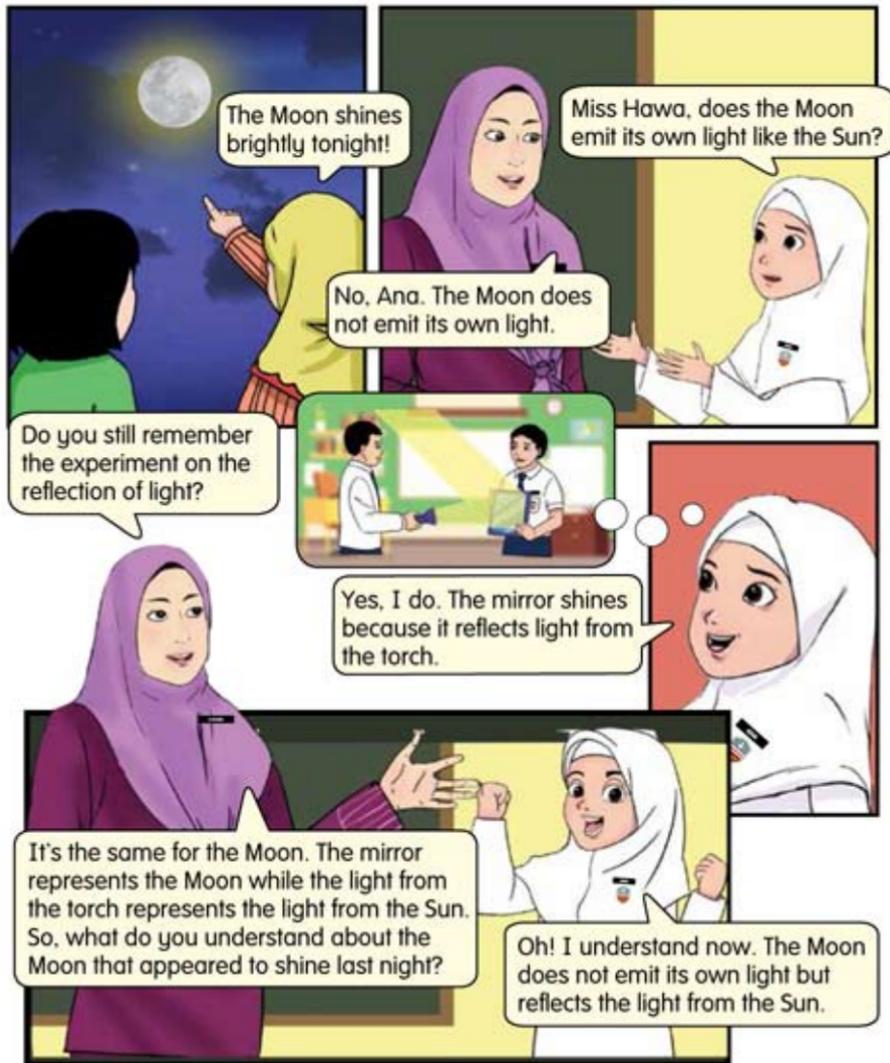




The Moon is the brightest natural satellite that you can easily identify in the sky at night. If you observe the Moon carefully, the shape of the Moon appears differently on different nights. Why?

THE MOONLIGHT

Ana and Melia are observing the Moon that shines brightly at night.



THE MOON ROTATES, THE MOON REVOLVES

The Earth rotates on its axis and, at the same time, revolves around the Sun. The Moon also rotates on its axis and, at the same time, revolves around the Earth.

