PRE-PRIMARY
CHANGES IN OUR ENVIRONMENT

Australian Curriculum Earth Science activities

with links to other subjects.

PALMS

PRIMARY AUSTRALIAN LITERACY MATHEMATICS AND SCIENCE

Santos & ESWA supporting earth science education

EARTH SCIENCE WESTERN AUSTRALIA

Santos

PRE-PRIMARY - TEACHER INTRODUCTION

The Primary Australian Literacy Mathematics & Science (PALMS) Program aims to enrich and support the teaching of earth science from Kindergarten to Year 5 across Australia. This will be achieved by providing, within the mandated Earth and Space Science curriculum, hands-on activities integrating aspects of Chemical Sciences, Physical Sciences and Biological Sciences as well as relevant components of English, Mathematics and other subjects into teaching packages.
These teaching packages will be made available at www.palms.edu.au.

Daily and seasonal changes affect everyday life

In Pre-primary, students observe and describe the behaviours and properties of everyday objects, materials and living things. They explore change in the world around them, including changes that impact on them, such as weather and the changes they can effect, such as making things move or change shape. They learn that seeking answers to questions they pose and making observations is a core part of Science, using their senses to gather different types of information.

Topic No.	Topic	Activities	Student Worksheet	Subjects	Page No.
1	Observing change	Use Your Senses	X	Science	1 + 6
		Stomping Senses	X	Science	1 + 7
		Mystery Packages	X	Science	1 + 8
		What Was That Sound?	X	Science Visual Art	1 + 9
		Use All Your Senses	X	Science Critical Thinking	1 + 10

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PRE-PRIMARY - TEACHER INTRODUCTION

Topic No.	Topic	Activities	Student Worksheet	Subjects	Page No.
2	Movement	Movement	X	Science Maths	11 + 13
3	Short Term & Daily Changes	Day and Night		Science	15
		I Know Day and Night		Science English	18
		Living Things	X	Science	19 + 20
		Things We Use	X	Science HASS	21 + 23
		What To Wear	X	Science HASS	24 + 26
		"This is the Way"		Science Music	29
4	Long Term & Seasonal Changes	I Know the Seasons		Science HASS	30
		Predictable Seasons	X	Science HASS	32 + 34
		Nyungar Seasons		Science HASS	36
		Pencil Puzzle	X	Science Maths	38 + 40
5	Very Long Term Changes	Little Rocks		Art	41
		Rocks and Sand		Science	44
		Tiny Teddies	X	Science	47 + 49
		Rock, number and shape	X	Science Maths	50 + 52

PRE-PRIMARY - TEACHER INTRODUCTION

Kindergarten

Australian Curriculum (WA) – Earth and Space Sciences

The world changes can affect how I feel/react (ACSSU004a)
The weather and time of day changes (ACSSU004b)
Weather involves sun, rain, wind and clouds and can be hot, cold and warm (ACSSU004c)
Events and clothing are effected by weather and time of day (ACSSU004d)

Pre-Primary

Australian Curriculum (WA) – Earth and Space Sciences

Daily and seasonal changes in our environment affect everyday life (ACSSU004)

Major concepts also included:

Science

Pose and respond to questions about familiar objects and events.
Participate in guided investigations and make observations using the senses.
Engage in discussion about observations and represent ideas.
Share observations and ideas.

Chemical Science

Objects are made of materials that have observable properties.

Mathematics

Connect days of the week to familiar events and actions.
Sort describe and name familiar two-dimensional shapes and three-dimensional objects in the environment.
Describe position and movement.

PRE-PRIMARY - TEACHER INTRODUCTION

English
Listen to and respond orally to texts and to the communication of others in informal and structured classroom situations.
Create short texts to explore, record and report ideas and events using familiar words and beginning writing knowledge.

HASS
Share observations and ideas, using everyday language.
Reflect on learning.

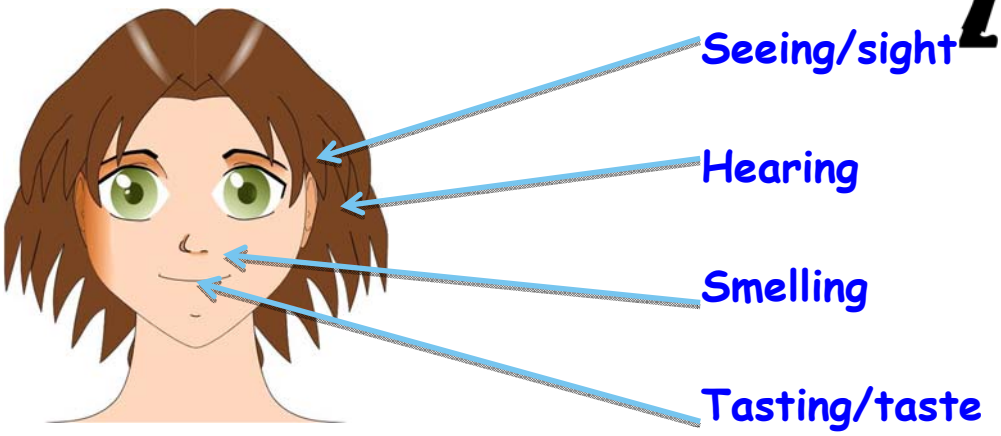
The Arts
Exploration of, and experimentation with, the visual art elements of shape, colour, line and texture.
Improvisation and practice of music (singing, playing, moving) for a specific purpose and a familiar audience.

Observing Change - Teacher Notes

An important part of Science is being able to observe changes. This suite of activities assists students to develop these skills.

Use Your Senses

Science depends on collecting good evidence of change and finding the best way of explaining it. Our five senses tell us when something is changing in our everyday lives. They keep us informed and safe. Label the senses we use in Science below.



What sense do our hands and most of our body surfaces have? ***Touching/Feeling***

Scientists rarely test things by putting them in their mouth. It can be very dangerous. Only taste things in Science classes if your teacher has said

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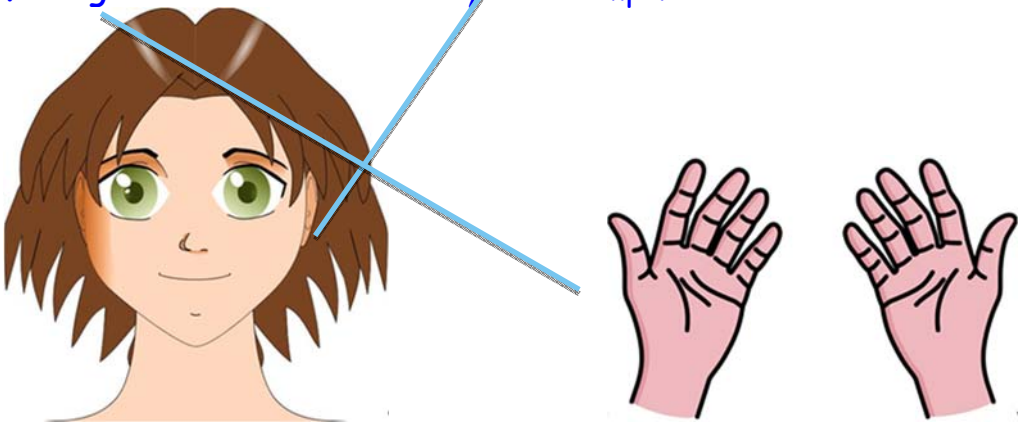
this is safe.

