Our World Holiday Booklet # 3

Live the Learning!

The Night Sky from our backyard

These activities promote fun, engagement and the use of our heads, our hearts and our hands.

For students Year Prep to Three.

Please ask your parent to send a snap of the challenge project into our Facebook site:

Jacobs Well Environmental Education Centre.

We would love to see them.

The Night Sky from our backyard

Night Walk

****Parents required for this activity.

Try a short simple walk up the street or around the block at night. It is new experience at night. The streets are quieter. The sounds are different. You may even notice insects and wildlife you don't usually see during the day. Prepare ahead of time so your family is wearing the right gear for a night walk. From headlamps to reflective vests, everyone will be able to see and be seen and the kids will love gearing up for their big walk. Walk with parents on the footpath.

The Night Sky from our backyard

Scavenger Hunt

This is a fun flashlight game for children of all ages. Adapt the rules for younger children by making gameplay easier or teaming them up with an adult. Everyone needs a flashlight to play or players can be split into teams with each team leader given a flashlight. Hide items around the backyard e.g. pegs. When it's dark, let the kids use their flashlights to find their treasures.

The Night Sky from our backyard

Outdoor Movies

It would be great if we did have a projector for outside! But I think a laptop or large iPad or a tv on a table would work too! It's the novelty of the experience.

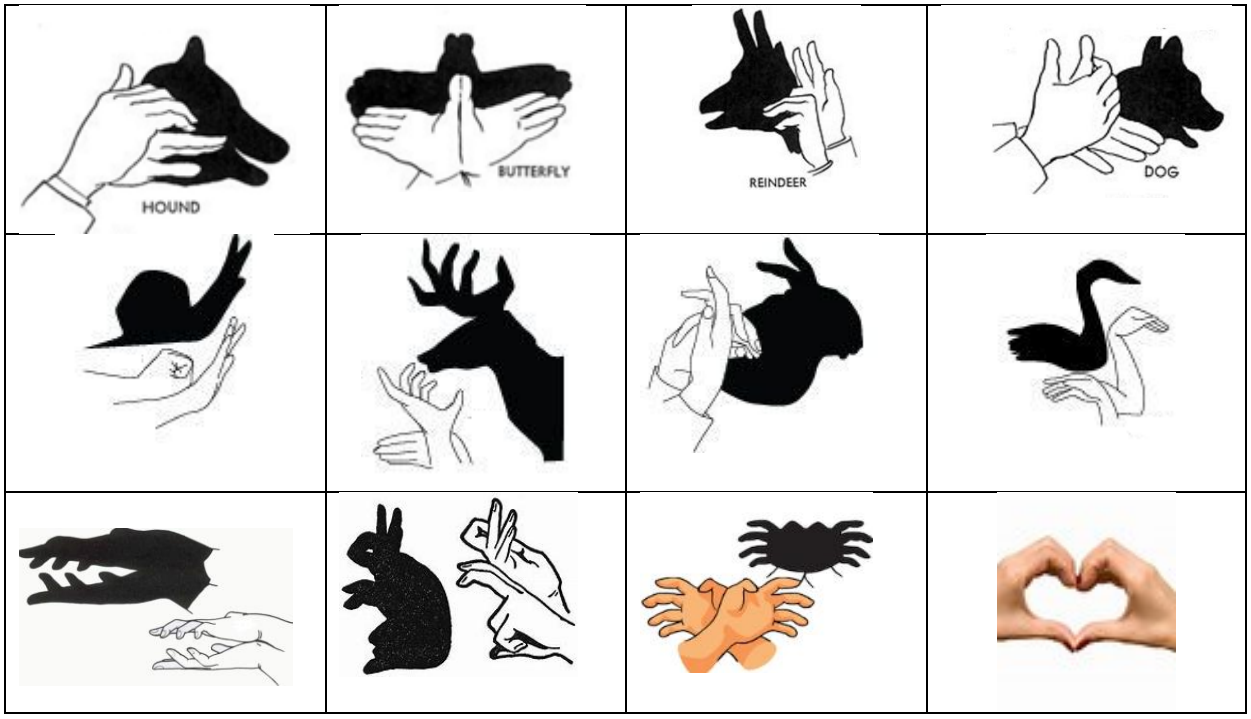
Put a blanket down, cushions and throw rugs to enjoy the experience – don't forget the popcorn, and maybe the mozzie spray.

The Night Sky from our backyard

Making shadow puppets

Any list of nighttime activities for kids wouldn't be complete without mentioning shadow puppets. Grab a flashlight or other low light source and light up a wall in your backyard. You've probably got a great rabbit shadow puppet but can you do a swan or dog? Learn how to make great shadow puppets so you can teach your kids. Your family's in for the ultimate puppet show.

The shadow puppet challenge. Cut up these cards. Shuffle and put upside down in a pile. When it is your turn, pick a card and try to make this shadow puppet. See if your family can guess what it is.



