendar year) from a local bird sanctuary's predator trap programme.

	2013	2014	2015	2016	2017
Rat	502	340	461	253	120
Possum	50	47	130	68	53
Stoat/weasel	35	32	20	12	14
Other	12	15	18	8	20
Sprung	86	82	73	50	62

1. If a trap has been sprung, we can assume that a predator was present but cannot count it as caught. Why not?
2. Find the total number of predators **caught** in traps each year.
3. Graph the total number of predators **caught** in traps each year.
4. Comment on the overall trend of the total number of predator's **caught** in in traps each year.

Day 4 activity 4: What is lurking in the darkness?

Notes for teachers and whānau

This activity is a practical one that encourages learners to get curious about what pests or predators may be living in their backyards.

I am learning to: determine what potential pests or predators may be living in my home environment.

What do I need?

- 30 minutes
- Resources as listed in the task below
- A digital device to access Pest Detective https://www.pestdetective.org.nz/clues/footprints-and-tracks/

Your task

Read over the task to see what resources you will need to create your tracking tunnel. **Access** the Pest Detective website and look through the footprints and tracks database. This will come in handy later when you analyse the tracks from your tunnels.

Mammalian pests are a threat

Predation by mammalian predators is the major cause of decline of New Zealand's native bird species. Rats, hedgehogs, and mustelids (weasels, stoats, and ferrets) eat chicks and eggs. They also prey on insect life and cause damage to surrounding flora. This results in birds having to compete for food sources.

The use of tracking tunnels

Tracking tunnels are used by conservationists to check for the presence of pest species in a target area. They may be used before and after pest control occurs to give comparative data on the effectiveness of eradication.

Tracking tunnels are used to constantly monitor predator-free environments such as offshore islands and mainland islands to check whether mammalian predators are present.

Because predators are often nocturnal and are not readily seen during daylight, tracking tunnels give an indication of the presence of predators overnight in a certain area.

By creating tracking tunnels to use in a local gully or the school grounds, students can check for the presence of mammalian pests. If any tracks are found, students are then encouraged to decide on an action project to reduce numbers of predators in their local environment.

What you need

- Make a tracking tunnel – student instructions
- Clean empty 1 or 2 litre milk cartons or plastic milk bottles (or similar)
- A craft knife or scissors
- Black polythene
- Electrical tape
- Food colouring or dye
- Thin sponges
- Small plastic trays that can fit inside the milk carton/bottle
- Glue
- Milk bottle tops
- Peanut butter
- White paper
- Thin wire (optional)

Make a tracking tunnel

1. Carefully open up the ends of the milk carton (or bottle) to create a tube. You may need to use a craft knife to help you.
2. Slide the end of one milk carton tube into the other so you end up with the two containers overlapping. This will form a longer tunnel.
3. Cover the outside of the tunnel with black polythene and fasten using electrical tape. This will darken the tunnel, as most of these predators prefer dark spaces. Ensure the ends are left open.
4. Cut the white paper to fit the bottom of the tunnel and place inside.
5. Place a sponge into a plastic tray and wet the sponge using food colouring or dye.
6. Place a dollop of peanut butter into a clean milk bottle lid. Put this in the middle of the dye-soaked sponge and slide into the middle of the tunnel. You might like to add a little glue to the base of the tray to keep it in place.
7. Leave the tracking tunnel overnight in a nearby gully or the school grounds. The tunnel can be held in place by making the piece of wire into a 'U' shape and pinning it into the ground. You might like to leave out several tracking tunnels in the area.
8. Check the white paper for animal prints in the morning.

Remember to do your end of day reflection and wellbeing activities (see p. 6 & 8).

Day 5 activity 1: Take action!

Notes for teachers and whānau

Learners will select a concept or idea from this week's learning and plan how they may be able to make a difference to contribute to the sustainability of their environment. This will be one focused activity across the day rather than 4 separate activities.

I am learning to: use the design process to put my ideas into action.

What do I need?

- 2 hours
- Access to a device for research/creative purposes
- A copy of the Design Process
- Materials for creating/presenting such as flet pens, colour pencils, cardboard, sellotape, glue etc.

Remember to start your day right (see p. 7).

Instructions:

Today's activity is a call to action! Choose one of the ideas below and use the design process to help you plan, implement, and evaluate your design idea. You will need to present your idea to other stakeholders (people that are interested in or directly affected by your idea) for feedback.

Your task:

Part 1 - Choose from one of the ideas below:

- Design and create a vertical garden for a space in your home (can be outside as well)
- Design a tiny home for a family of 3 (2 adults and 1 child) who also have a pet dog
- Design a system to recycle the grey water (waste water from baths, sinks, washing machines)
- Design and implement a system to improve the air quality in your home
- Design and implement a system to be more energy efficient in your home.

THE DESIGN PROCESS

1. **Identify a need**
2. **Research information**
3. **Plan a design**
4. **Create a product**
5. **Present**
6. **Evaluate**

Part 2 - Creating a design brief

1. Setting the scene
   a. what is the problem you have identified?
   b. how will your design benefit individuals, your community, or the environment?
   c. what else do you need to find out before you can start planning?
2. Surveying others
   a. If your idea is designed to benefit people, then it is a good idea to survey others and find out what their ideas might be about your innovation.
   b. If you do not have prototype available to start with, then you should prepare a list of questions that will help guide data collection.
3. Your construction materials
   a. before you start make a list (or create a table) of what materials you may need and how you intend to use them

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Part 3 – Plan a design

4. Your design
   a. at this stage you want to create a design plan including specific details and labels.
   b. you should also check your design before you start building to ensure that your design is practical and is achievable.

CHECKPOINT! – Get feedback

5. At this stage you may want to take the time to present your plan to your stakeholders and get their feedback on what you are proposing before you make a start, especially if it requires them to make changes to their behaviours or environments.

Part 4 – Create your product/implement your design

6. Build your design (only if you have time and materials available on hand)
   a. use plan and list of materials to construct a prototype of your design.
   b. test your prototype for functionality and consider how it looks and feels.
   c. if you have to make any changes to your design, make sure that you record the changes that you have made and state why you have done so.

Part 5 – Present your product/system (optional and dependent on time)

7. Having completed your first attempt at your design
   a. present your prototype or system idea to your stakeholders
   b. explain to them how it works and what it is meant to achieve
   c. describe how you incorporated their feedback from earlier

Remember to do your end of day reflection and wellbeing activities (see p. 7&9).

Context 2: Cultural Sustainability

Over the next five days we will investigate the theme of sustainability by looking at how we can understand and work towards cultural sustainability.

Cultural sustainability

Sustainability | Toitū

Day 6 activity 1: What is culture?

Getting started

Notes for teachers and whānau

Today's activities focus on setting the foundation for the rest of the week. The overall theme for this week is cultural sustainability. Each day will look at a different aspect of cultural sustainability and why it is important to society.

I am learning about what culture is and the different types of culture there are.

What do I need?

- 30 minutes
- Dictionary

Your task:

Read the text below then complete the tasks that follow.

What is culture?

Written by Lynette Hay

When you think of the word "culture", what comes to mind for you? It's a word we all seem to use but do we really understand what it means?

If you were to do a quick search on the Internet, you would find a lot of information saying pretty much the same thing – that culture refers to things like traditions, customs, values, beliefs, behaviours, ideas and language of a particular nationality or ethnic group. Things that we feel give us an identity and differentiate us from one another. For example, if we saw a haka being performed we would identify it with the Māori culture. Another example might be that we make connections between coconut palms and the Pacific Islands.

But is culture this simple and easy to define? What happens if the way you do things in your family is not the same way that others in your wider family, community or ethnic group do things? Does this mean you are no longer part of that "culture"?