Materials for the following activities

- A medium sized cardboard box or a tea towel to conceal things.
- Two sheets of newspaper and sticky tape to make mystery packages.
- A pencil and pencil sharpener.
- A bell or whistle.
- Half an onion and half an orange. Optional: hammer or heavy object.
- Opaque plastic bags or newspaper to wrap things.
- Some small objects such as a potato, an apple, a rock, a crayon or small toy, such as a plastic dinosaur, hidden in sealed opaque plastic bags.

Stomping Senses

Students should have their eyes shut. Select someone to stomp from one side of the classroom to the other. Students should feel the sound vibrations travelling through the floor through their buttocks and hear those travelling through the air to their ears.
What senses did you use to detect these changes? Use the picture below to circle the senses you used. ***Hearing*** and, with a resonant wooden floor ***feeling*** the vibrations caused by the stomps.



Observing Change - Teacher Notes

Quick question

Which senses do you use to know it is almost lunchtime? ***Feel*** hungry, ***hear*** the pre-lunch announcements, ***see*** students being sent to collect class lunch orders and lastly ***hear*** the bell/siren.

Mystery Package

The half onion and half orange should be wrapped in a double sheet of newspaper to prevent students from seeing them. If you enjoy a bit of drama give both a smash with a hammer or heavy book to release their smelly juices before giving them to the students to detect what they are.

Which senses did you use to detect what is in each of these packages? Use the picture below to mark the senses you used. ***Feel*** the shapes of the onion and orange, ***feel*** the damp from the juice from their juice and ***smell*** their juice.

NOTE: Some children with recurrent ear, nose and throat infections might not smell the orange. Therefore, in Science we always repeat an experiment many times so that our observations are not affected by unusual or

"outlying" observations.

Quick question

Which senses do you use when you put on your school clothes this morning? You need to ***look*** to find your clothes and then ***feel*** to put your arm and legs through the correct part of the garment. If the school uniform has buttons and buttonholes or zips then ***looking and feeling*** are also necessary to do up the garment.

What Was That Sound?

Using a hidden bell, whistle or any other noisy object, make a noise while it is still hidden by the box (or tea towel).
Students could draw a picture of the object they think is making the sound on the accompanying worksheet. Once they are done you could reveal the object and compare it to their pictures.

Quick question

If you are about to cross a busy road. how should you use your senses to keep yourself and others safe? If possible cross at the official road crossing with crossing guards and obey signals (***Looking/sight***). To avoid being hit by traffic, wait, ***look*** right look left and look right again. ***Listen and look*** for traffic. Some crossing signals make a beeping sound you can ***hear*** when it is safe to cross.

Use All Your Senses

Place a solid object of your choice inside a sealed opaque plastic bag. Tie or staple the bag shut. It is a good idea to have a few different objects and have a different bag for each group. Students hold the bag feeling with their fingers for a count of five and then pass it on to another from their group. You may wish to have students put down words about how the object

feels on the accompanying worksheet. The group then decides what is hidden in the bag.

Student questions

Ask the students what good questions they could ask to get a better idea of what is hidden the bag (they could also write these down on their sheet, if you wish).

Colour, edible/food, play toy?

Quick question

You are at a barbeque, are handed a pile of raw sausages and asked to place them on the grill when it is hot. How could you use your senses to do this safely? NO BURNT HANDS!

You would use "common sense" and ask an adult for help. You could see if the metal was hot if it was smoking or sizzling. ***Looking and listening.*** From a distance you could **look and see** if a little water would steam and sizzle if it was splashed onto the plate. Again using "common sense" you would use metal tongs to place sausages on the hot top of the barbeque.

REVISION What have we learned?

What do we use to see change with? Our eyes.
What do we use to hear change with? Our ears
What do we use to smell change with? Our nose
What do we use to taste change with? Our mouth
What do we use to feel change with? Our skin particularly on our hands
We only use 4 of senses these in Science. Which one do we usually not use?
Our mouths. Things could be hot, freezing or poisonous.

EXTENSION: If you lost a sense, such as the ability to see, how would you manage to get up, get dressed, get your breakfast and get to school?

Name _____

Use Your Senses - Student Worksheet

Our five senses tell us when something is changing in our everyday lives. They keep us safe.
Label the senses we use in Science below.

What sense do our hands and most of our body surfaces have?

Only taste things in Science if your teacher has said this action is safe.

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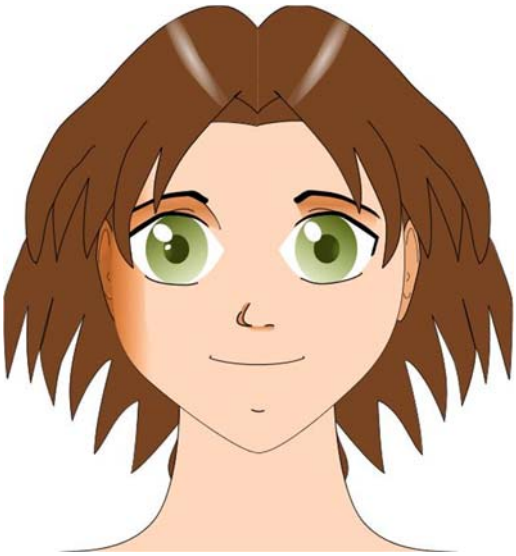
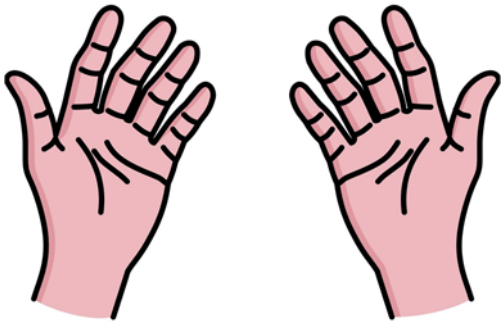
Stomping Senses – Student Worksheet

Shut your eyes while someone stomps through your classroom.
Concentrate on what you can sense!