The Night Sky from our backyard

Stargaze

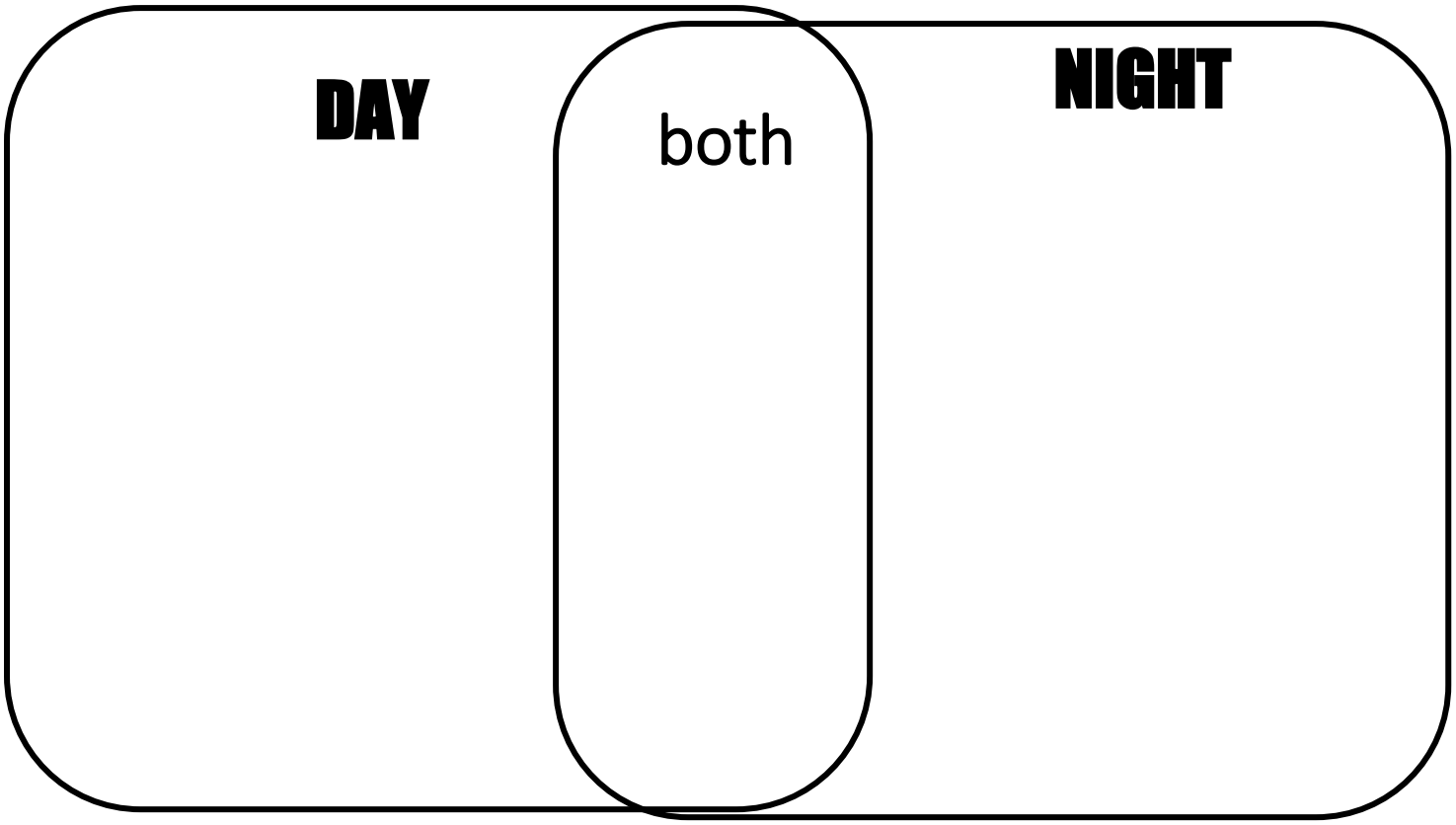
Big and little kids are fascinated with the night sky, which makes stargazing one of the top nighttime activities for kids. Teach them about space and astronomy when you plan a night of stargazing for your family. Pick any night when the sky is clear or check the calendar to find specific dates for expected meteor showers, new moon phases, full moons, and more.

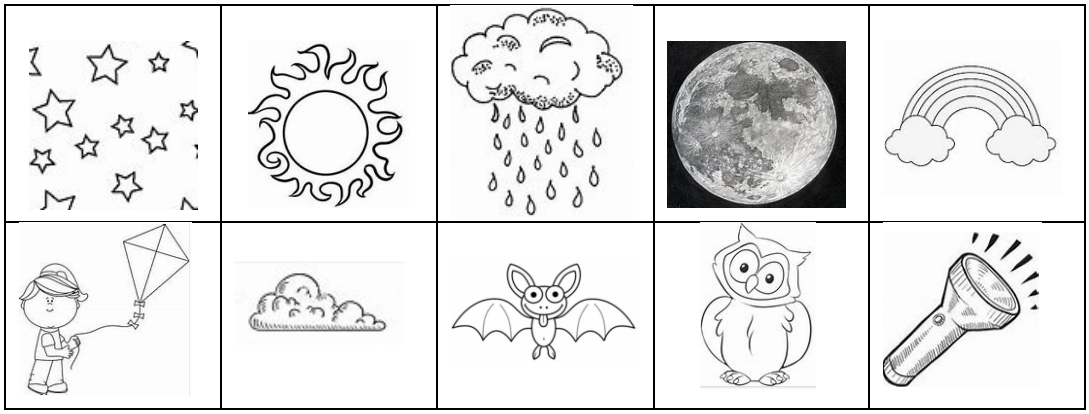
The Night Sky from our backyard

What is in the Night Sky

There are differences between the Day and the Night. Let us see if you can work out the differences.

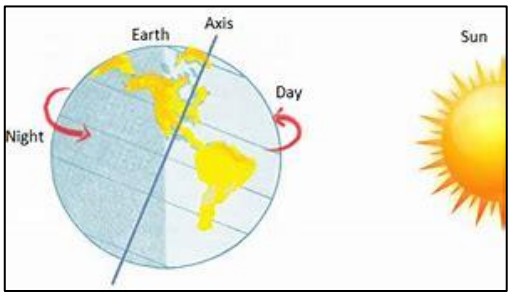
Direction:	You will need:
1. Cut out the objects below 2. Stick the object in the day, night or both	• Scissors • Glue • Coloring pencils





The Night Sky from our backyard

Explaining Night and Day



Use the following words to complete the text.

light	*24*	*Solar system*	*axis*	*daytime*
Night-time	*sphere*	*centre*	*heat*	*star*

1. The Earth is a _____ shaped planet.
2. The Sun is a _____, an unimaginably large ball of gas.
3. The Earth and the Sun are part of our _____ .
4. The Sun is located at the _____ of our solar system.
5. The sun is important because it produces _____ and _____ for the Earth.
6. The Earth slowly spins around it's _____.
   An axis is an imaginary line an object turns around. This imaginary line runs directly through the Earth's centre, from the north to the south poles.
7. It takes the Earth _____ hours to complete one full turn.
8. As the Earth rotates, the sun's light shines on the Earth. The side facing the sun will have light and it will be _____. The side facing away from the sun will have no light, therefore it will be _____.

The Night Sky from our backyard

Modelling Day and Night Challenge

Use the following household objects, to model Day and Night. Try to teach another member of your family about how night and day occur.

The Night Sky from our backyard

Nocturnal Animals

nocturnal - belonging to or active during the night;

These animals that are nocturnal.

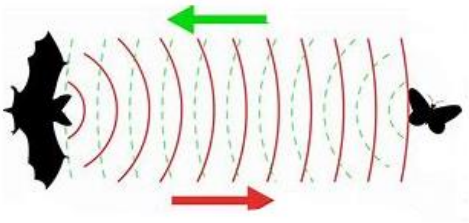
Moth	Possum	Owl	Mouse	Bat	Fox

Write in name below each creature below.

					
_____	_____	_____	_____	_____	_____

The Night Sky from our backyard

Going Batty: Echolocation box



Bats are **nocturnal** as they are active at night.