Culture is not so easily defined as just being connected to our ethnicity. If we look back at the list of the things we started with at the beginning of this text, we might realise that those same elements can be used to describe groups that are not based on ethnic grouping.

Here are some examples of other types of cultures:

Types of culture	Defined by…
Youth culture	shared choices in music, clothing, words, expressions, and dance moves.
School culture	shared customs, rituals, behaviours, and stories that can be seen throughout the whole school.
Team culture	shared values, beliefs, behaviours, and attitudes that help the team achieve their common goal.

While some cultures may be influenced by different trends and generations and change with time, other cultures can remain relatively stable and maintain their shared practices, knowledge, and understandings for centuries. But why is that you may ask. That's because culture and society are intricately linked. Culture directly affects the way people behave and react to changes and ideas. At the same time, the way people behave and react shapes their culture.

Vocabulary task.

Find the definitions for the following words and write the meaning for them in your own words. Some words may have more than one definition. Make sure the one you choose matches the idea behind the text.

New vocabulary	Definition
ethnicity	
trends	
elements	
intricately	

Think critically about the questions below and record your responses in your exercise book or online doc.

1. Even though there are different types of culture, what elements do they have in common? List 3.
2. Culture can be defined as a set of _____ ideas, beliefs, values, behaviours etc.
3. Why/how do you think some cultures are able to remain relatively unchanged over many years?
4. Based on your understanding of culture, what other types of culture can you name? What would they share in order to be called a "culture"?

Day 6 activity 2: Why is culture so important?

Notes for teachers and whānau

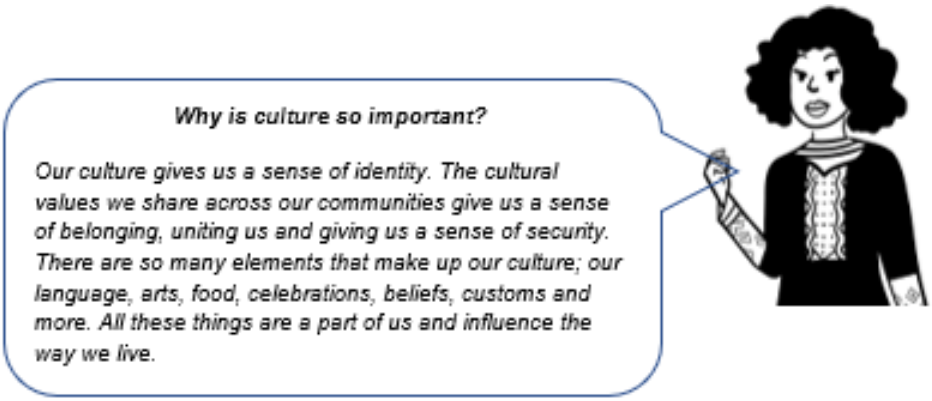
This activity helps the learner to reflect on the value of culture, the reasons why we need to protect it and the part it plays in sustainability.

I am learning to: understand the value of culture and my role in protecting it.

What do I need?

- 30 minutes
- Video: *A world without culture is a world without a future* – UNESCO https://www.youtube.com/watch?v=ye1wT7gtdeU

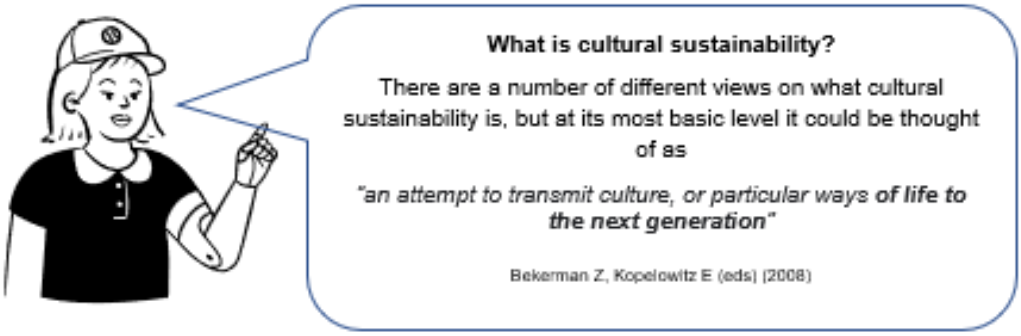
Your task:



1. What communities do you feel you share "culture" with? List them.
2. Many of us may belong to a number of different cultures, but we will have one that is more dominant than the rest. Which cultural identity do you relate to the most and what are the things that you value the most about that identity?

Watch *A world without culture is a world without a future*

1. What messages is the video is trying to get across about the importance of culture?
2. Read the definition about cultural sustainability and think about your own cultural. What 5 things are essential for you to pass onto the next generation and why?



Here's another definition of cultural sustainability:

> "Cultural sustainability is defined as values and attitudes that can be maintained or improved **despite external influences**."

In other words, cultural sustainability is a way of protecting, maintaining, or improving our cultures no matter what is going on in the world around it.

1. What external influences do you think have the potential to impact or influence your culture? Why is that?

Day 6 activity 3: Who am I? Creating a personal coat of arms.

Notes for teachers and whānau

This activity is designed to encourage learners to reflect on their own culture and establish a starting point for their understanding of their own and other's cultures.

I am learning to: consider what are important elements of my culture that I want to communicate to others.

What do I need?

- 30 minutes
- Crafting materials such as felts, pencils, glue, scissors, sellotape, coloured paper, crayons etc – OR –
- A digital device to design and create your coat of arms
- A4 piece of blank paper

Your task:

Reflect on the quote below and consider what you would want to communicate to the world about your cultural identity.

> The better you know yourself, the better your relationship with the rest of the world.
> - Toni Collette -

Design your own coat of arms - A coat of arms was a unique design made up of an arrangement of symbols, colours, and shapes, painted on a shield and used to identify families or individuals. This practice was used during the Middle Ages by knights as a way to identify each other. These days, many different organisations like governments, universities, and schools have their own coat of arms.

1. Think about elements or aspects of your culture that you feel are important for you to communicate to others.
2. Consider what symbols, colours, and shapes you could combine and add them to a shield shape of your choice.
3. Complete your coat of arms by adding in a motto, which reflects your beliefs.
4. Label each piece of your coat of arms and give a short explanation of why you used it.

Tip – you may want to do a bit of research on the internet to find out what different symbols and shapes meant.

New Zealand Government

Tuvalu Government

Malawi Government

Day 6 activity 4: Initials logo.

Notes for teachers and whānau

This activity is a mixture of mathematics and creativity. Learners will be engaged in tasks that will involve solving simple linear equations as well as using graphs, tables, and rules to describe linear relationships found in number and spatial patterns

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I am learning to: use a table to find a rule for a geometric pattern and write it as a linear equation.

What do I need?

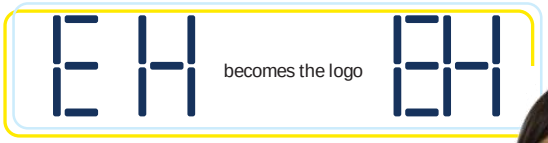
- 30 minutes
- FIO, Level 4+, Algebra, Book Four, Initials Logo, pages 6-7
- classmate
- sticks (optional)
- Materials for recording your responses in

Your task:

Initials Logo

You need: a classmate, sticks (optional)

1. Evalesi Henry makes her initials into a stick logo like this:



She also makes a design by repeating her logo like this:

a. Evalesi predicts that 5 x 8 + 2 = 42 sticks will make a design with 5 joined logos. Make the design and check whether she is correct.
b. Explain how Evalesi's short cut, 5 x 8 + 2, works.
c. Predict the number of sticks used in a design that has 100 joined EH logos.
d. Complete the table below.