Label the pictures below to share what you could sense.





Name _____

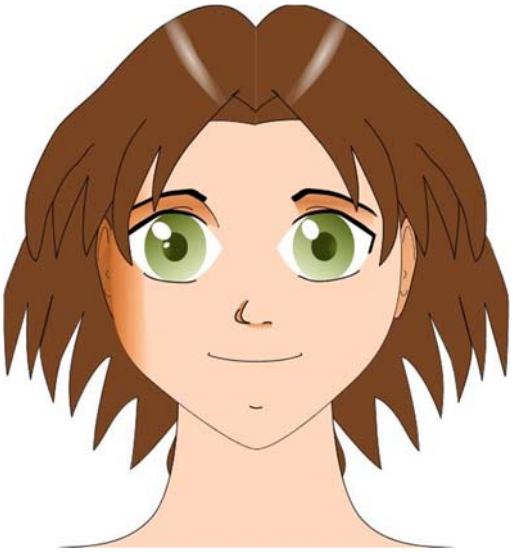
Mystery Packages – Student Worksheet

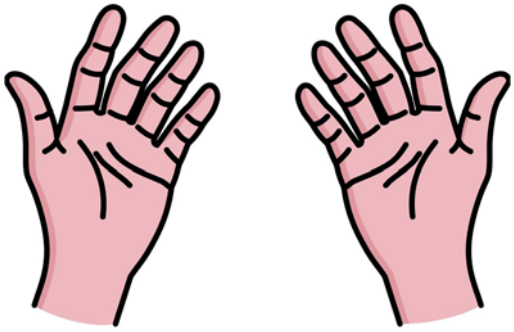
Your teacher will pass around two mystery packages.

Use your senses to work out what is in the packages.

Which sense shouldn't you use?

Label the pictures below to share what you could sense.





Name _____

What Was That Sound? - Student Worksheet

What was that sound?

Draw a picture of the object you think made that sound.

Name _____

Use All Your Senses - Student Worksheet

The object in the bag feels…

Things I want to know…

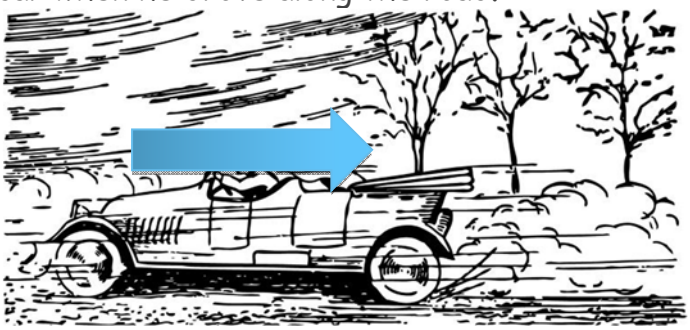
Movement - Teacher Notes

As adults we realise that movement can be relative but many younger students measure movement relative to themselves. Please read the comments above each picture for the students. They should then be asked to look at these pictures and judge if the comments are true or false. The blue arrow indicates the sensation of movement "felt" by the observer.

A: The parachute jumper said that it felt like the Earth was flying up to meet him when they jumped from the plane.

False. The Earth stayed still and the jumper moved towards it.

B: The racing car driver said that the countryside was speeding past the window of the car when he drove along the road.

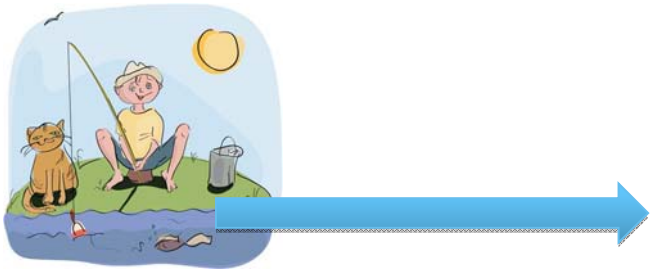


False. The countryside stayed in place the car moved by it quickly.

C. Joey spent all day at the beach and watched the Sun move across the sky until it was time to go home.

False. The Sun remains in the same position in the sky and the Earth spins.

D: A boy and his cat went fishing on a summer day as the spinning Earth made the Sun appear to move in the sky. Of course the Sun actually stayed still while the Earth moved round.



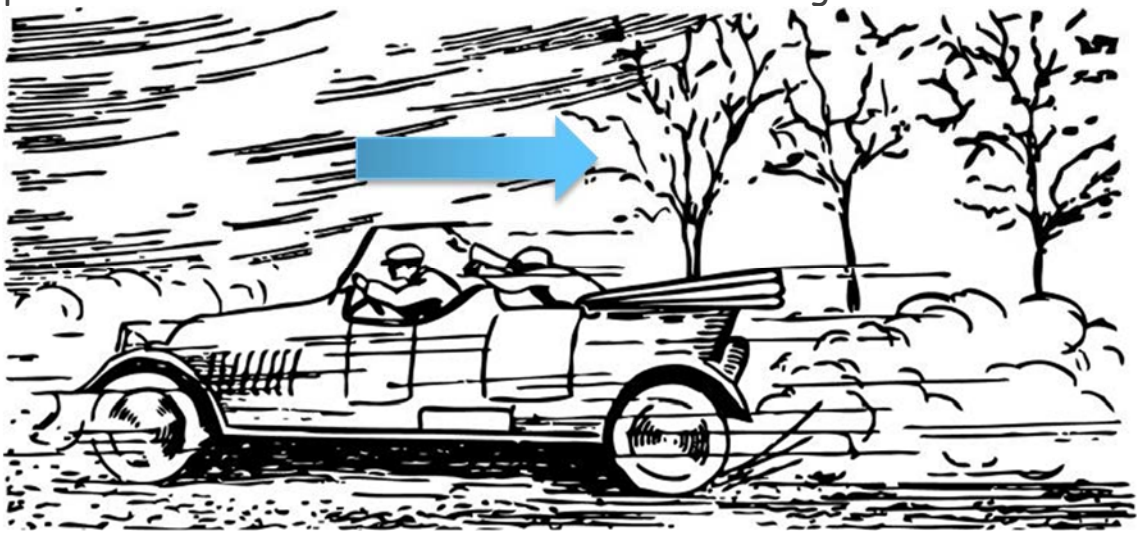
True

Name _____

Movement – Student Worksheet

A: The parachute jumper said that it felt like the Earth was flying up to meet him when he jumped from the plane.

B: The racing car driver said that the countryside was speeding past the window of the car when he drove along the road.



Name _____

Movement – Student Worksheet

C: Joey spent all day at the beach and watched the Sun move across the sky until it was time to go home.

D: A boy and his cat went fishing on a summer day as the spinning Earth made the Sun appear to move in the sky. Of course, the Sun actually stayed still while the Earth moved round.