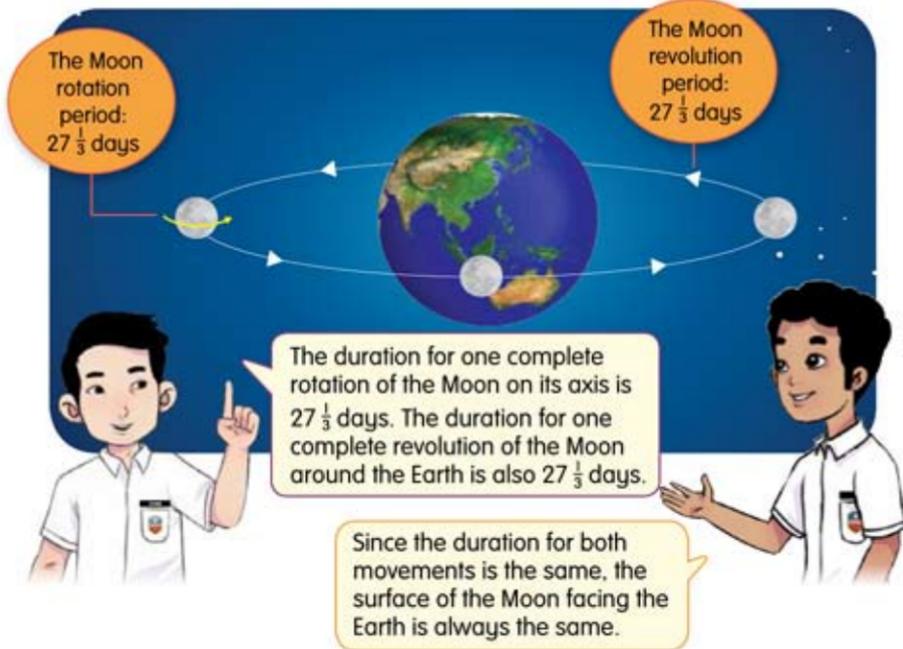


If the Moon rotates on its axis, why can't I see it rotates?

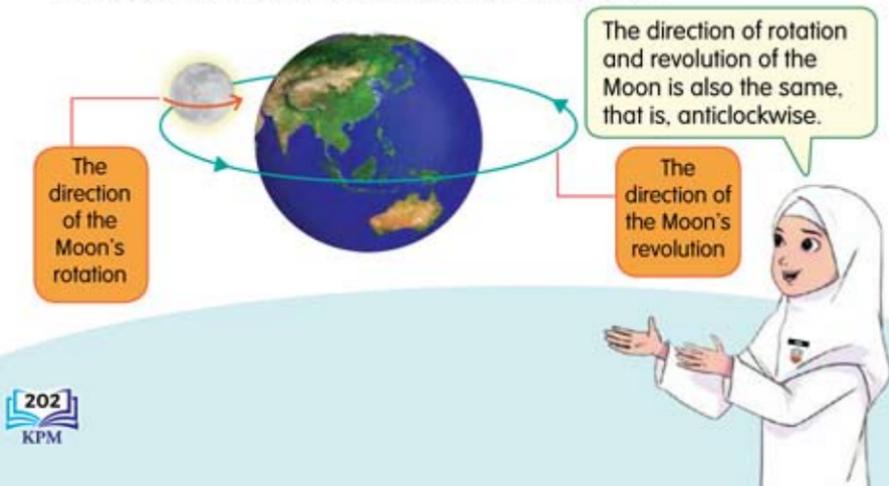
You're right, Ana. We only see the same surface of the Moon.

Why does the Moon appear not to rotate?

Observe the rotation and revolution of the Moon below. What can you tell about the time taken for the rotation and revolution of the Moon?



How about the direction of the movement of the Moon?





Let's carry out a simulation of the rotation and revolution of the Moon.



FUN ACTIVITY

SIMULATION OF ROTATION AND REVOLUTION OF THE MOON

APPARATUS AND MATERIALS

Globe, adhesive tape, balloon, and small card.



STEPS



- Inflate a small balloon. Paste a small card to one side of the balloon. The balloon represents the Moon and the small card represents the part of the Moon that is facing the Earth.
- Hold the balloon with both hands. Carry out the simulation of the Moon rotating on its axis and revolving around the Earth. The small card on the balloon must always face the globe as shown in the picture.

Simulation of the Moon rotating on its axis.



Start



$\frac{1}{4}$ rotation



$\frac{1}{2}$ rotation



$\frac{3}{4}$ rotation



1 complete rotation

Simulation of the Moon revolving around the Earth.



Start



$\frac{1}{4}$ revolution



$\frac{1}{2}$ revolution



$\frac{3}{4}$ revolution



1 complete revolution



- What are the two types of movements of the Moon?
- State the direction and duration of the movements of the Moon.