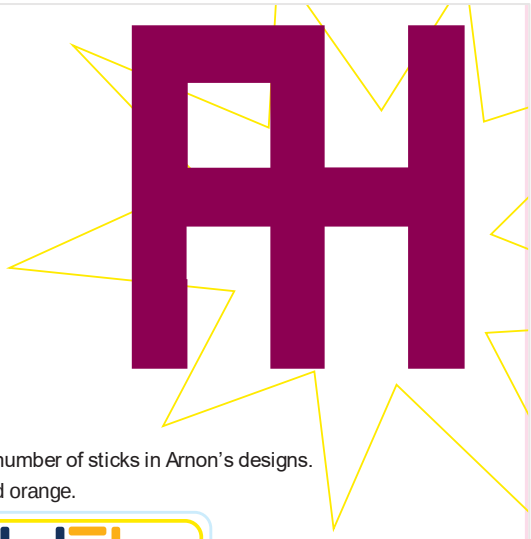
Number of joined logos	Number of sticks
5	5 x 8 + 2 = 42
6	
20	
94	
256	

2. Arnon Hosiri also makes a design by repeating the logo from his initials.

a. Arnon predicts that 5 x 7 + 2 = 37 sticks will make a design with 5 joined logos. Make the design and check whether he is correct.
b. Explain how Arnon's short cut, 5 x 7 + 2, works.
c. Predict the number of sticks used in a design that has 100 joined AH logos.

d. Complete the table below.

Number of joined logos	Number of sticks
5	5 x 7 + 2 = 37
7	
36	
87	
109	



3. Evalesi uses another short cut to predict the number of sticks in Arnon's designs. She uses 5 additional sticks that are coloured orange.

Evalesi then says that a design with 3 of Arnon's logos has 4 x 7 – 5 sticks.

a. Explain how Evalesi's new short cut, 4 x 7 – 5, works.

b. Use this short cut to predict the number of sticks in a design with 5 of Arnon's logos.

c. Complete the table below.

Number of joined logos	Number of sticks
3	4 x 7 – 5 = 23
9	
15	
47	
183	

d. Complete the table below using Evalesi's new short cut.

Number of joined logos	Number of sticks
6	
	16
	30
	72
	632

LET'S GET CREATIVE!

What are some different ways you can combine your initials to create a personal logo? Try creating a couple of draft designs and get some feedback from your friends or family.

Remember to do your end of day reflection and wellbeing activities (see p. 6 & 8).

Day 7 activity 1: World Heritage Sites

Explore, investigate, discover

Notes for teachers and whānau

Today's activities will be exposing the learner to the different ways cultural identity has been and can be expressed. This particular activity will start by looking at ancient architecture.

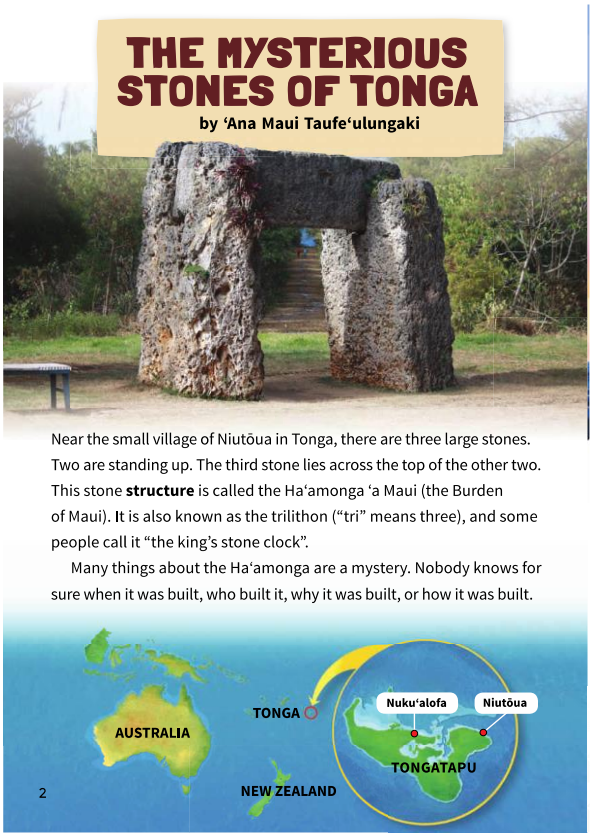
I am learning to: understand the different ways cultures express their ideas, values, and beliefs through architecture.

What do I need?

- 30 minutes
- Look in your pack for a copy of *The mysterious stones of Tonga* by 'Ana Maui Taufe'ulungaki https://instructionalseries.tki.org.nz/Instructional-Series/School-Journal/School-Journal-Level-2-August-2017/The-Mysterious-Stones-of-Tonga
- A digital device to research World Heritage Sites on Google Earth. https://bit.ly/3LIDffT

Your task:

Read *The Mysterious stones of Tonga*.


THE MYSTERIOUS STONES OF TONGA

by 'Ana Maui Taufe'ulungaki

Near the small village of Niutōua in Tonga, there are three large stones. Two are standing up. The third stone lies across the top of the other two. This stone **structure** is called the Ha'amonga 'a Maui (the Burden of Maui). It is also known as the trilithon ("tri" means three), and some people call it "the king's stone clock".

Many things about the Ha'amonga are a mystery. Nobody knows for sure when it was built, who built it, why it was built, or how it was built.

1. What does the text say are the four different interpretations of the purpose of the Ha'amonga –'a-Maui?
2. What does Tamale say was the value King Tu'i-tā-tui wanted his son's to remember?
3. Ha'amonga–'a-Maui is listed as a World Heritage Site. Using Google Earth, visit UNESCO World Heritage Sites and select an architectural structure (building) that interest you.
4. Then find answers to the following questions:
    a. What message does the structure communicate about the beliefs, ideas or values of the people that built it?
    b. How long has it been around?
    c. Are there any symbols that stand out as being important or a vital part of the structure? What are they and what do they mean?

Remember to start your day right (see p. 7).