Bats have a problem: how to find their way around in the dark. They hunt at night, and cannot use light to help them find prey and avoid obstacles. Bats find their way in the dark using echolocation—sending out sound waves and listening for their echo. Sound waves reflecting off an object back towards the bat can indicate the position of an obstacle to be avoided, letting the animal change its course

The following activity will help you explore how echolocation works.

Materials:

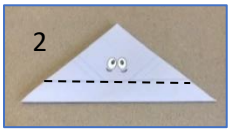
- parent
- shoe box lid
- marble
- blindfolds

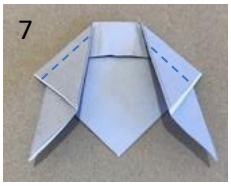
Directions:

1. Blindfold your child
2. hold the two ends of the box lid, rolling the marble back and forth.
3. The blindfolded child tries to listen to the ball rolling and then tries to grab it using only the sound.
4. Explain to child:
   Like echolocation, the sound is the only thing they have to "see" where the ball is rolling just like a bat.

Going Batty: Batty Bookmarks

Reading is a great activity to do before going to sleep at night. Mark your page with a little batty bookmark.



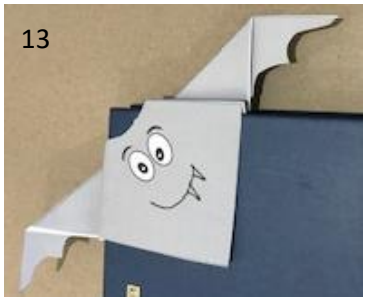


You will need:

- Black paper (square)
- Embellishments (white paper, pink paper, pens) (optional)
- Glue stick (optional)
- Scissors

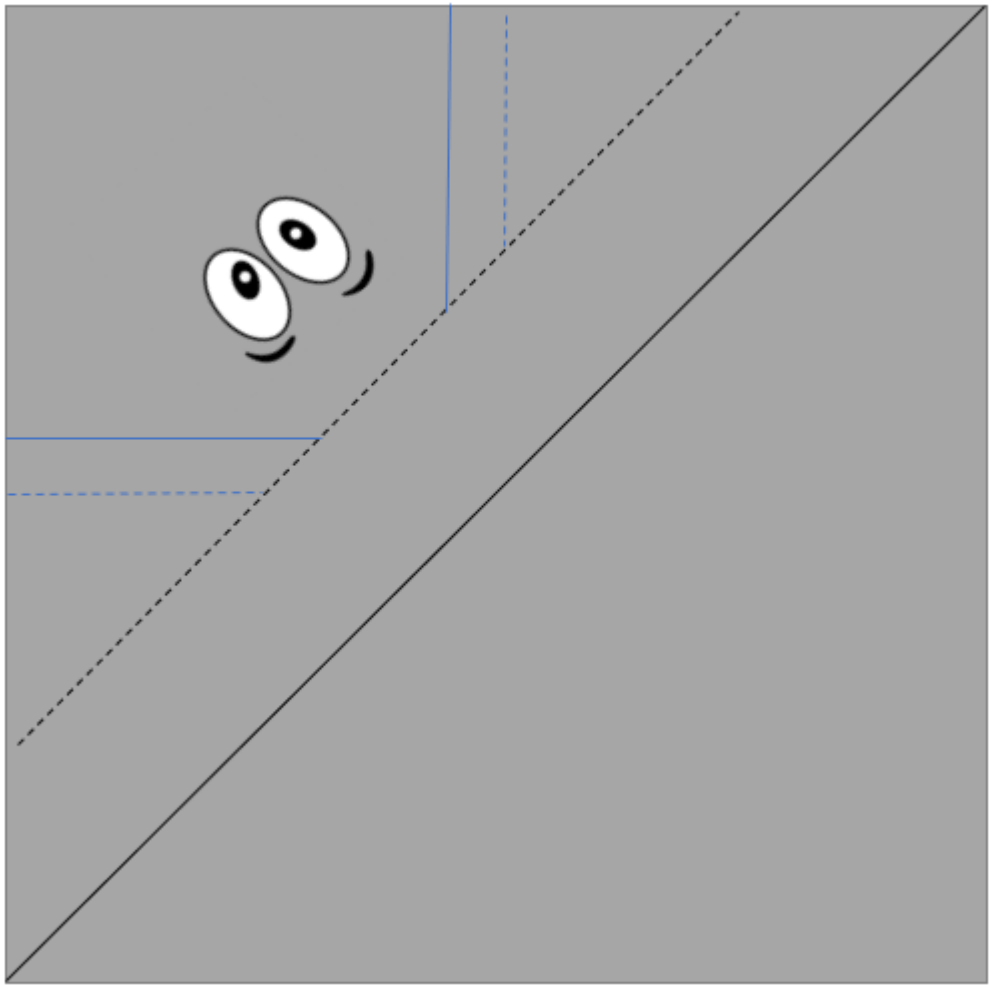
Directions:

1. Carefully cut out template on next page
2. Fold along diagonal black line ——— with colour on the outer side.
3. Position paper so you are looking at the face
4. Fold on the black dotted line ----------
5. Position paper so you are looking at the face
6. Fold wings back along the blue solid line ———
7. Turn paper over to see back
8. Fold wings back up along blue dashed line ----------
9. Turn over to see face.
10. Cut curves on wings
11. Cut top of head
12. Draw in smile with teeth.
13. Place on the corner on a page of your favorite book.



Note: Try with black card if you have some and simply follow the directions. Make your own eyes on white paper and cut and stick.

Going Batty: Bookmark template



What do you know about the Moon?

Write some words/facts/thoughts under the following headings to record what you already know about the moon.

When do you see it?

Does it move?

What shape is it?

What colour is the moon?

Things found on the moon?

Facts you know?

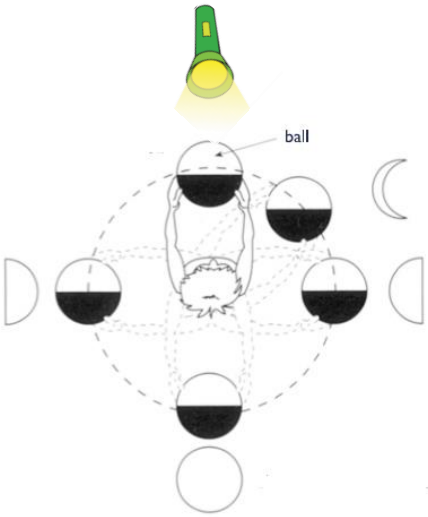
The moon has lots of different shapes.