PHASES OF THE MOON

As the Moon revolves around the Earth, we will observe different parts of the Moon that are lit up by the sunlight. This causes the shape of the Moon that is observed appears to change. The shapes of the Moon that appear differently are known as the phases of the Moon.



8 crescent moon



1 new moon

The dark side of the Moon is facing the Earth.



2 crescent moon

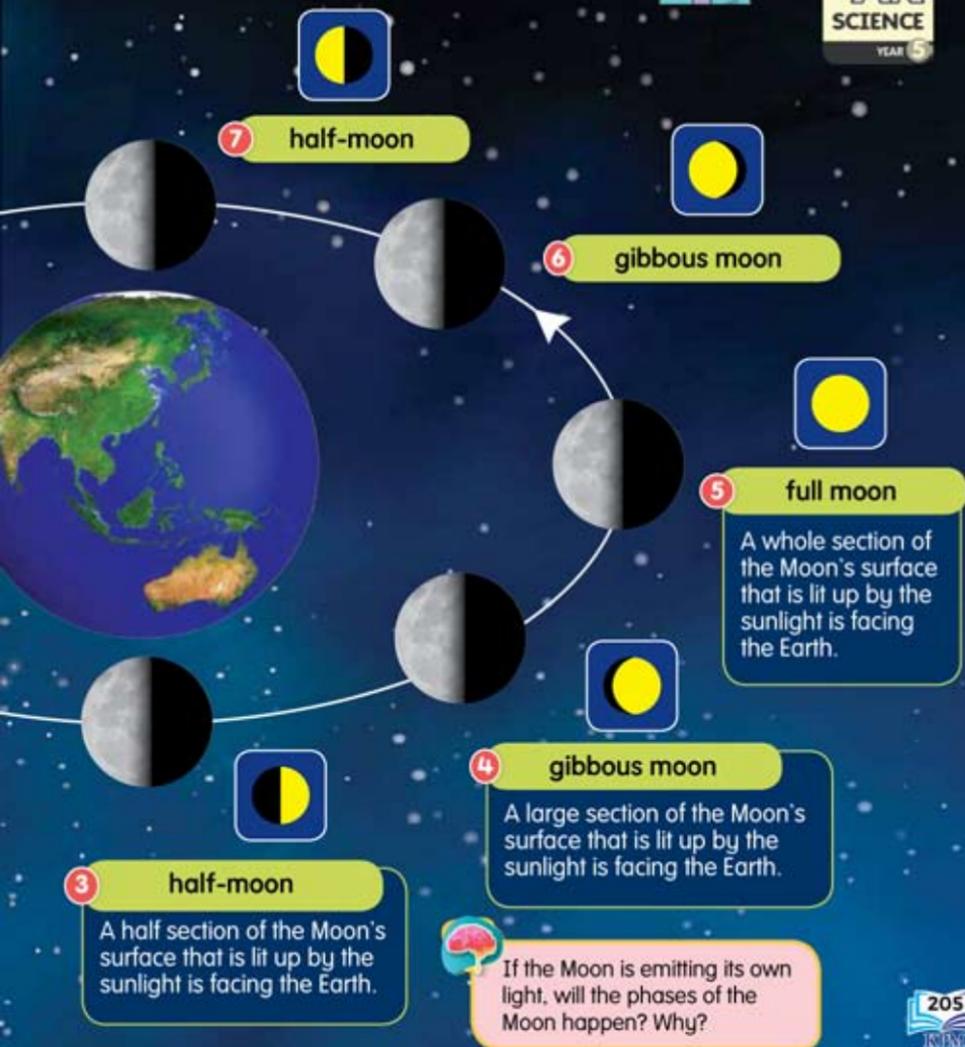
A small section of the Moon's surface that is lit up by the sunlight is facing the Earth.

Legend:

 The view from space.

 The observer's view from the Earth.

When the Moon revolves around the Earth, the position of the Moon changes with time. This causes the following phases of the Moon.



THE LUNAR CALENDAR

Have you heard of the lunar calendar? This calendar is determined based on the phases of the Moon. The lunar calendar is also known as the Hijra calendar. Observe the dates of the lunar calendar for the month of Muharam 1442H that are determined by the phases of the Moon.