Day 7 activity 2: Ancient Architecture

Notes for teachers and whānau

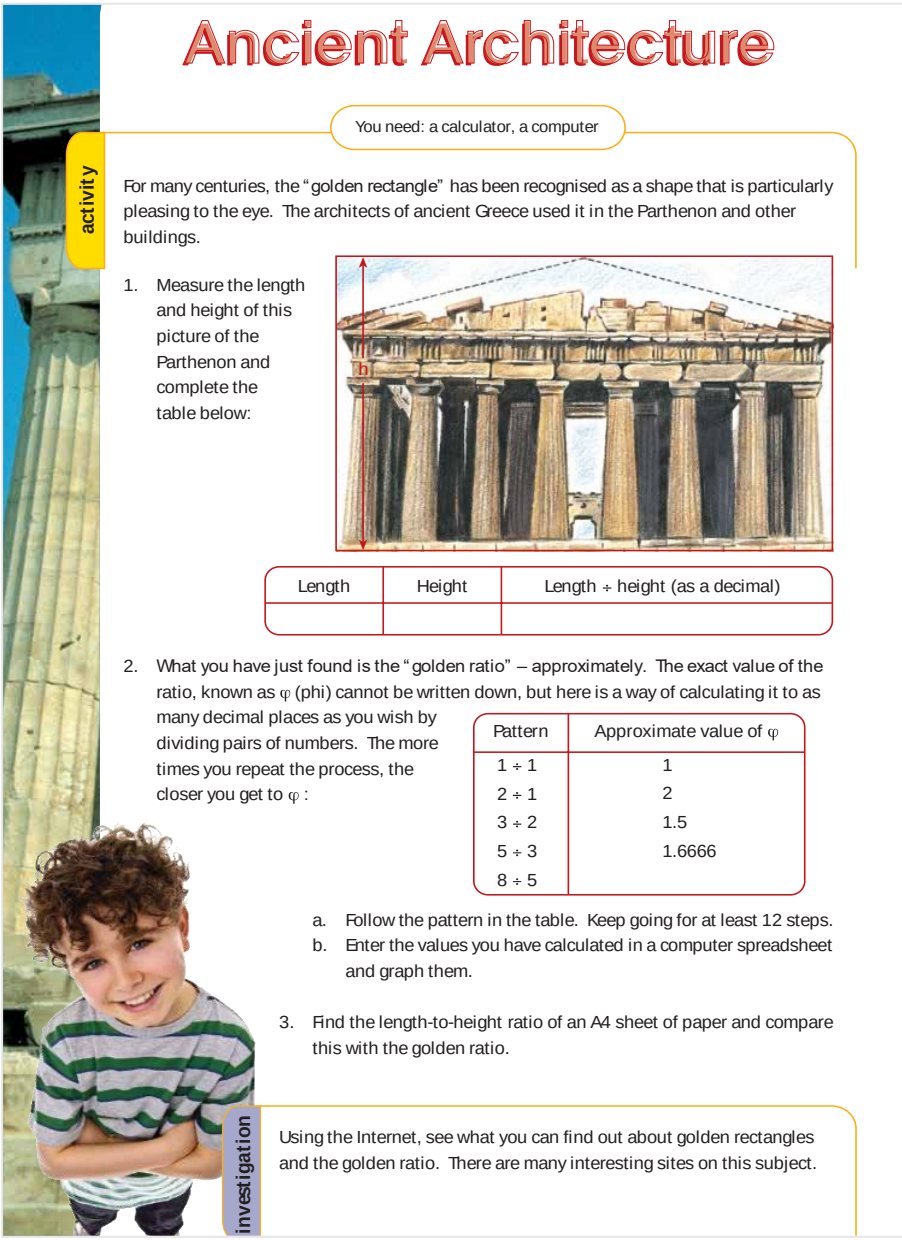
Continuing with the theme of ancient architecture, this explores mathematical ideas and beliefs of the ancient Greeks. The learner will explore the idea of the golden ratio and how it was used to create structures that were pleasing to the eye.

I am learning about the idea of the "golden ratio" and how the Greeks used in creating their ancient structures.

What do I need?

- 30 minutes
- A computer or digital device
- A calculator

Your task:



Ancient Architecture

You need: a calculator, a computer

activity

For many centuries, the "golden rectangle" has been recognised as a shape that is particularly pleasing to the eye. The architects of ancient Greece used it in the Parthenon and other buildings.

1. Measure the length and height of this picture of the Parthenon and complete the table below:

Length	Height	Length ÷ height (as a decimal)

2. What you have just found is the "golden ratio" – approximately. The exact value of the ratio, known as φ (phi) cannot be written down, but here is a way of calculating it to as many decimal places as you wish by dividing pairs of numbers. The more times you repeat the process, the closer you get to φ :

Pattern	Approximate value of φ
1 ÷ 1	1
2 ÷ 1	2
3 ÷ 2	1.5
5 ÷ 3	1.6666
8 ÷ 5	

   a. Follow the pattern in the table. Keep going for at least 12 steps.
   b. Enter the values you have calculated in a computer spreadsheet and graph them.

3. Find the length-to-height ratio of an A4 sheet of paper and compare this with the golden ratio.

investigation

Using the Internet, see what you can find out about golden rectangles and the golden ratio. There are many interesting sites on this subject.

What other ancient structures do you think followed the golden ratio? Use the internet to find some.

Day 7 activity 3: Storytelling through carving

Notes for teachers and whānau

This activity takes a look at the ways different cultures use carving as a means to tell stories of their past. Learners will reflect on the different ways cultures use natural material, forms, and colours to communicate aspects of their identity.

I am learning to think about the way cultures use different art forms to express their cultural identity.

What do I need?

- 30 minutes
- Access to a device to watch "National Geographic Explorer Christoph Niemann Visits New Zealand" https://www.youtube.com/watch?v=fnhaDH-kNRo

Your task:

Read *Legendary origins of carving* by Brett Graham

Legendary origins of carving

Rukuhia te ata o te whakairo
Rukuhia te ata o te wānanga
Rukuhia te ata o te wharekura.
Whano, whano, hari mai te toki,
Haumi e, hui e, tāiki e!

Delve deep into the image of carving,
Delve deep into the essence of knowledge,
Delve deep into the image of the schooling,
Proceed! Advance! Welcome the adze!
Unite! Assemble the (vessels), ribs and hull!

The legend of Ruatepupuke

According to an East Coast legend, the art of carving was discovered by Ruatepupuke, the grandson of the sea god Tangaroa. Ruatepupuke's own grandson had an insatiable appetite for kai moana (seafood) and to meet his demands, Ruatepupuke fashioned a stone into an exquisite fishing lure which he named Te Whatukura-o-Tangaroa (the sacred stone of Tangaroa).

Tangaroa was offended that his name had been used without permission and sought revenge. When Ruatepupuke's son, Manuruhi, tried the prized lure he caught a massive haul but did not observe the custom of offering the first fish back to Tangaroa, further aggravating the sea god. Tangaroa decided to punish his great-grandson by pulling him down to the depths of the ocean, where Manuruhi was transformed into a birdlike tekoteko (carved figure) on the top of Tangaroa's house, Hui-te-ana-nui.

Ruatepupuke, noticing that his son was missing, followed his footsteps to the edge of the ocean and dived into the water. He came upon the underwater village and found Hui-te-ana-nui. To his amazement, the whare was covered in carvings that spoke and sang to each other. When Ruatepupuke asked about his son's whereabouts, one of the talking poupou (carved posts) told him that the bird-shaped tekoteko of the house was Manuruhi.

Ruatepupuke hid in the house and waited for its residents, the fish people, to fall asleep, whereupon he set the house ablaze. He had time only to rescue his son and some of the poupou – which were unable to speak – from the mahau (porch). Thus the first carvings came into the world.

Many years later, Ruatepupuke's descendants brought these examples from the legendary homeland of Hawaiki to Aotearoa, where they served as models for Te Rāwheoro, the famous whare wānanga (school of learning) established by Hingaangaroa at Ūawa (Tolaga Bay). Future students of the wānanga, such as Tūkākī and Iwirākau, spread the influence of this school throughout the East Coast and eventually beyond.

Links with other Polynesian carving traditions

The legend of Ruatepupuke establishes carving as a taonga tuku iho, a divine gift from the gods handed down from ancestors, and therefore an art form that requires ritual respect. It also indicates that the tradition of carving was established in Hawaiki and brought to New Zealand. Linguistically and technologically the cultures of the early Māori and of other eastern Polynesian societies such as Rarotonga, Tahiti, the Marquesas, and Hawaii are closely related, so it is not surprising that there is a direct relationship between the carving found on these islands and those of the earliest phases of Māori art. Those early forms evolved as the first Māori became accustomed to their new islands, and an art emerged that reflected the local flora, fauna, and climate.