Day and Night - Teacher Notes

Background

About 4.6 billion years ago, the rocks and dust that formed our planet became a lumpy sphere that slowly started solidifying from the outer crust inwards. It continued spinning and circling the Sun until a small planet crashed into it about 4.5 million years ago. This blasted off some of our planet's surface to create our Moon. The impact also tilted the planet's axis by approximately 23^0 from vertical, this tilt is responsible for our seasons.

The Earth has continued to spin on its axis once every day. The Sun will appear to track across the sky in the day. It "rises" in the east and it "disappears or sets" at night over the western horizon. Actually the Sun remains constant at the center of our Solar System and we rotate daily in our orbit round it.

Day and Night

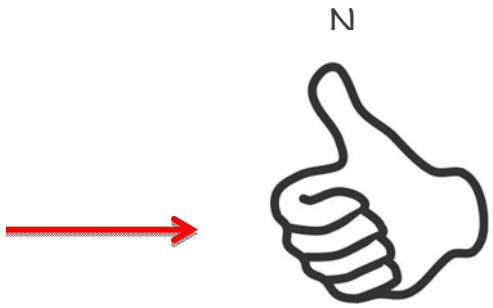
To help the students understand why the position of the Sun appears to change and why some people suggest that dawn and dusk should really be called "earthrise" and "earth set" we have this activity.

Materials

- Room on the mat for students to stand up
- A good torch or lamp
- Find North (most smartphones have a compass in them). North should always be at the "top" of the map.

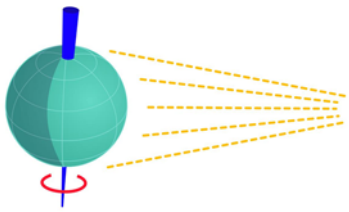
Method

1. Dim the overhead lighting if possible
2. Ask the students to stand and hold out their right hand in front of them with the thumb pointing upwards.
3. Ask the students to fold their fingers to make a fist.



The direction that our fingers fold is the direction that the Earth spins. This is sometimes known as the "Right hand rule".

4. Using the walls of the classroom and your knowledge of the location of north, organise the students to slowly spin and stop when asked.
5. Remain unmoving like the Sun and shine your torch while the students rotate into torchlight on their front side (day) and out of torchlight on their front side (night).



Some fascinating spin facts

Although we are standing on the surface of a spinning planet moving at about 1,600 km/h, we are not spun out into space because the force of gravity is greater than this centrifugal (out-throwing) force.

One regular change that all humans expect to find is that day follows night.

Day and Night - Teacher Notes

Heat and Light from the Sun

Roughly half of any 24 hour day, one half of the planet will be facing the Sun absorbing its heat and light and the other half will be facing away from the Sun experiencing night and cooler temperatures.

Quick question 1 Which senses could we use to find if day is warmer than night?
We could use our sense of touch to feel. Our skin has heat receptors. Some students may answer that we could use our eyes and ears to watch and listen to TV or radio to hear the weather report!

Quick question 2 If it is cold at night, what can we do to keep warm?
We can light fires, wear warm clothes and stay in shelter away from cold wind.

Quick question 3 Which senses could we use to find if day is brighter or lighter than night?
We can use our eyes to see. It is usually easier to see during the day.

Quick question 4 At night when it is dark, what can we do to see better?
We can put on lights.

These daily changes affect our everyday lives.

I Know Day and Night - Teacher Notes

I know that it is day or night when …..

Seat the students on the mat, preferably in a circle. They take turns to say how their senses will tell them if it is day or night. It is easier if you stick to one round of day followed by one round of night. Encourage the students to be descriptive, where possible.

Students this activity was trialed with made statements such as:

DAY

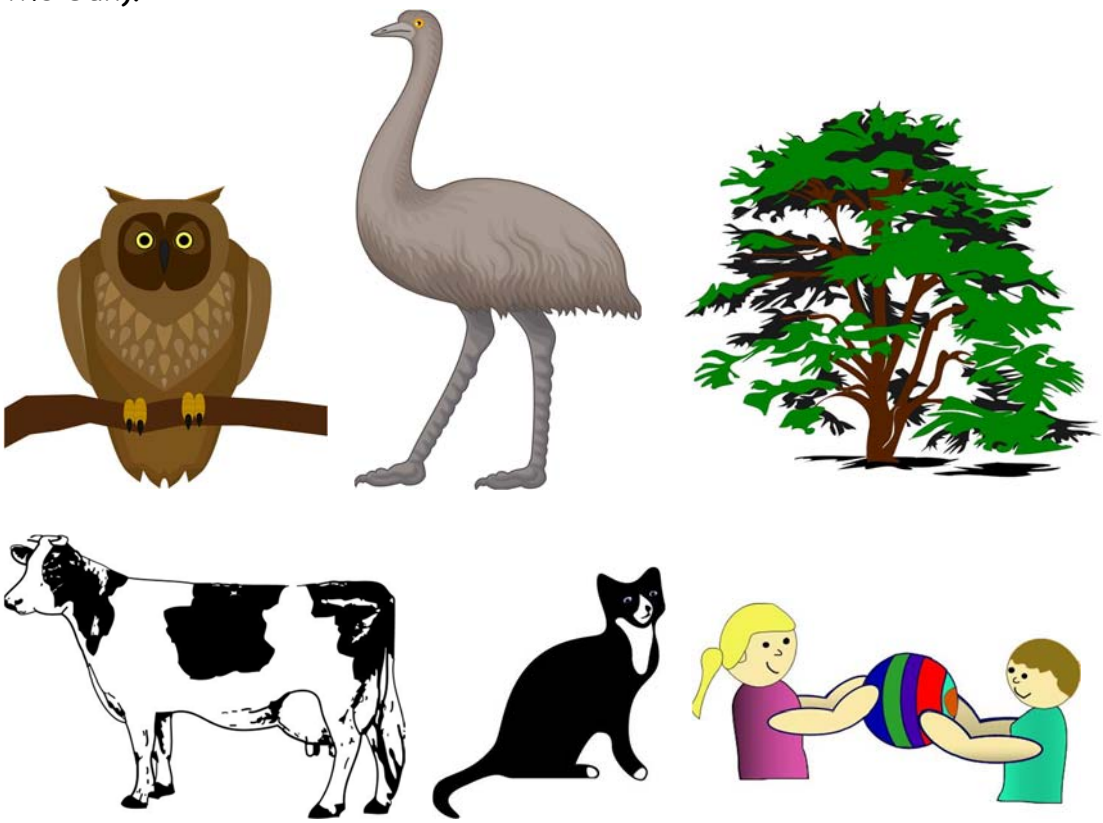
I know when it is day when I can ***see***	the Sun, school, my friends, clouds, light, flowers, rainbows
I know when it is day when I can ***smell***	Canteen, soap, school, my dog, dinner, sport
I know it is day when I can ***hear***	Traffic, school, bells
I know it is day when I can ***feel***	Football, bicycles, food
I know it is day when I can ***taste***	Breakfast, lunch, recess, crunch and sip, lollies