1 Muharam 1442H
20 August 2020

The first day of each lunar month is determined when the new moon has fully appeared.

1 Safar 1442H
19 September 2020

Phases of the Moon									
	new moon	crescent moon	half-moon	gibbous moon	full moon	gibbous moon	half-moon	crescent moon	new moon
Dates of Lunar Calendar	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, ①

15 Muharam 1442H
3 September 2020

The full moon always appears in the middle of each lunar month.

The lunar calendar is also used to determine the Islamic celebrations. What celebration that you know falls on the 1st Syawal? What is the phase of the Moon that appears on that date?



LET'S TEST

THE SIMULATION OF THE PHASES OF THE MOON

GROUP ACTIVITY

AIM

To explain about the phases of the Moon through simulation and sketching.

APPARATUS AND MATERIALS

Pencil, polystyrene ball, and a lamp with lampshade.

STEPS



1. Stick the pencil into the polystyrene ball. Take off the lampshade and put the lamp in the middle of a dark room. The polystyrene ball represents the Moon while the lamp represents the Sun.



Simulation of the phases of the Moon



The pupil's view



The pupil's view

2. Point the ball towards the lamp. Look at the direction of the ball to observe the new moon phase.

3. Turn your body to the left at 45° to observe the crescent moon phase.



The pupil's view



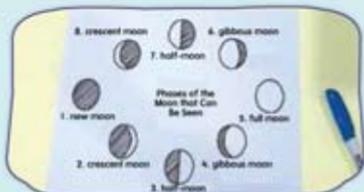
The pupil's view

4. Turn your body to the left again until 90° to observe the half-moon phase.

5. Keep turning to observe the gibbous moon phase at the angle of 135° .



The pupil's view



6. Keep turning until the position of the ball is directly opposite to the lamp to observe the full moon phase at the angle of 180° .

7. Keep turning to observe all the phases of the Moon in the 360° . Sketch the shape of the Moon that you have observed in sequence on a piece of paper.



- (a) Explain the positions of the Moon at the new moon and full moon phases.
 (b) Why is the new moon not visible?
 (c) Why does the Moon appear full during the full moon phase?
 (d) Why do the phases of the Moon occur?

CONSTELLATIONS



Sir, the crew members are ready to raise the net.

Good.



Hopefully we can catch many fishes at this location.

Look at that constellation. There is a mainland over there where we can sell our catch.

Come on, everyone! We sail to the north while our catch is still fresh.

Yes, sir!

You are right, sir. Thanks to our effort, our catch is almost sold out.

Fresh fish! Come buy some fresh fish!

Have you seen a constellation? In the olden days, the constellations were very useful to the sailors while sailing. What is the meaning of constellations?

A constellation is **a group of stars which appears to form a certain pattern in the sky that can be seen at night**. Not all the constellations are visible from all locations on the Earth. Some of the constellations are visible in the northern hemisphere, while some are visible in the southern hemisphere. There are also some constellations visible between the northern and southern hemispheres.

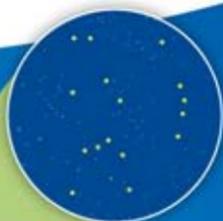
The Big Dipper constellation can be observed at the northern hemisphere.

The Orion constellation can be observed between the northern and southern hemispheres.



Big Dipper

northern hemisphere

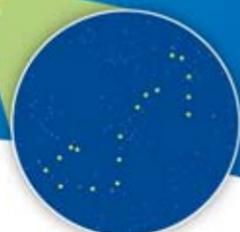


Orion



Southern Cross

southern hemisphere



Scorpion

The Southern Cross constellation can be observed at the southern hemisphere.

The Scorpion constellation can be observed at the southern hemisphere.





If we connect each group of stars with a line, what is the pattern formed on each constellation?

The Big Dipper

The Big Dipper constellation comprises a group of seven stars. This constellation appears to form a pattern of a water dipper or a scoop.



SCIENCE INFO

The Big Dipper is part of the Ursa Major or the Great Bear constellation.



The Orion

The Orion constellation appears to form a pattern of a hunter wearing a belt and holding a weapon.