Find different items around your house that have the same shape as the moon. Draw and label below.

 A chili			

Modelling the phases of the moon

The moon changes its shape almost every night. But why? The phases of the moon are caused by the light from the sun, and the moon's orbit around the Earth.



Materials:

- Mum or Dad with a torch
- a pale-coloured ball about 8–12 cm in diameter
- ruler and sticky tape
- preferably at night

Method:

1. Sticky tape the ruler to the back of the ball.
2. The student stands facing parent holding torch - holding the ruler with ball at arm's length, just above head height
3. The student stays in the same spot and pivots, preferably clockwise (see the diagram below).
4. When the ball is in a direct line between the torch and the student (at 12 o'clock), the ball is illuminated on the other side but not visible to the student.
   This is a New Moon.
5. The student must continue to hold ball out in front and continue to look directly at the ball. Rotating slightly clockwise (to 1 o'clock) some of the light shining on the ball will become visible.
   This is the shape of the young Crescent Moon.
6. When the student continues in a clockwise direction until they are at 3 o'clock.
   Now a Quarter Moon is visible.
7. When the student is in a direct line between the torch and the ball (at 6 o'clock) the half of the ball facing the student is lit up.
   This creates the shape of a Full Moon.
8. If the student continues in a clockwise direction (to 9 o'clock) where the students' right shoulder is facing the torch.
   A Quarter Moon shape becomes visible again.
9. If the student continues to rotate clockwise back to start at 12 o'clock, the cycle will be repeated.

Watch this great video. Phases of the Moon: Astronomy and Space for Kids – FreeSchool
https://www.youtube.com/watch?v=f4ZHdzl6ZWg

Phases of the moon

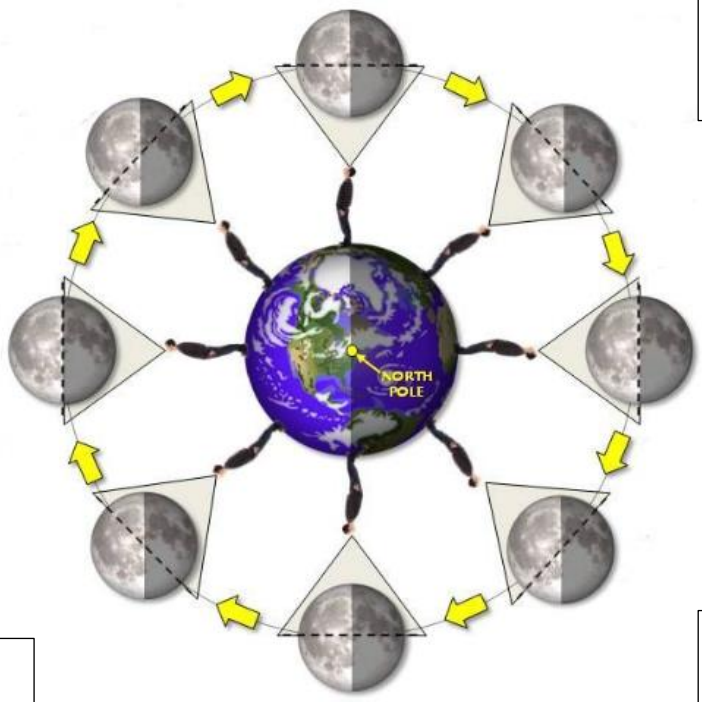
Remember as the moon orbits around the earth, it lets us see more or less of its surface lit up by the sun. See if you can use the illustration below to work out what phase of the moon, the man can see at each position. Cut and Paste.

3

2

4

Waxing Gibbous



1

5

8

6

Waning Gibbous

7

Full Moon

Last Quarter

New Moon

First Quarter

Waxing Crescent

Waning Crescent

The Night Sky from our backyard

Phases of the moon – Answers Page 11

1. New Moon
2. Waxing Crescent
3. First Quarter
4. Waxing Gibbous
5. Full Moon
6. Waning Gibbous
7. Last Quarter
8. Waning Crescent

The Night Sky from our backyard

Waxing and Waning

Consider the terms- 'waxing' and 'waning'. Use a dictionary or word search to write the definitions below.

Waxing

_____

_____

Waning:

_____

Draw a line to connect the term --to the correct explanation-- to the correct diagram.

Waning Moon	The moon is 'growing', or getting larger. Part of the lunar phase, where the moon was dark (new moon) and becomes it's brightest (full moon).	
Waxing Moon	The moon is 'shrinking', or getting smaller. Part of the lunar phase, where the moon was its brightest (full moon) and now is becoming darker.	

Let's look at our Moon. A Moon Record sheet

From our activities we now know that the lit area of the moon changes shapes. Each day the moon appears to change shape allowing us to see different amounts of the lit part as the Moon orbits Earth. Below is a record sheet to put up on your fridge. Look at the moon each night and draw what you see. Don't forget to record the time as well.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Date: Time:	Date: Time:	Date: Time:	Date: Time:	Date: Time:	Date: Time:	Date: Time:
Date: Time:	Date: Time:	Date: Time:	Date: Time:	Date: Time:	Date: Time:	Date: Time:

The Mosaic Moon

The moon is one of the most beautiful objects in the Night sky. We can create this beautiful mosaic moon for our room.

You will need:

- A parent to help you
- Black card if you have some
- Scissors
- Sticky tape, wide is best
- Buttons
- Beads
- Glitter

Directions:

1. Print the design found on the next page on to black card stock paper or paper. Even though it is black on black, you will be able to see it well enough.