Night

I know that it is night when I can ***see***	Stars, streetlights, TV, my dad
I know that it is night when I can ***smell***	Pizza, dinner, my brother's shoes
I know that it is night when I can ***hear***	My family, TV, the air conditioner, dogs barking
I know that it is night when I can ***feel***	My bed, my pyjamas, my Teddy bear
I know that it is night when I can ***taste***	Pizza, toothpaste, water

Living Things – Teacher Notes

Another way that students may be able to distinguish day from night is by the living things they will see moving around at these times. In this activity you could use the accompanying worksheet and ask students to circle which living things usually move around during the day. Otherwise you could place picture cards around the room for students to select or project them up onto your Smartboard for students to discuss as a group.
Some classes may enjoy a discussion about what the term 'nocturnal means' and if plants move or not (many move a small amount towards or away from the Sun).

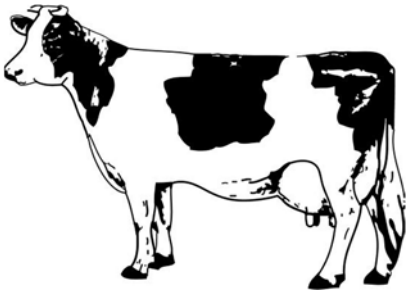


Owl – night Emu – mostly day Tree – does not move very much at all
Cow – day Cat – day or night Children – mostly day

Name _____

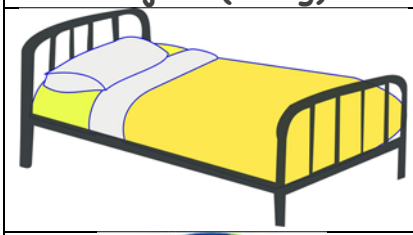
Living Things - Student Worksheet

Circle which living things usually move around during the day.



Things We Use - Teacher Notes

We use familiar objects at familiar times of the day.
Our weekdays tend to proceed in a similar pattern.
This activity asks students to think about when they would use each of these objects on a typical school day.

Object (Thing)	Morning		Afternoon	Evening	Used for?
	✓			✓	Bed for sleeping
	✓		✓	✓	Ball for sport
	✓		✓		Sandwich for lunch/recess
	✓				Sandpit for playing
	✓		✓		Schoolbag for carrying books etc. to school

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Things We Use - Teacher Notes

Quick question 1: How do you know when it is time to get up in the morning? What do you use to tell the time?
Alarms in radios, mobiles and clocks. Mum shouting "Get out of bed!".

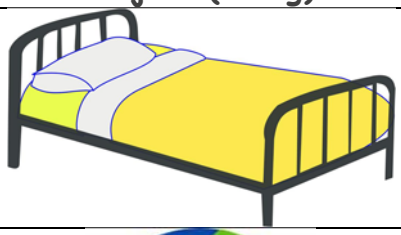
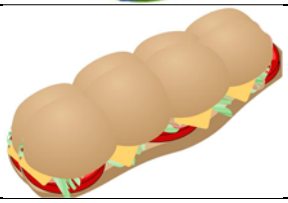
Quick question 2: How do you know when it is time to line up outside the classroom? What do you use to tell the time?
Bell, siren, teacher & other students.

Quick question 3: How do you know when it is time for lunch? What do you use to tell the time?
Bell, siren, teacher, classroom clock.

Name _____

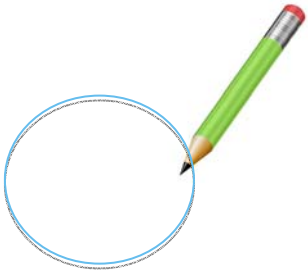
Things We Use - Student Worksheet

During a school day, when would you use ✓ these?

Object (Thing)	Morning	Afternoon	Evening	Used for?
				
				
				
				
				

What to Wear - Teacher Notes

Daily changes in the weather can affect what clothes we wear and how we behave.
Ask students to look at the picture provided and circle the places it shows how some students have stopped getting nasty sunburn on a hot sunny day.



Circled areas
Standing & sitting in the shade from buildings, umbrellas and trees
Wearing clothes which cover exposed skin such as long sleeved tops and long legged trousers/jeans and caps.

Quick question
What has not been shown in the picture which you should use before going out into the sun?
Sunscreen and you may need to put on sunglasses.

Quick question
How did Aboriginal people manage to avoid getting sunburnt when they moved around?
They stayed in the shade away from the heat of the midday sun.

What to Wear - Teacher Notes

Choose Your Clothes

Materials

- Worksheets
- Scissors
- Glue

Method

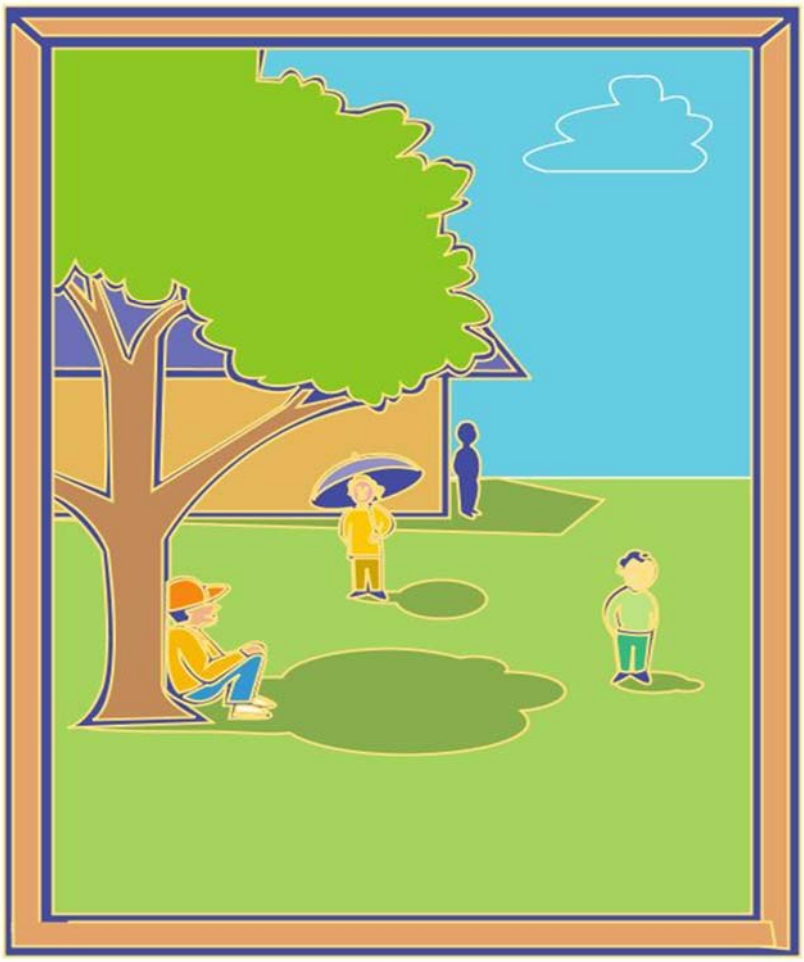
Students cut out the clothes best suited for each weather type and glue them into the worksheet.