Brett Graham, 'Whakairo – Māori carving - Legendary origins of carving', Te Ara - the Encyclopedia of New Zealand, http://www.TeAra.govt.nz/en/whakairo-maori-carving/page-1 (accessed 29 April 2022)

Vocabulary search

1. What do the following words mean? How do they relate to the art of carving?
    - flora
    - fauna
    - linguistics
    - ritual respect

Mini research tasks:

2. What are other societies do you know of that use carving as a way of storytelling or communicating aspects of their cultural identity to those around them? Use the internet to search for examples, then copy and paste 3-5 examples of different carvings from cultures around the world.
3. Choose 2 cultures that have a history of carving. Use a Venn diagram to compare and contrast things such as:
    - their carving styles,
    - who is allowed to carve,
    - the materials used,
    - any shapes, colours, and forms,
    - possible rituals as well as their purposes for doing the carvings.

Day 7 activity 4: Coming of Age traditions from around the world.

Notes for teachers and whānau

This activity takes a look at the way different cultures acknowledge significant stages in the lives of adolescents. The learner will be encouraged to reflect upon their own cultural traditions around growing up and compare these with others.

I am learning to reflect on the different traditions cultures have around growing up during teenage years.

What do I need?

- 30 minutes
- Access to a device to watch the videos associated with each tradition (optional)
  Bullet Ant Initiation https://www.youtube.com/watch?v=XwvIFO9srUw
  Japanese Coming of Age ceremony day
  https://www.youtube.com/watch?v=VSzz5b7UoFc
  How we celebrate first time haircutting for boys traditionally
  https://www.youtube.com/watch?v=JRrXd9pe3tM

Your task:

Read the following information about different coming of age traditions:

Coming of age traditions around the world by Lynette Hay

"Coming of age" – a time period in a young person's life where they transition from being a child to being an adult – is commemorated and celebrated all around the world and in different ways. For many of us here in New Zealand, turning 21 is considered a significant time in the life of a young person. This acknowledgement of a turning point in a young person's life is often celebrated with a big party and the gifting of a large key. The tradition of gifting a key is generally considered to symbolise independence or being given the "key to the door" to their future as adults.

However, turning 21 is not the only age that is considered a significant moment in a young person's life for many cultures. Let's look at coming of age traditions from some other cultures.

The Sateré-Mawé Coming of Age Tradition: Bullet Ant Initiation

Young men of the indigenous tribe Sateré-Mawé mark their coming of age when they turn 13. This tribe lives in the Brazilian Amazon and have been performing this tradition for many years. The initiation ceremony, led by the older men of the village, is held several times a year and is designed to test whether the initiate (young male) is worthy of being considered a true warrior. Initiates must wear gloves filled with bullet ants, giant tropical ants whose sting is the worst pain a human is capable of experiencing, for at least 10 minutes. The initiate must go through this process not once, not twice, but 20 times before he is considered a man by the tribe.

Fulani Mali Coming of Age Tradition: Tchoodi

Young Fulani women in Mali, experience a tradition called "Tchoodi" to signify their transition into womanhood. This ritual involves young girls having their gums tattooed black as a sign of beauty and does not involve any pain relief or numbing. While the young girl goes through the initiation, women from the village gather to sing, chant,

and beat drums throughout the process. Thankfully, not all coming of age traditions involve rituals involving pain.

Japanese Coming of Age Tradition:

The second Monday of January marks a special day for 20-year-old males and females in Japan. The tradition which began over 1200 years ago, is a day that welcomes young people into Japanese society, acknowledging them legally as adults. Preparation for the special day takes place on the Sunday before, as it takes a while to get dressed and ready in traditional Kimono (Furisode) before attending a formal public ceremony hosted by local governments. The day is also considered a national holiday, so friends and family are able to gather and celebrate after the ceremony.

Niuean Coming of Age tradition: Hifi ulu

The tradition of hifi ulu or haircutting, dates back to before the arrival of palagi (Europeans) to Niue. This tradition celebrates the transition of a young Niuean male from boy to man, through the removing of his hair. This is not your everyday haircut, however. In order for the process to be legitimate, the young man's hair must not have been cut since birth. On the day of the ceremony, the young boy's hair is portioned off into smaller plaits which particular guests are invited to come and cut. Traditionally guests would give gifts of money to the boy and at the end of the ceremony the family distribute allotments of taro, fish, pork, chicken, and beef to the guests that differ in size depending on the amount of money the guest gave. Nowadays this part of the tradition is not possible in New Zealand, however, these *galue* (collection of food) have been replaced by large feasts that are enjoyed by everyone who attends.

Reflect on a 'coming of age' tradition that your family or culture practice. Choose one of the following tasks below to communicate this tradition to others. You can create a:

- Multimedia presentation
- Poster
- Pamphlet
- Video

Include relevant pictures or videos, as well as text to explain what is going on. Other pieces of information you will need to add in are:

- The age of the person involved
- What symbols, actions, beliefs, or values are involved
- The history behind the tradition
- Who else is involved
- And anything else you think is important to add.

Remember to do your end of day reflection and wellbeing activities (see p. 6 & 8).

Day 8 activity 1: Carnival – the global party

Making meaning

Notes for teachers and whānau

Today's tasks encourage the learner to reflect on different ways communities keep their heritage, traditions, and cultures alive. This activity looks at the origins of one of the world's biggest festivals.

I am learning about the way different communities take on other traditions and make them their own.

What do I need?

- 30 minutes
- Access to a device to watch *What is carnival: origins of the world's biggest party* https://www.youtube.com/watch?v=ltXfR_TIlEE

Remember to start your day right (see p. 7).

Your task:

Watch *What is carnival: origins of the world's biggest party* or read the transcript

Transcript

This Photo by Unknown Author is licensed under CC BY-SA

From Samba Blocos in Brazil to masked balls in Italy, Carnival is a global phenomenon celebrated in over 50 countries. Carnival originated as a Pagan festival in ancient Egypt to usher out winter and celebrate the beginning of spring. When Alexander the Great conquered Egypt, the ancient Greeks adopted the festival. The Romans assimilated the festival from the Greeks and it was later overlaid with Christian meaning become the festival of "C*arne Vale"*. The word *carne* means meat from Latin, and *vale* means farewell.

In the Catholic calendar, Carne Vale, a farewell to meat is a feast before the fast of Lent. In 18th century Italy, people preparing for Lent with throw indulgent fancy dress parties and gorge before the fast. As Christianity spread across Europe, so too did the celebration of Carnival. Colonization exposed it across the world.

Portuguese colonists took lend to the shores of Brazil where they had also taken an estimated 4 million African slaves. Overtime European rituals fused with African ones to create Brazil's world-famous Carnival. The flamboyant street parties are a celebration of Brazil's mixed heritage.

On the Caribbean Island of Trinidad, French colonists introduced the festival of Lent. Slaves excluded from these celebrations created their own parties to the soundtrack of calypso music which mocked the French. This is now a key part of Trinidad's Carnival.

In India, only the southern state of Goa celebrates Carnival, where Portuguese colonists ruled for over 4 centuries. Parades occur throughout the state with bands, dancers, and floats. Carnival is known as Mardi Gras in the American city of New Orleans. Quebec holds the third biggest carnival celebration in the world.

From humble beginnings, Carnival has become a truly global celebration with millions of revelers all over the world contributing billions of dollars to the party.

What do you remember?

1. What was the original meaning of the word Carnival?
2. Out of all the states in India, why is Carnival only celebrated in Goa?
3. What is the purpose of Carnival? How do you think this purpose is communicated through Carnival?

Create an acrostic poem using the letters of CARNIVAL to describe or explain the tradition.

C	
A	
R	
N	
I	
V	
A	
L	

Mini-research project

The modern day Carnival is a grand display of mixed heritage. Conduct a small research project and find out how the current celebrations in Brazil, and Trinidad and Tobago came about. Reflect on things such as the history behind wearing costumes and masks, as well as the type of music that is part of Carnival. Present your findings in a format of your choice.