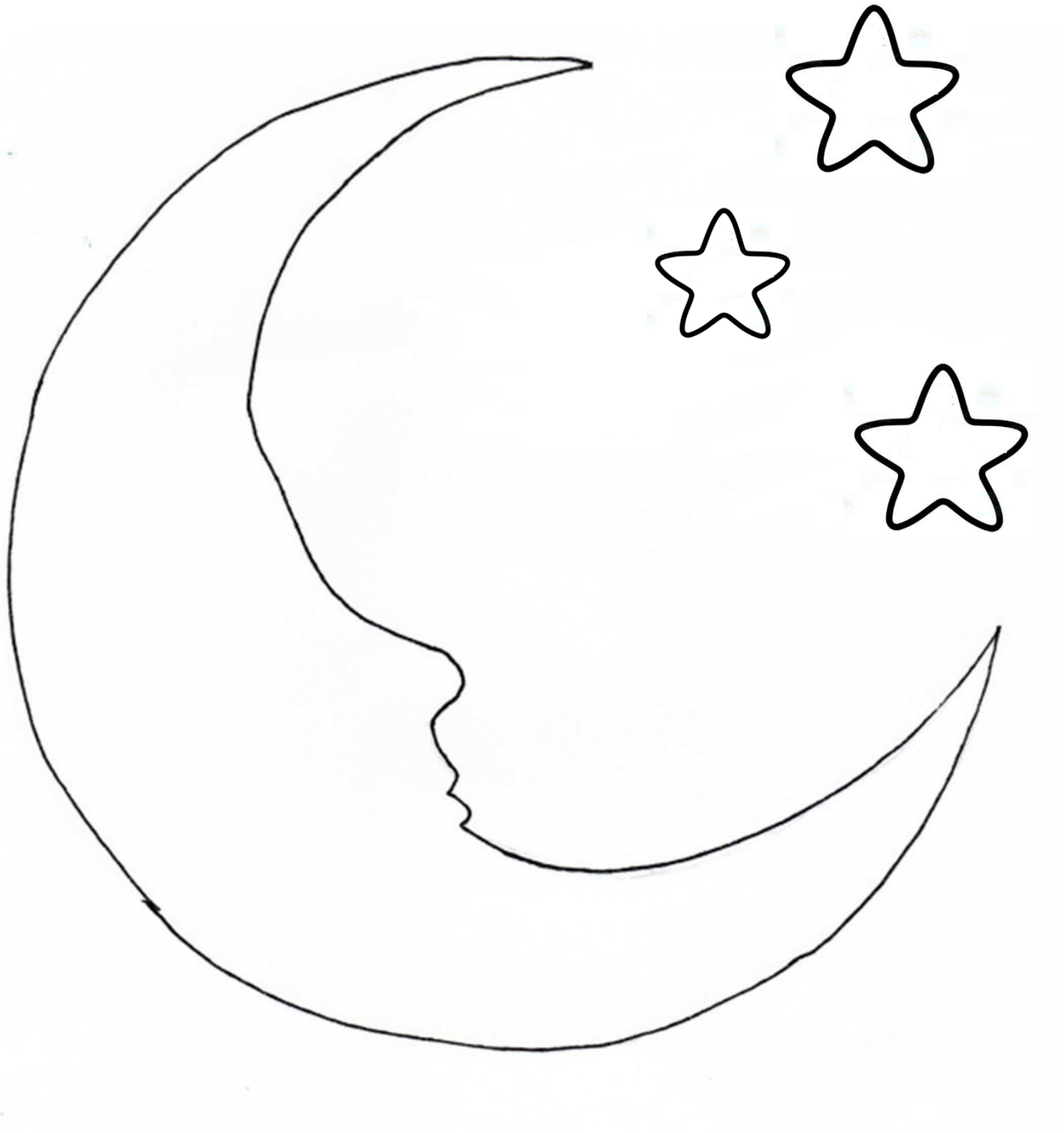
2. Ask your parent to help you cut out the picture.

3. Apply strips of tape to the back of the paper so that their sticky surface is exposed in the cut outs.

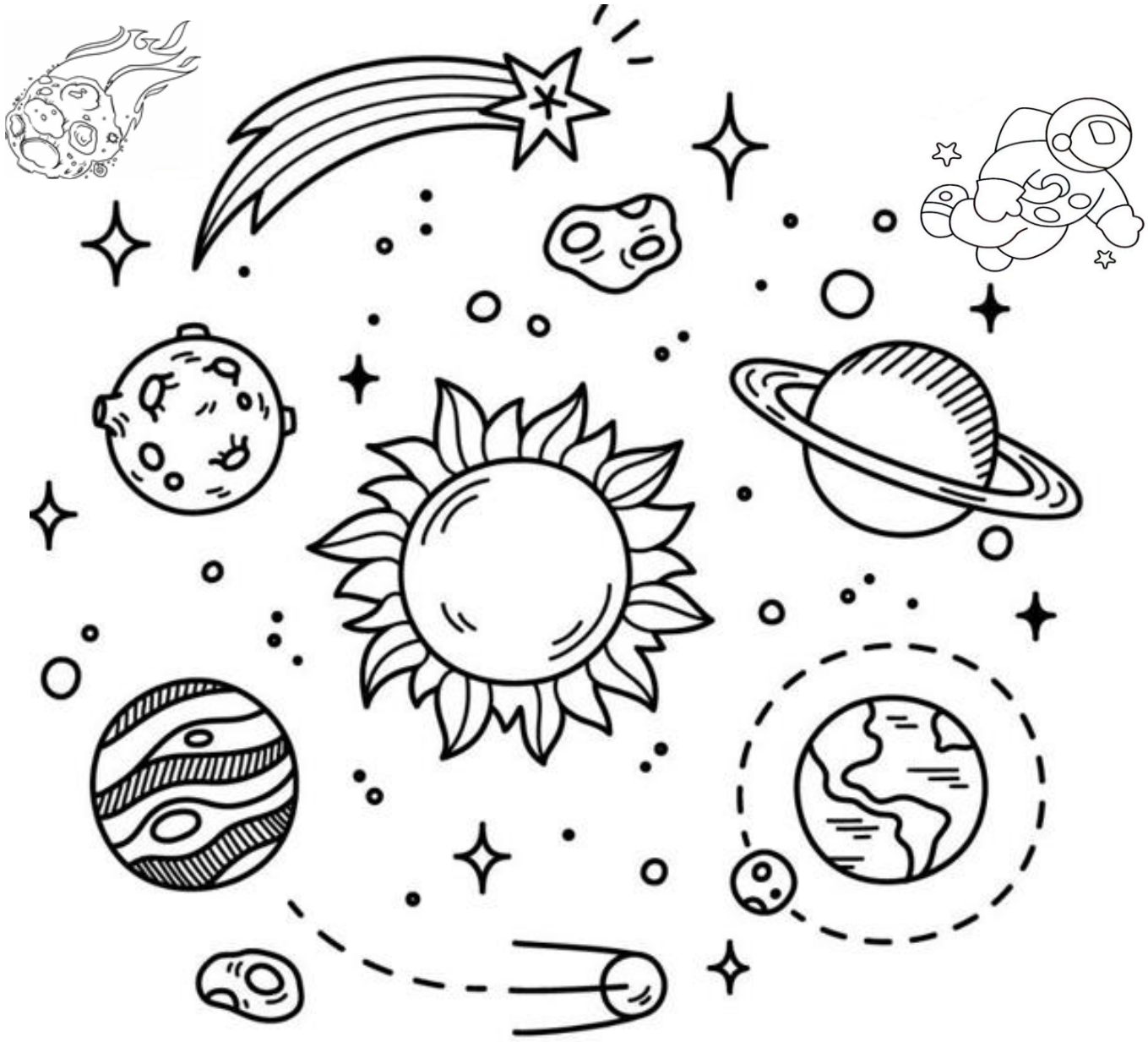
4. Collect buttons and beads in a bowl. Get buttons of various shapes and shades. Of course, if you are doing this craft with little kids, make sure that they are past the stage of putting things in their mouths and stay close, just in case.