Weather	Clothes
	
	
	

Name _____

What To Wear - Student Worksheet

Look at the picture and circle the places it shows students keeping out of the Sun on a hot day.



Name _____

What To Wear - Student Worksheet

On the weekend you can choose clothes to suit the weather. Cut out the best clothes to suit the weather and stick it onto the sheet below.

Weather	Clothes
	
	

Name _____

What To Wear - Student Worksheet

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"This is the Way" - Teacher Notes

You might want to share this lovely action song with your students which covers some of the things we explored when we looked at short term and daily changes.

"This is the way" - https://www.youtube.com/watch?v=4XLQpRI_wOQ

Students mime the activity as they sing the old song:

This is the way we rise from bed, rise from bed, rise from bed.
This is the way we rise from bed, all on a school day morning

This is the way we wash our face, wash our face, wash our face.
This is the way we wash our face, all on a school day morning.

This is the way we clean our teeth…
This is the way we put on our clothes…
This is the way we eat our breakfast…
This is the way we go to school…
This is the way we sit on the mat…
This is the way we put up our hands…

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I Know the Seasons – Teacher Notes

The seasons are an example of a longer term change that students will have observed.

I know that it is summer when …..

Seat the students on the mat, preferably in a circle.
They take turns to say how their senses will tell them which season it is. It is easier if you stick to one round of each season. I have given only two examples – winter and summer.
Students this activity was trialed with made statements such as:

Summer

I know when it is summer when I can ***see***	Cricket, swimming, suntans, freckles and hats
I know when it is summer when I can ***smell***	Cut grass, dust, fruit,
I know it is summer when I can ***hear***	Air conditioners, fans and surf,
I know it is summer when I can ***feel***	Heat on my skin, hot winds, sand, sunburn and cool sea
I know it is summer when I can ***taste***	Fruit, ice creams, and BBQ sausages and Xmas pudding

Winter

I know that it is winter when I can ***see***	People in jackets, rain, raincoats and skates
I know that it is winter when I can ***smell***	Paraffin heater and my brother's Ugg boots

I Know the Seasons – Teacher Notes

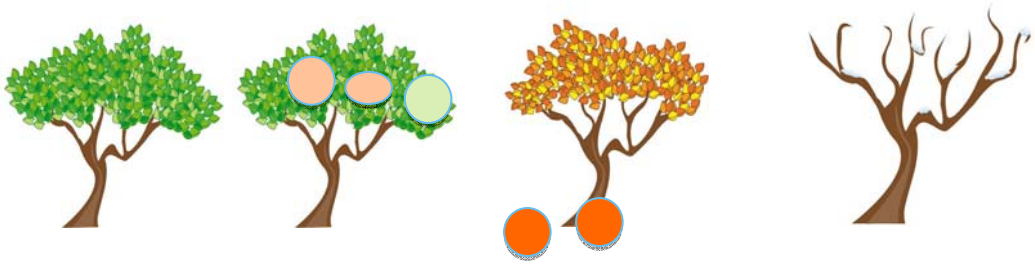
I know that it is winter when I can ***hear***	My teeth chitter together, winter storms
I know that it is winter when I can ***feel***	Cold, soreness in my toes and hot water bottles
I know that it is winter when I can ***taste***	Roast dinner, sour grass

Predictable Seasons - Teacher Notes

Weather describes short-term day-to-day changes in temperature, rainfall and humidity at a specific location. Seasons however describe long-term changes through the year. About 4.5 billion years ago a large object collided with the Earth. This blasted off some of our planet's surface to create our Moon. The impact also tilted the planet's axis by approximately 23^0 from vertical. Geographical position and this tilt towards and away from the Sun are responsible for our seasons.

Western Australia is part of a large continent with a variety of climates. It can be very roughly broken into four zones. In the north lies the Kimberley and Broome in a tropical zone with wet and dry seasons. The grasslands to the south of this surround the central desert zone and in the south and southwest lies a temperate zone. These areas have four seasons. Spring, Summer, Autumn and Winter.

The first sheet is designed for students living in temperate areas and asks them to draw on the trees to show how they would change across four seasons. How they will approach this will depend on the kinds of trees in their local area. If they are near fruiting and deciduous trees they will come up with something similar to our example below. If they are surrounded by Australian native trees (like Eucalypts) their drawings will likely show very little change (except for a period of flowering). Some students may recognise the classic autumn/winter leaf fall from television.



Spring	Summer	Autumn	Winter
Sowing season	Growing season	Harvesting season	Resting season

Predictable Seasons - Teacher Notes

Students may visit the school's veggie garden to guess which season they are experiencing now and how the planting of vegetables will change with the change of the seasons.

The second sheet is designed for students living in tropical zones with distinct wet and dry seasons.
The "wet" is also called the monsoon or cyclone season. Intense storms and high winds can cause damage and plans need to be made to prepare for them.

Dry season

After cyclone in wet season

Cyclone Safety

Most schools have their own cyclone plans which you can take your students through.

Most contain the following steps.

1. Prepare before the season starts by tidying away loose materials.
2. Stay inside and keep well clear of windows if there is a cyclone alert.
3. Shelter in the strongest part of the building (hallway, bathroom or cellar).
4. Have prepared emergency kits and plans.

Name _____

Predictable Seasons - Student Worksheet

Some trees change a lot in different seasons. Draw on the tree to show what it would look like in each season.

Winter

Spring

Autumn

Summer

Name _____

Predictable Seasons - Student Worksheet

We know that after the dry season is the wet season which may have cyclones. What will the palm tree look like during a cyclone in the wet season?

Dry season **After the cyclone**

People living in tropical areas need to keep safe during cyclones.

Nyungar Seasons - Teacher Notes

Below are some comparisons between European and traditional Nyungar use of seasons in Western Australia.