Day 8 activity 2: In the new old-fashioned way

Notes for teachers and whānau

This activity looks at the way cultures use clothing and adornment as a way to express their identity. For this particular tasks, the learner will look at how younger generations are reclaiming their heritage by returning to wearing traditional clothing or mixing them in with modern accessories.

I am learning how different dress styles communicate cultural and personal identity.

What do I need?

- 30 minutes

Your task:

Read the following text:

Re-interpreting the Sari

Adapted from How Gen Z is putting a fresh spin on a centuries-old fashion by Zinara Rathnayake

The sari is said to be one of the oldest forms of clothing in the world. The history of it goes back to around 3200 BC, to the Indus Valley civilisation, where people wore a long piece of cloth – approx. 5.5 m long. Over time the sari evolved with external influences especially in the 19th and 20th centuries when Indian was under British colonial rule.

Many urban women nowadays had moved away from the sari, saying it is too restrictive and difficult to wear. However, younger generations are now challenging traditions and coming up with innovative ways to make sari's everyday clothing. Instead of using petticoats, some are wrapping them over jeans. Others are wearing them over t-shirts instead of a tailored blouse. One designer has even created The Saree Sneaker to be worn with the sari and make it more popular with younger women.

The Hanfu Style Revival

Adapted from Meet Shiyin, the Fashion Influencer Shaping China's Hanfu Style Revival by Meng-Yun Wang

On the streets of Shanghai, there is a movement being led by China's fashion-conscious youth – the revival of the *hanfu*. This type of attire comes from the era when the Han Dynasty ruled China. It is said that there are over six million enthusiasts that follow this style of dressing.

After many decades of younger generations following western trends, there now appears to be a push toward something more traditional. While there are some who stick to the strictest rules, refusing anything that is not historically correct, most are attracted to the fantastical elements of hanfu.

Vocabulary task

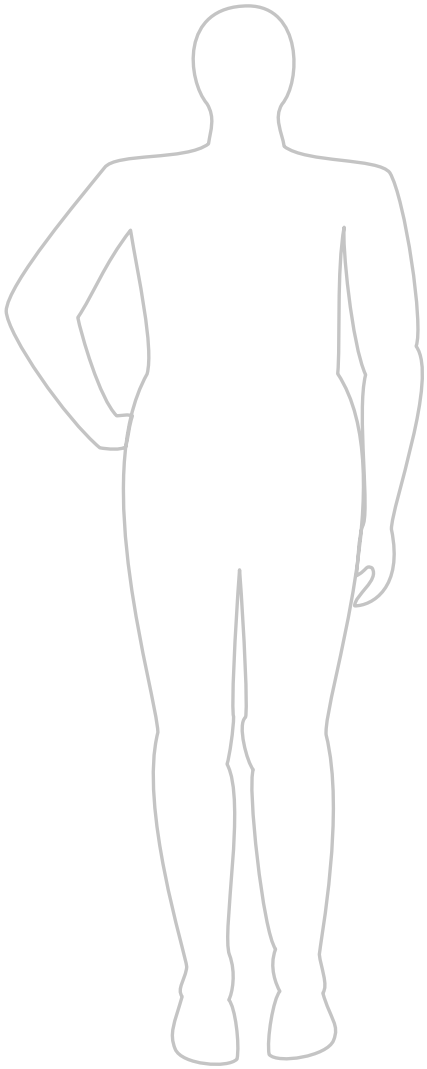
1. What does the word attire mean?
2. List 3 synonyms for the word attire.

What's your style?

1. What types of traditional attire does your family or culture wear?
2. How long has it been a part of your family?
3. Has it changed much over the years?
    a. If it has, what kinds of changes has it gone through and why?
    b. If it hasn't, do you think it needs to change or not? Why?

You be the designer!

Choose an element of your family or cultural traditional attire. Consider ways that you would modify it to either suit more your own personal styling or make it more appealing to other young people. On the body outline below, sketch out your design, including labels, descriptions and/or explanations of what your are hoping to achieve.



Day 8 activity 3: Sumo!

Notes for teachers and whānau

Many cultures use sports and games as ways of maintaining cultural traditions and language. This task will engage the learner in some different examples of how indigenous tribes have used these methods to help pass their cultural beliefs, ideas, language, and values onto the next generation.

I am learning to think critically about the role sports and games have in helping to keep a culture alive.

What do I need?

- 30 minutes
- Access to a device to watch "Sumo Wrestling 101 | National Geographic" https://www.youtube.com/watch?v=Cj_QyxPZE8M

Your task:

Watch *Sumo Wrestling 101* or **read** the transcript below:

Sumo Wrestling 101 | National Geographic (transcript)

Six times a year, these giants battle each other for top placement in Japan's most beloved traditional sport - Sumo.

Highly ritualized, this sport dates back more than 1000 years, originating as a rite of the Shinto religion. Matches are a true window into an earlier era. Participants wear colorful Shinto gar. Stomping drives, evil spirits from the ring. While tossing sacred salt appeases the Shinto gods before the ring is sullied by the wrestler's presence.

What's surprising about Sumo is the sheer size of the wrestlers. A traditional diet that includes chankonabe, a stew made from fatty meats, cabbage, eggs, and bean sprouts, helps them bulk up. Entering the ring, girth is advantageous. The rules are simple. Knock your opponent down or out of the ring. Wrestler's slam, slap and toss opponents into submission. It usually lasts less than a minute.

Sumo wrestlers belong to stables, which function like clubs and are where they learn the finer points of sumo from experienced mentors. Each match is an opportunity for sumo wrestlers to move up the complex ranking system - or down. At the top are the Yokozuna or grand champions distinguished in the ring by the large ropes around their waist. A match like this is a feast for the fans. But no matter what their rank, the stylized battle of these giants lies at the heart of Japanese tradition.

The language of sumo

Use the internet to find the English word for each of the following Romanized sumo terms.

Japanese term (Romanized)	Sumo vocabulary (English)
rikishi	
mawashi	
keshō-mawashi	
Yokozuna	
dohyō	

Japan has three writing systems – Hiragana and katakana which are native to Japan also known as kana, and kanji which is the oldest writing system adapted from Chinese characters.

1. Try converting your name to Japanese katakana by using the online tool https://japanesenameconverter.nolanlawson.com/#home
2. Practice drawing the katakana symbols on a piece of paper or in your book and write the Romanized equivalent next to it.
3. Try converting the names of others in your household or in your friend group.

Japanese calligraphy is one of the most celebrated forms of artistic expression in the Japanese culture. Known as shodō (書道) which literally means 'way of writing', this writing system has a very long history dating back to the 6th century when it was first introduced from China. This art form is such an important aspect of Japanese culture and ideals that it is introduced to primary school aged Japanese children. According to those who practice the art, shodō is more than simply drawing characters. It is a form of communication as well as a form of Zen meditation that evokes harmony and wisdom.

1. The kanji symbols for sumo are shown below. Practice drawing them in a calligraphy style. Make sure you take note of the differences in brush stroke widths and shapes.

相撲

To help you with your calligraphy, you can watch this video *5 Basic Rules of Writing Kanji* https://www.youtube.com/watch?v=X80ZkYJgaqc

Day 8 activity 4: To’ona’i

Notes for teachers and whānau

Our final task for the day looks at another tradition that has been practiced for many decades. This task engages the learner in thinking about different ways in which people meet, greet, and host one another in different settings.

I am learning to use simple proportions to find costs of food.

What do I need?