5. Place any beads and buttons onto the sticky surface, defining the moon silhouette.

6. Add a little glitter on to the spaces if you have some.



Our Solar System



What do you know? Write down all the words associated with the Solar System picture above.

●	●	●
●	●	●
●	●	●
●	●	●

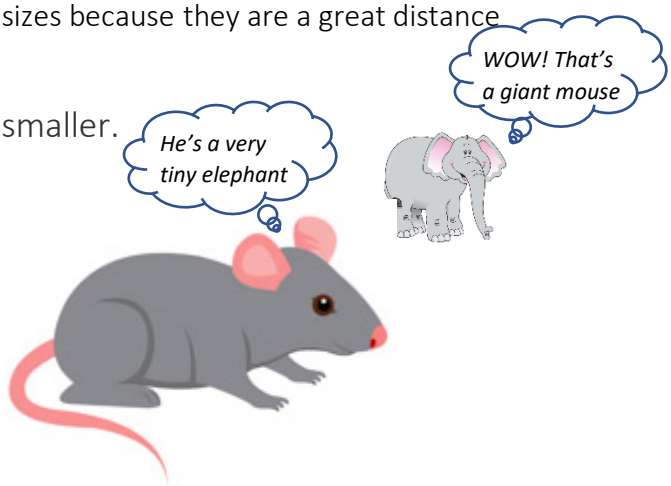
Whatever space words you can think of - Comet, Earth, Planets, star, shooting star, meteor, moon, Saturn, sun, astronaut, rings of Saturn, orbit, space, galaxies

Stars – How big are they?

Our sun is a medium-sized star – but it is still enormous! You could line up 109 Earths across the face of the sun.

But it doesn't look enormous?? And that is because it is a long way away. If you travelled at 100 km/h on a straight highway between your current position and our sun, it would take about 170 years to reach our sun.

The size of stars in the night sky may appear different sizes because they are a great distance away from us.



Let's test how distance can make objects look smaller.

Materials:

- Parent to supervise/assist
- camera/phone
- a ball - soccer/basket ball

Directions:

1. Take a photo of the soccer ball beside the students' head from a distance of 0.5m.

2. Select a suitable area such as an oval or footpath for placing and viewing the chosen balls for both near and far viewing.

3. Parent should place the ball on the ground and position the child about 2m away.

4. Take a photo of the child's head again from 0.5m away with the soccer ball in the distance. The child's head should remain the same size in the photo

5. Repeat the photo again at 5m and then 10m.

6. Review the photos

7. What happens to the size of the ball in each photo. From beside your head, at 2m, 5m and 10m away.

Discussion:

Is the ball actually getting smaller? *Why does it look smaller in each photo?*

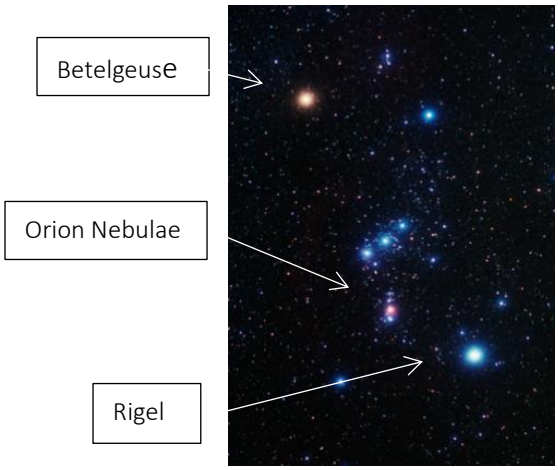
Does your head get smaller in the photo? *Why not?*

Think about planes in the sky – do they look smaller because of distance as well?

Think about the actual size of stars …They are so very far away …They must be huge!

Constellations – Stories written in the stars.

A constellation is simply defined as a **recognisable group of stars** that are placed together as imaginary patterns or outlines in the night sky.



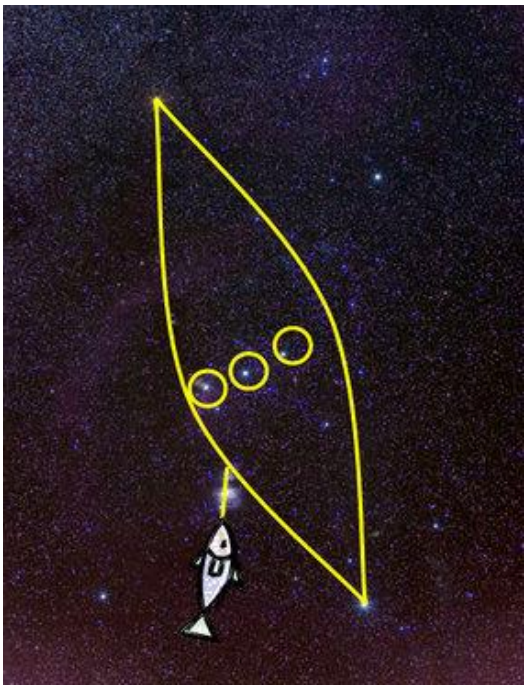
This is one group of stars in our night sky. You may know it?

Since the earliest times, people have looked for patterns in the stars. Most constellation names are from the Roman empire, but their meanings often originated in the distant past of human civilization.

This group contains two bright stars called Betelgeuse and Rigel. Betelgeuse is a star nearing the end of its life. That why it is red and known as a red giant. Rigel is a blue supergiant and is one of the brightest stars in the night sky.

Djulpan – An Indigenous dreamtime story.

Aboriginal people have been described as 'the world's first astronomers'



To the aboriginal people in the Northern Territory these stars represent the constellation known as Djulpan. In Arnhem Land the Aborigines of Yolngu speak of the time when three fishermen, who belonged to the kingfish totem, spent several days at sea trying to catch fish. They were successful, but only in catching a kingfish, which they could not east since it was their totem of their people. They were worried for their children would go hungry if they did not return with some fish. In desperation they decided to break the taboo against eating kingfish. They resumed fishing and soon caught two more kingfish. The sun, angered that they would kill and eat their totem, called upon the clouds, the sea and the wind to create a gigantic waterspout. It was so powerful that it whirled the three fisherman and their canoe into the sky.