Month	European		Aboriginal (Nyungar)	
	Season	Use	Season	Use
January	**Summer**	Work, shop & school holidays, camp, swim and back to school. Conserve water and play cricket	**Birak**	Catch Bronze wing pigeons. Burning for regrowth to attract animals
February			**Bunuru**	Trap fish & collect seafood, tortoises and wattle seed.
March	Autumn	Work, shop & go to school. Rake up leaves. Conserve water. Watersports. Harvest grains and fruit.		
April			**Djeran**	Inland & estuary fishing. Collect bulbs & seeds
May				
June	Winter	Work, shop & go to school. Play football & netball. Collect rainwater Plant crop seed if there are good rains. Lambs born. Green leafy vegetables grow easily.	**Makuru**	Move inland for hunting. Sleep under skins.
July				
August			**Djilba**	Dig roots and tubers for food. Hunt emu, quenda and kangaroo. quandongs

Nyungar Seasons - Teacher Notes

Month	European		Aboriginal	(Nyungar)
	Season	Use	Season	Use
September	Spring	Work, shop & go to school. Royal Show & Grand Final. Wine Harvest. Collect rainwater.	**Djilba (cont'd)**	
October			**Kambarang**	Move to coast and collect seafood, yams and waterfowl eggs
November				
December	Summer	Summer holidays	**Birak**	Collect banksia flowers for sugar.

Local Aboriginal people are the best source of information about local seasons and names. Each area has different names and descriptions of their local seasons. These spoken calendars gave information on where hunter-gatherer people could find food and what the conditions would be like. They were very important for survival.

Pencil Puzzle - Teacher Notes

Miss Bloom is a wonderful teacher who expects students writing and drawing to be neat. At the beginning of each year she expects students to have new pencils and at the beginning of each week she asks students to sharpen their pencils.

This is how the new pencils look at the beginning of the year.

By the end of term 1 the pencils had changed.

Quick question 1: How had the pencils changed?
The pencils were all shorter.
They were not all the same size.
One had been chewed.
One had been splashed with liquid paper or white paint

Quick question 2: What do you think had caused these changes?
Weekly sharpening. Some students had sharpened them more than others (JW). Somebody had chewed one (JW). Somebody had spilled paint (GB)

Pencil Puzzle - Teacher Notes

If we notice that changes are happening in a fairly regular way, we can predict (make a good guess) what will happen next.

Quick question 3: How do you think the pencils will look at the end of the year?
The pencils will be shorter and more battered/used.

More predictions please!

At the end of this year, will you be taller or smaller than you are now?
Taller

Tonight, will it be lighter or darker than it is now?
Darker

What season will follow Spring?
Summer

If it rains, will you get wet or dry?
Wet (if you are outside)

As you grow older, will your shoe size get bigger?
Yes, but only until you are an adult and then it stays the same

Name _____

Pencil Puzzle - Student Worksheet

Pencils at the start of the year.

Pencils at the end of term.

How have they changed?

Little Rocks- Teacher Notes

For this series of activities you will need a number of small rocks. Some suggested suppliers of these are:

1. Egg sized rocks can be bought in bags from the garden section of your hardware store or florist. Ten dollars buys more than 25 rounded decent sized pebbles, most of which are imported from China. Many of these rocks were initially rounded river stones but have been polished by rolling them in a metal drum with steel balls. Polishing makes them easier to decorate but masks some of the rock's detail if you want to look for differences between rocks.
2. Collect rocks during the year from the yard, their garden, on the beach and almost anywhere except within National Parks.
3. Ask students to bring rocks from home, or, if their parents work somewhere else such as a Pilbara or Goldfields mine site, ask them to collect some for the class.

Suggest to students that their rocks must be able to fit into egg cartons. This makes them easier to count and tidy away.
Student's names can be written on the back of the rocks to prevent squabbles

Decorating the rocks

Eyes

Packets of sew-on and stick-on goggle eyes can be cheaply bought in craft shops and large shops. I flattened the sewing tab on the back with my thumbnail before applying good glue to the back and sticking it to the rock. The large eyes cost just over $1.00 for eight in 2017. Smaller eyes cost even less.

OR

Dip the blunt end of an old pencil into white paint and blob it twice onto the rock to make the white parts of the eye. A black permanent marker dot can be added after the paint has dried.

Eyelashes can be added using a thin permanent ink marker.

Ears, mouth etc.

Plasticine or modeling clay sticks on rock and is easier to shape than play dough.

Little Rocks- Teacher Notes

For teacher consideration and student safety.

Humans have used rocks for many purposes during the history of mankind. We have made tools of them, jewelry of them, used them to produce sparks to light fires, used them for shelter and for defense and aggression.

In many parts of the world children still use rocks as weapons. In my own semi-rural Scottish childhood we called rocks that fitted nicely in our hands "chuckies" because they were good for chucking or throwing.

The biblical story of David killing the giant Goliath with only 5 small stones and a sling is a fine example of this.

To be able to throw a rock effectively a person needs to be standing so they can use the strong muscles and tendons of the back and legs to add power to the arm. Our bodies act like a woomera and increase the power of forward thrust of the missile.

I heartily recommend that all of our rock based activities should be carried while students are either sitting at their desks or on the mat.

Rocks and Sand – Teacher Notes

Rocks are naturally broken down (or weathered) into much smaller fragments, containing minerals, in sand and soil. The nutrients found in rock mineral fragments are the basic food for all life on earth.
Polished or tumbled rocks are too smooth to crumble into sand.

Gneiss	Limestone	Sandstone	Banded Iron Formation
SW of WA	Mid west	Broome	Hamersley Ranges

The rocks above demonstrate that the colour (and chemistry) of the parent rock determines the colour of the sand. But of course, we as scientists will not accept this idea without experimenting and testing it.

Rocks and Sand – Teacher Notes

Rocks become rounder and smaller.
Our "little rocks" were once part of a mountain range. Falling downhill or being moved by wind or water, they have been tumbled into our rounded small rocks. If the rock had been left it would have been banged against other rocks until it was eventually sand. This may have been buried in the Earth and turned to rock again.

Since rocks can be very hard and take a long time to break down, I have used two pieces of brick. Limestone also works well.

Before **After**

Rocks and Sand – Teacher Notes

Materials per student group

- Newspaper to protect the desk and collect rock fragments
- Two pieces of each rock type to rub together. Well-weathered rock is ideal as it breaks down easily. Reasonably small pieces of broken rock such as sandstone, limestone and old brick are easiest to find.
  Limestone rubble can be found at the beach or where limestone walls have been built or knocked down. Most schools have retaining walls around sandpits and garden beds made of limestone.
  Sandstone fragments can be found at some garden centers.
  Brick in Australia is an artificial rock made from baking mud at high temperature in kilns, elsewhere in the world where hot molten volcanic rock has pushed its way through mudstone "cooking "it, it occurs naturally. Broken pieces of brick can be found on demolition sites.
  Garden centers can be good sources of other rocks.