- 30 minutes
- Someone to work with

Your task:

Activity 1

Mika’s family are planning a to’ona’I to welcome their friends into their new home. This is the food they need for their family of 8 people:

- 1 kilogram of talo at $3.95 a kilogram
- 1 ½ kilograms of green bananas at $2.70 a kilogram
- 1 ½ kilograms of fish at $12.95 a kilogram
- Three 400 millilitre tins of coconut cream at $1.75 a tin
- One chicken at $9.49
- ½ a kilogram of oranges at $2.39 a kilogram
- A 2-litre carton of ice cream at $3.75
- One chocolate cake at $4.55
- One pavlova at $7.99

1. What will the cost of the food for the family be?
2. Mika has counted 24 people who will come to the to’ona’i. What will the cost of the food be now?
3. His father then invites 22 of his friends from work to the to’ona’i. They all say they will come. What will the cost of the food be now?
4. Mika wants to find a rule so that he can work out the cost of the food quickly. What rule could he use?

Activity 2

Mika’s sister, Eseta, wants to make her favourite drink for the to’ona’i. This is the recipe for 5 glasses:

- 125 ml of orange juice
- 500ml of water
- 250 ml of mango juice
- 60 ml of lemon juice
- Sugar to taste.

1. How much of each ingredient would Eseta need if 15 people wanted 1 glass each?
2. If Eseta makes enough for 45 glasses, how much of each ingredient does she need?
3. Find a rule to work out the amounts needed.

What are your food traditions?

What kinds of ways do you meet, greet, and host people?

Who would you normally invite to join you?

What kinds of events do you celebrate with feasts or large meals?

What kinds of food would you traditionally serve?

Remember to do your end of day reflection and wellbeing activities (see p. 6 & 8).

Day 9 activity 1: The Science of Rongoā

Going further/ deeper

Notes for teachers and whānau

Today's activities explore ways that traditional knowledge and practices are used alongside modern innovations to provide better solutions to present-day problems. This activity looks at how traditional Māori knowledge helped a young man learn more about the healing property of plants and discover a connection to his cultural roots.

I am learning how traditional knowledge and modern scientific process can work together to find sustainable and organic health solutions.

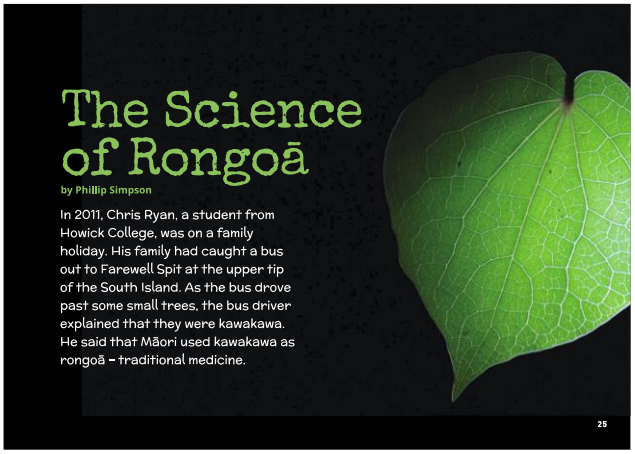
What do I need?

- 30 minutes
- Look in your pack for a copy of The Science of Rongoā https://instructionalseries.tki.org.nz/Instructional-Series/Connected/Connected-2015-level-3-Fact-or-Fiction

Remember to start your day right (see p. 7).

Your task:

Read *The Science of Rongoā* then complete the tasks that follow.


The Science of Rongoā

by Phillip Simpson

In 2011, Chris Ryan, a student from Howick College, was on a family holiday. His family had caught a bus out to Farewell Spit at the upper tip of the South Island. As the bus drove past some small trees, the bus driver explained that they were kawakawa. He said that Māori used kawakawa as rongoā – traditional medicine.

25

Critical thinking task.

1. What does the "Māori view of medicine" mean? How does this compare with other views of medicine?
2. How did Chris come up with his hypothesis and how did he test it?
3. What sort of questions do you think Chris was thinking about when he critiqued the scientific evidence?

Summarise the process Chris used, using the table below:

What Chris did	His purpose for doing this was…

Vocabulary task:

Compare the words antibacterial, antiviral and anti-inflammatory. How do the words differ from one another? Can they all be used to mean the same thing or not? Why?

Traditional health practices

Find out if there are any traditional remedies or practices that are used by others in your home. Record your findings in a book or online document.

- what are they?
- where have they come from?
- how long have they been in your family?
- what do they involve?

Day 9 activity 2: Healing honey

Notes for teachers and whānau

This activity focuses in on a health practice that dates as far back as ancient Egyptian times. Learners will look at how cultural knowledge can lead to the development of innovative and sustainable ways of treating illness and disease.

I am learning how traditional knowledge and modern scientific process can work together to find sustainable and organic health solutions.

What do I need?

- 30 minutes
- *Hui across the country to help Māori protect Mānuka honey* https://www.teaomaori.news/hui-across-country-help-maori-protect-manuka-honey

Your task:

Healing Honey

Honey has been noted for its healing properties for thousands of years. The ancient Egyptians used honey as a wound treatment. They were also obviously aware of the difficulty of keeping honey on the body because it gets runny at body temperature. Ancient Egyptians mixed honey with cotton fibre to make a paste, and sometimes with grease to make something that would stay on the wound. Thus the birth of the first gauze bandage.

But how does honey treat wounds?

In normal situations, like a cut finger or a grazed knee, the wound will heal on its own. But sometimes wounds can become infected with bacteria, and they don't heal.

Bacteria feed on the injured tissue, multiplying in the wound and causing more tissue damage. The wound starts to smell and pus collects. This pus is made up of dead white blood cells, part of the body's effort to kill the bacteria and heal the infection.

Honey the bacterminator!

Honey helps wounds to heal by killing the infecting bacteria. Honey has four main properties that help it to exterminate bacteria:

Honey contains lots of sugar	Honey is a supersaturated solution, containing lots of sugar and very little water. When honey is applied to a would it soaks up any spare water from the wound which starves the bacteria of the liquid they need to be able to grow.
Honey is very acidic	Honey has a pH between 3 and 4. Bacteria are killed in acidic environments like this.
Honey produces hydrogen peroxide	Hydrogen peroxide is an antibacterial substance made naturally in honey by an enzyme called glucose oxidase, which is added to the plant nectar by the bees.
Honey contains plant-derived factors	Some honeys have antibacterial action that are caused by plant chemicals found naturally in the nectar that bees collect.

Mānuka honey has a unique property that comes from Mānuka trees, which make it particularly useful for healing wounds. Unlike other honeys, Mānuka's antibacterial action is not caused by peroxide. Scientists are not sure exactly what it is that makes Mānuka honey so effective at healing wounds, but they do know that it's the only honey in the world that can do what it does!

(Adapted from How honey heals wounds – Science Learning Hub 1 June 2007)

Honey wars

In 2015, the Mānuka Honey Appellation Society applied to trademark the name Mānuka in the United Kingdom. They were successful in 2018, with the United Kingdom Intellectual Property Office ruling that manuka was a Māori word and that Mānuka can only come from honey producers in New Zealand. Unfortunately, Australia beekeepers objected to this saying that their species of tea tree is the same as the ones in New Zealand, arguing that they can also use the word Mānuka for their honey.

(Adapted from Hui across the country to help Māori protect Mānuka honey – Te Ao Māori News 30 March 2021)

Critical thinking task:

1. What do you think could be some of the challenges to being able to keep producing or supplying natural Mānuka honey-based bandages? List 2-3 factors.
2. Read the full article "Hui across the country to help Māori protect Mānuka honey". Reflect on the arguments posed by both the New Zealand and Australian beekeepers.
    a. How important do you feel it is for the word mānuka to be protected and why?
    b. Why do you think the name is so important to the Māori?
    c. What factor is driving others to want to use the name Mānuka?