To this day, the three stars in Orion's belt are the fishermen sitting side by side, with the stars Betelgeuse and Rigel marking the front and back of the canoe. And if one looks very carefully, stars in Orion's nebula represent the three fish hanging from the canoe.

Orion, the Hunter – An ancient Greek Myth.

In Greek mythology, there was a poor farmer, a kind man who frequently helped strangers even though he had nothing. One day he helped three unusual strangers. He did not know that they were the gods Zeus, Neptune and Hermes. In return for his kindness he was granted one wish. The farmer, who was childless, asked to have a son. The wish was granted and Orion was born. Orion grew up and became a superb hunter for he had been blessed by the gods, but as he became more and more famous as a great hunter, he also became insensitive to the animals he hunted. He actually enjoyed the killing of an animal. He did not hunt and kill for necessity. He was so unfeeling about the life of animals that Artemis, the goddess of hunting, sent a giant scorpion (Scorpius) to attack him. He was stung and about to die when a healer gave Orion an antidote which saved his life. When Orion recovered, he realized after being so close to death, how precious life is and how pitiless and uncaring he had been. He repented and there fore was placed in the heavens with the scorpion whose sting had taught him that all life is precious.

The Australian flag – the Southern Cross

The Australia flag contains part of the Southern Cross (Crux) which is a well-known pattern of stars in the Southern Hemisphere.

Among the indigenous people of Australia is the belief that a giant eagle lives in the sky and one can see its footprint among the stars of Crux. It nests in the dark patch of sky next to the Crux called the Coalsack.

The Zulu people of South Africa conserved the Southern Cross as the "Tree of Life' for it helped those walking in dangerous bush country at night to find their way home.

A Constellation Projector

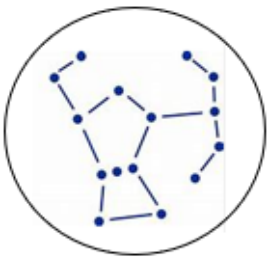


You will need:

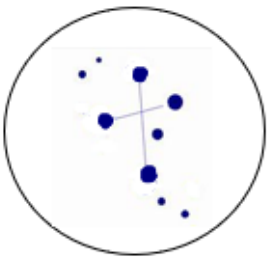
- Printable Constellation Cards below
- Light source: Smart Phone, Flash Light
- Push pins
- Clip wrap roll etc
- Tape
- Cardboard

Directions:

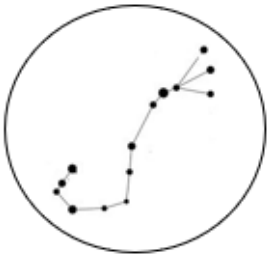
1. Better to print onto cardstock if possible -will hold up better to manipulation
2. Place the print out on top of a piece of Styrofoam or cardboard to protect your working surface.
3. Then, give your child a push pin and instruct them to poke holes at each dot (dots only) in the constellation formations.
4. Once your holes are punched, cut out the circle cards and affix them with tape to the top of a paper roll. Write name of constellation on side of roll
5. Last, tape the paper roll to your light source and project your constellation on the wall.



Orion



Southern Cross



Scorpio

Musca, the fly

Meteors, asteroids and comets information

Meteors

A meteor or 'shooting star' is not a falling star at all, but a streak of light in the sky produced as a meteoroid enters Earth's atmosphere. A meteoroid is made of stone or metal and is smaller than an asteroid. It can be any small body travelling through space which, when it meets Earth's atmosphere, is heated to the point where it vaporizes, thus becoming a meteor. If such an object collides with the Earth, it is called a 'meteorite'. Scientists have strong evidence that some immense meteorites in the past have landed upon Earth. They believe some meteorite impacts have generated immense clouds of dust and heat. The heat may have penetrated up to a kilometer into the Earth's crust, boiled off surface water, removed most of the atmosphere and sterilized the surrounding area. The dust is believed to have been sufficient to block out the sun. Such an event may have killed off the dinosaurs.

Asteroids

An asteroid is one of many minor bodies orbiting the sun, mostly between the orbits of Mars and Jupiter. Asteroids may be fragments of a shattered planet or, more likely, leftovers from the formation of the planets. Some asteroids are also believed to be 'dead' comets. An estimated 2000 different asteroids may cross Earth's orbit at some time. The largest known asteroid is Ceres, with a diameter of more than 900 kilometers. Asteroids may be made of many different materials; however, the most common are ices and rocks. The rocks may be similar to Earth's rocks, or be made of iron-nickel compounds.

Comets

Comets are huge balls of ice mixed with pebbles and rocky materials, like dirty snowballs. They orbit the sun with highly elliptical orbits that bring them both very close to the sun and deep into space, often beyond the orbit of Pluto. Comets have a central solid nucleus surrounded by a misty mass (the coma) that forms a tail. The tail is always directed away from the sun. No-one knows how comets were formed, but they seem to pre-date the formation of the solar system. Comets that impacted with Earth early in its development are believed by scientists to have provided the organic material and water from which life as we know it developed. Some comets, such as Halley's, are 'short period' comets, with an orbital period of only about 76 years. Others are 'long period' comets, which take thousands of years to complete an orbit.

How are Craters Formed?

There are many craters on the Earth and on the Moon. These craters have been formed by the impact of a meteorite or by volcanoes.

Impact crater

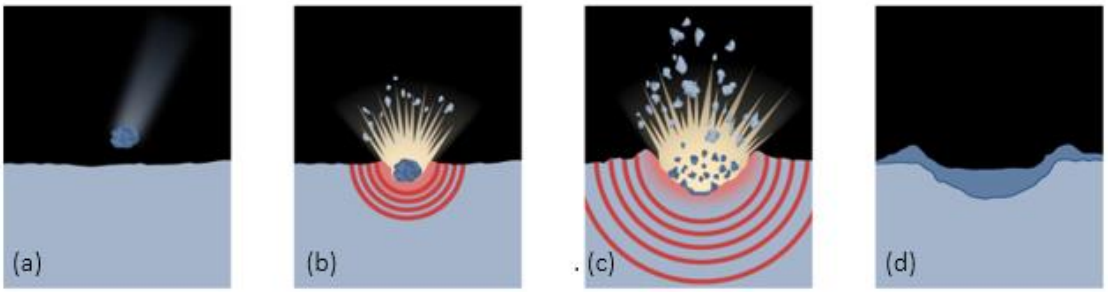
Volcanic Crater

Look at the pictures above and answer the following questions.