Method

1. Cover desks with newspaper
2. Demonstrate how to rub rocks together safely. One piece of rock is held on the desk and the other grated over its surface
3. Each student in the group rubs the rocks together for a count of ten, then passes them on.
4. Students create rock fragments on the paper and compare them with the parent rock.

Tiny Teddies - Teacher Notes

Rocks moving against each other will become rounder as bits break off. Fragments left create sand and soil.
We will be shaking together tiny teddies in glass jam jars to copy what happens to rocks in rivers. To make things work faster we will be adding a few glass marbles.

Predict (good guess)
Which bits of biscuit do you think will break off first?
Any bump or outstanding part will be the first part to break off.

Materials per group

- Six Tiny Teddy biscuits
- One jam jar and lid
- Three marbles (optional)

Method

1. Retain three biscuits for comparison (Before/After)
2. Place three biscuits in jar and screw on the lid
3. The group takes turns to shake the jar for three minutes
4. Compare the shaken and unshaken biscuits
5. Draw any changes in the worksheet provided

Before After

Tiny Teddies - Teacher Notes

Initially the outstanding pieces of biscuit will break off quickly. As the biscuit becomes rounder the erosive process slows down. Soft rocks can be broken down in hundreds and thousands of years. Hard rocks can take millions of years. Through this process the surface of the Earth refreshes its soils.

Some soft rocks will break down to become sands and then with living plants and animals form soils very quickly, especially if the movement is fast and there are plenty of other rocks to bounce off.

Cutting or faceting jewels is a quite recent development. A similar process to our Tiny Teddies experiment was used by ancient jewelers as they rolled semi-precious stones in barrels with steel balls to give them a pleasing rounded "cabochon" surface.

Name _____

Tiny Teddies - Student Worksheet

Rolling rounder

Copying what happens to lumpy rocks in rivers

We will roll Tiny Teddy biscuits in a glass jar with marbles.

Before

After

Rock, Number and Shape - Teacher Notes

Little rocks can provide a physical context for Number and Geometry. You might like to gather your students into groups of five our more to complete these mathematics challenges with their decorated little rocks.

5 rocks can create a straight line

5 rocks can also create a circle

4 rocks can create a square and 3 rocks can create a triangle triangle

Other shapes can be made also (All that can be made by straight lines)

Rock, Number and Shape - Teacher Notes

Quick question 1: Which group has the longest line? This can be difficult to estimate but if all groups align one end and place the rocks edge to edge it is easy to see.

Quick question 2: Which group has the biggest rock?

Quick question 3: Which group has the smallest rock

Quick question 4: If you take away one rock from the group of four, how many shapes can you make with the remaining rocks? Two, a triangle and a straight line.

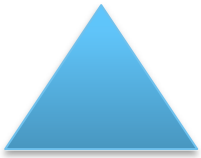
Quick question 5: How many shapes can two rocks make? One. A straight line.

Name _____

Rock, Number and Shape - Student Worksheet

Little rocks can make a straight line.

See if you can make your group's rocks into the following shapes.

			
Straight line	Triangle	Circle	Square

Draw your rock shapes below

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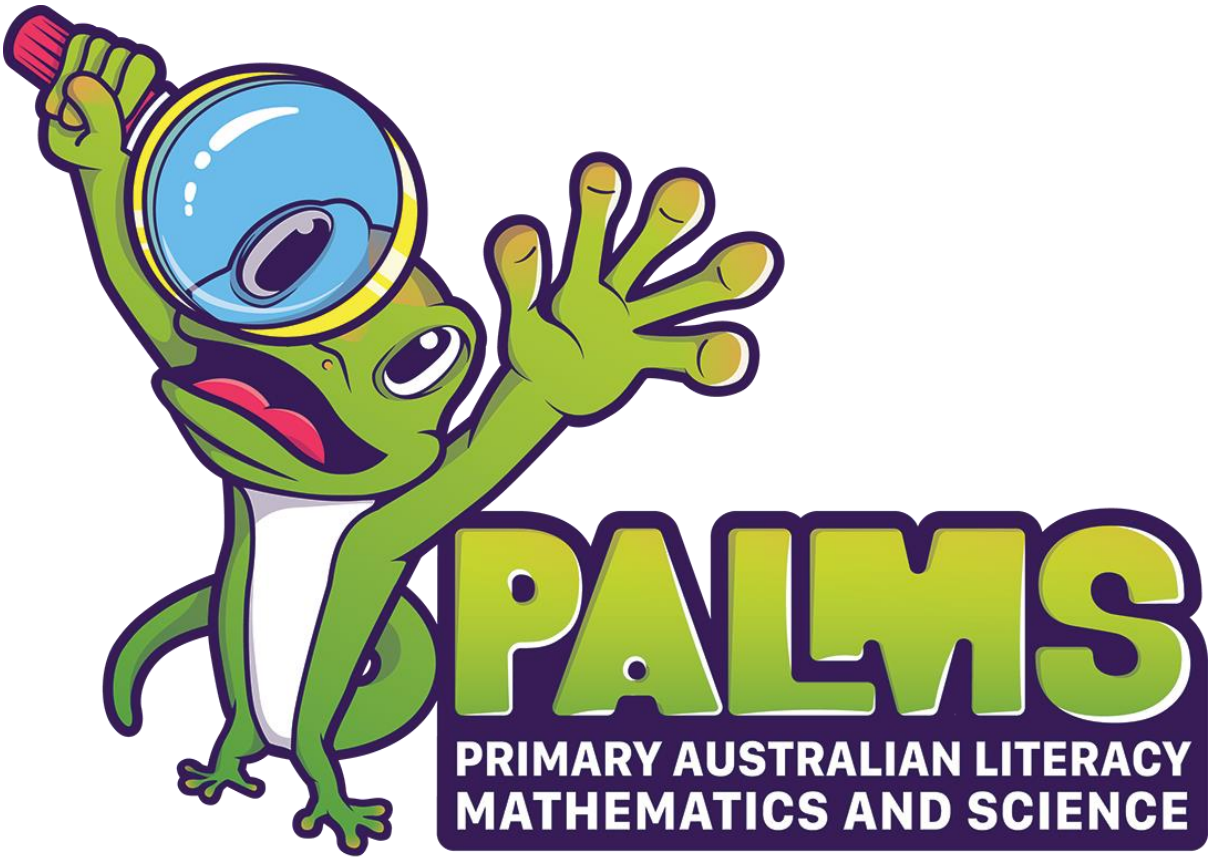

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