Day 9 activity 3: Learning from the tangata whenua

Notes for teachers and whānau

This activity looks at how environmental scientist and tangata whenua James Ataria uses both knowledge streams and practices to study problems caused by pollution. Learners will think about abstract ideas and consider how one's cultural identities can impact on each other in different environments.

I am learning about how James's identity as Māori affects his work as a scientist and about how different kinds of knowledge can address environmental issues.

What do I need?

- 30 minutes
- *Learning from the Tangata Whenua* by Susan Paris https://docs.google.com/presentation/d/1F0hyjQHUhDMaoyxWeD1QCA27pO4PyVeKYzkBXODULSw/present?slide=id.p

Your task:

Read the full interview with James Ataria, then complete the tasks that follow.

The word *tangata whenua* means people born of the whenua, i.e. of the placenta and of the land where the people's ancestors have lived and where their placenta are buried.

Who are the tangata whenua in your area?

What sorts of things might a scientist want to learn from the tangata whenua?

How well did you read?

1. How did James's early life affect his decision to become a scientist?
2. How do you think James might work differently to other scientists?
3. What is James saying about the differences between scientific knowledge and cultural or local knowledge?
4. How does James expect scientists on his team to work with local Māori hapū and iwi? How does this benefit the research?
5. James says he doesn't question local or cultural knowledge. Why do you think this is?

Use the text to locate answers to these questions.

- What was the problem?
- How was it addressed?
- Whose knowledge was used? Was this local, cultural or scientific knowledge? How did it help?
- Could the findings be trusted? Why or why not?
- How successfully was the problem addressed? How do we know?*

*You may have to do further research on the internet to answer this question.

Day 9 activity 4: Fishing by the sign of the moon.

Notes for teachers and whānau

The final activity for today engages the learner in an task involving an age old practice that uses the moons phases to predict how well fishing might be for anglers at different times of the month.

I am learning to locate and read different charts to construct a fishing calendar based on moon cycles.

What do I need?

- 30 minutes
- A device to access the internet for "The Māori Phases of the Moon" https://www.museumswellington.org.nz/matariki-the-maori-phases-of-the-moon/

Your task:

Archaelogical evidence suggests that humans have been using the moon as a timekeeping device for thousands of years. While the sun's movements across the sky is able to give us an approximate indication of the time of day (for a single day), the moon's nightly phases are able to tell us how many days have passed.

Using a Maramataka (Māori lunar calendar), tides charts and a range of other resources to:

1. Construct a fishing calendar for the month of June 2022

Hint – you might want to find out what phase of the moon we are in currently to help you plan the calendar for June.

JUNE 2022						
SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Remember to do your end of day reflection and wellbeing activities (see p. 7&9).

Day 10 activity 1: My own language

Sharing my learning

Notes for teachers and whānau

This activity gives the learner a chance to share aspects of their own cultural identity as they see it. This task in particular taps into the age-old practice of young people developing their own lingo (language). Note that today our Inquiry focus is "Present – share learning about the big idea" which includes thinking about who the audience is and considering different ways of communicating learning for example, presentation, video, poster, etc.

I am learning to think about a new way of communicating with my peer's using symbols.

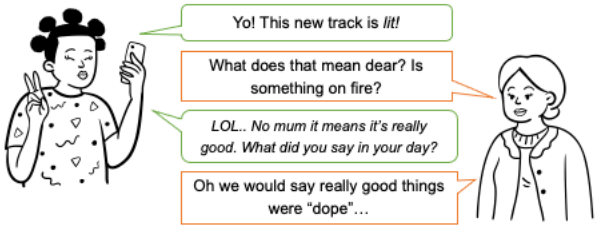
What do I need?

- 30 minutes

Remember to start your day right (see p. 7).

Your task:

Teenagers have been coming up with their own expressions for a very long time. It's true! Just ask your parents what they used to use when they were young – you might be surprised what they came up with. According to researchers, the language choices we make as young people play a big part in shaping our social identity.



For this task, think about 5 of the most common expressions that you or your friends use often – just make sure they are appropriate for even your grandma to hear!

Next, interview your parents or someone from their generation to find out what they used to use for the same expression. Trying digging a little deeper to find out why thy used that particular word or combination of words to describe that common expression.

Your generation	Your parents generation

Day 10 activity 2: Our whānau time capsule

Notes for teachers and whānau

The learner reflects on aspects of their cultural identities they would want to pass onto another generation. Encourage whānau and friends to contribute to this activity.

I am learning to reflect on the things that are important to myself and my family, that I would want to pass onto the next generation.

What do I need?

- 30 minutes
- A container that is airproof, waterproof and resistant to breaking down (i.e. something that won't rust, rot or degrade)
- Access to a device to watch "Writing Prompt: Create a Time Capsule" https://www.youtube.com/watch?v=1kgUs4UHVK8

Your task:

The term "time capsule" was first used in 1937 when a capsule was prepared to for burial for at the 1939 New York World's Fair. However the concept of a time capsule goes further back than that. Time capsules have been used for thousands of years to preserve pieces of the present for the future. Time capsules are containers that hold items related to the present, or past, depending whether you are the one who buried it or the one who retrieved it. These containers are usually filled with photos, letters, newspapers, etc, things that what the past was like communicate to those in the future.

What to put in a time capsule:

There are no hard and fast rules on what should go into a time capsule, but there are some things you need to consider before you place items inside.

- If you are going to include any digital recordings, make sure you add in a device that can read the contents and instructions on how to use it in the future because technology changes quickly these days (anyone remember DVDs?).
- Seal your important and precious documents in plastic bags to prevent moisture from getting in.
- Use good quality ink and paper if you're going to print or write things to add in.
- Don't put in any food items, plant items or living things. These things can rot and ruin everything inside the capsule.
- Include a list of what should be in the time capsule and why they were included.

Plan your time capsule:

1. Talk to your whānau and family about the types of things they think are important for the next generation to know about them and you.
2. Start collecting your items and choose a good quality container that will last at least 10 years unopened.
3. Talk to your whānau and family about where you would like to bury it or store it, how long you will keep it stored away, what date you want it opened and by whom. You will need to make sure that the site you choose to bury or store your time capsule will still be accessible when it's time to open it.
4. Make a list of the things you are including in the time capsule, who they are from and why they were put in there before you seal the capsule.
5. Plan a ceremony to commemorate the burying or storing of the time capsule.

Day 10 activity 3 & 4: Create a taonga

Notes for teachers and whānau

This practical activity is designed to encourage students to think about tangible and long lasting ways to express their culture through the creation of taonga.

I am learning express aspects of my culture through the creation of a taonga.

What do I need?

- 60+ minutes
- A range of crafting tools and resources such as paper, paints, felts, crayons, wood products, crafting knife, sellotape, glue, cloth, etc..

Your task:

The word taonga is a Māori word meaning treasure of prized possession. This term is also used across Polynesia to describe artefacts that are of cultural or spiritual significance.

For the last task of the day, you will design and create a personal taonga, to reflect aspects of your culture and heritage. Seeing the purpose of this is for the piece to be presented as a prized possession, it's important to consider how you form this piece and the workmanship that you put into it. Taonga works can include paintings, written poetry or songs, calligraphy, weavings, carvings, pottery, sculpture etc.

Think creatively about the piece you wish to create and take your time.

Remember to do your end of day reflection and wellbeing activities (see p. 7 & 9)