Read questions ✓yes ✗ no	Impact	Volcanic
1. Is found on the top of a mountain?		
2. Is found on flat land?		
3. Has steep sides?		
4. Seems more open with a flat bottom?		

Formation of an Impact Crater on the moon.

Let's consider how an impact at these high speeds produces a crater. When such a fast projectile strikes the moon, it penetrates two or three times its own size before stopping. During these few seconds, its energy of motion is transferred into a shock wave (which spreads through the planet) and into heat (which vaporizes most of the surrounding area). The shock wave fractures the rock of the moon, and generates an explosion similar to that of a nuclear bomb detonated at ground level. The size of the crater formed depends firstly on the speed of impact, but generally it is 10 to 15 times the diameter of the meteorite.



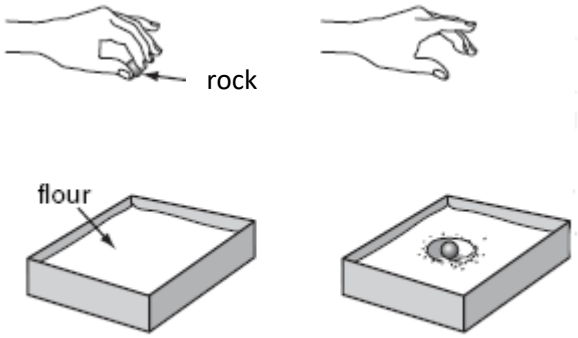
Stages in the Formation of an Impact Crater. (a) The impact occurs. (b) The projectile vaporizes and a shock wave spreads through the lunar rock. (c) Ejecta are thrown out of the crater. (d) Most of the ejected material falls back to fill the crater, forming a shallow crater.

Fair Testing: Making craters

After reading about impact crater formation. Let's test some of the information present on page 20.

You will need:

- A container with sides about 10cm high
- Flour
- 3 x different sized rocks. (Not too big)
- Ruler, pencil and worksheet
- You will need to do this experiment outside so you don't make a mess



Hypothesis idea: *As the size of the rock increases so does the size of the crater.*

Method:

1. Drop the smallest sized rock from a distance of 30cm
2. Drop it three times into the flour, away from each drop
3. Measure the size of the opening of each crater, record measurement.
4. Smooth flour.
5. Add up each crater measurements for rock #1 and divide by 3 to get the average.
6. Repeat 1,2,3, for rock #2
7. Repeat 1,2,3 for rock #3.
8. Compare results

Rock #	Drop 1 (mm)	Drop 2 (mm)	Drop 3 (mm)	Average (mm)
#1				
#2				
#3				

Conclusion:

Write about what you noticed. Did the smaller rock make a smaller crater?

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Further investigations: You could drop one rock from different heights. I wonder what might happen. Use a 1-metre ruler or some rulers taped together to measure the different heights.

Craters on the Moon

Even as seen through a good pair of binoculars, we can observe the Moon's surface. When the moon is in first or third quarter, the sunlight streams in from the side, helping us to see shadows of its features.

At a full moon, it can contrast bright and dark areas of the moon. Several of the large craters seem to be surrounded by white material - like streaks or rays, that stretch for hundreds of kilometres across the surface are clearly visible. These lighter features are materials, splashed out from the crater-forming impact.

Moon Crater Art:

Materials you will need:

- -black sheet of cardboard
- -white crayon
- -cereal bowl (to trace the Moon shape)
- -white paint
- -flour
- -paint brush
- -Empty bottle with plastic cap on it
- empty water bottle, a small rock
- -star stickers

Directions:

1. Trace your cereal bowl onto your black paper with the white crayon.

2. Mix together white paint with flour until it is the consistency of cottage cheese, and paint that onto your Moon circle.

3. While the paint is still wet, press your circular plastic cap or rock onto your Moon all over to create even more texture.

4.Then let the paint dry completely overnight.

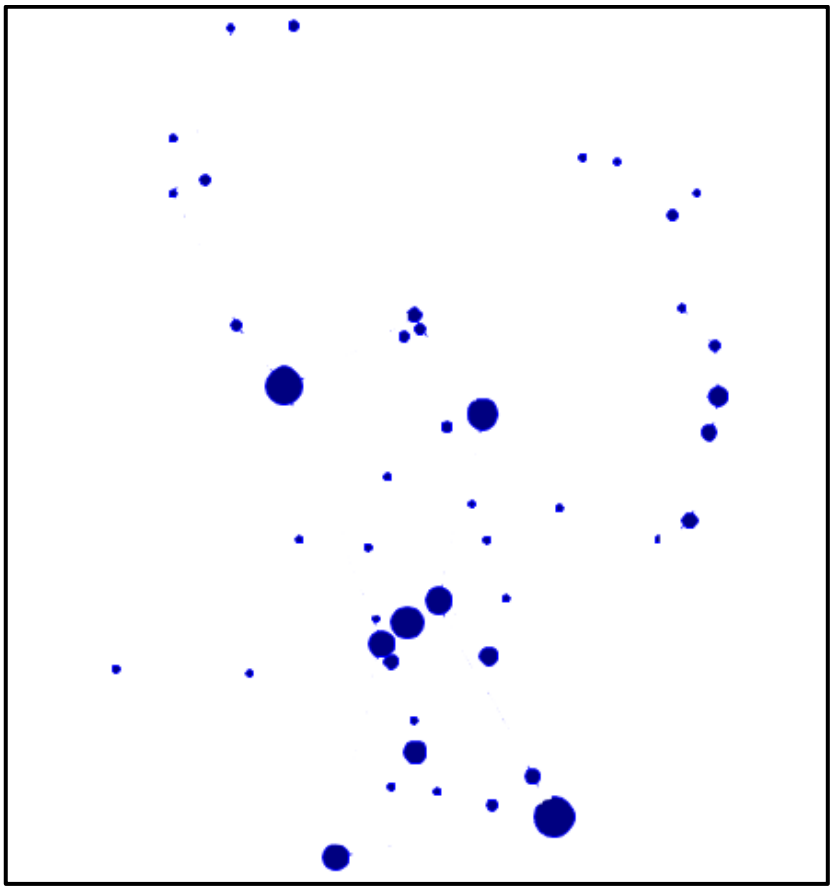
5. Add some star stickers for finishing touches.

Challenge: Create your own Constellation

Use the following group of stars to draw a picture using some of the stars. It may be your favorite pet or animal or activity.

Name your constellation.

My constellation is called .....



Write a little story about how it ended up in the night sky.

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