The Southern Cross

The Southern Cross is the smallest constellation. This constellation comprises a group of four stars that appears to form a pattern of a kite.



The Scorpion

The Scorpion constellation comprises a group of stars that appears to form a pattern of a scorpion.



THE USES OF THE CONSTELLATIONS

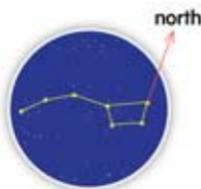
Constellations are useful because they help humans to identify certain stars in the sky. The direction and location of a place can be easily identified when looking at the patterns of the stars.

How do humans use the constellations in their daily life?

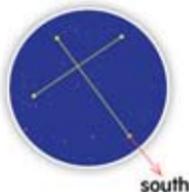


TO SHOW DIRECTION

Travellers and sailors used the constellations as a compass to determine their directions.



The Big Dipper constellation always points to the north.



The Southern Cross constellation always points to the south.

We are lost. How do we find the way out?



Don't worry. Let's rest and find the way out tonight.



Oh, look at the Southern Cross constellation. The direction of north is over there. Follow me!

TO INDICATE SEASONS

Before the calendar was invented, farmers in the areas with four seasons in the northern hemisphere looked at the constellations to identify certain seasons. The constellations helped them to plan the time for planting and harvesting crops.

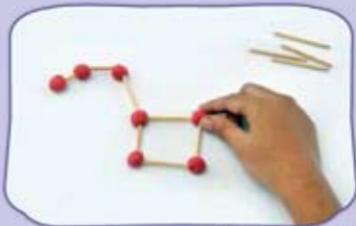


**APPARATUS AND MATERIALS**

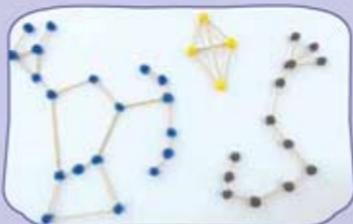
Computer, internet access, modelling clay, and skewer sticks.

STEPS

1. Make seven small balls using modelling clay to form a model of a group of stars.



2. Cut the skewer sticks accordingly. Then, connect the small balls using the skewer sticks to form a model of the Big Dipper constellation.



3. Make the models for the Orion, Southern Cross, and Scorpion constellations using the same method.



5. Discuss the features of the constellations that you have built in front of the class.

4. Make the models for other constellations in the sky by gathering information from the internet.



Be careful when using sharp tools to cut the skewer sticks.



Based on the models of constellations that you have built, state the uses of constellations to humans.



Build a model of a moon phase cup using a coin, two clear plastic cups, yellow-coloured paper, black-coloured paper, glue, marker pen, and coloured adhesive paper.



Moon phase cup

STEPS



1. Trace the shape of a coin on the yellow-coloured paper and cut it out.



2. Put the black-coloured paper inside the first cup.



3. Paste the cut yellow-coloured paper on the outer part of the first cup.



4. Insert the first cup into the second cup.



5. Sketch the phases of the Moon in sequence on the outer part of the second cup.



6. Draw arrows and label the phases of the Moon in sequence on the coloured adhesive paper. Then, paste the coloured adhesive paper on the moon phase cup.

7. Turn the second cup to see the changes in the phases of the Moon.



MIND REFLECTION

- The Moon does not emit its own light but reflects light from the Sun.
- The Moon rotates on its axis, anticlockwise for $27\frac{1}{3}$ days.
- The Moon revolves around the Earth, anticlockwise for $27\frac{1}{3}$ days.
- As the Moon revolves around the Earth, we will observe different parts of the Moon that are lit up by the sunlight.
- Parts of the Moon that appear differently are known as phases of the Moon.
- Phases of the Moon:



new moon



crescent moon



half-moon



gibbous moon



full moon



gibbous moon



half-moon



crescent moon

- Phases of the Moon are used to determine the dates in the lunar calendar which is also known as the Hijra calendar.

The first day of each lunar month is determined when the new moon has fully appeared.

Phases of the Moon									
Dates of Lunar Calendar	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, ①

The full moon always appears in the middle of each lunar month.

- A constellation is a group of stars which appears to form a certain pattern in the sky that can be seen at night.
- Examples of constellations are Big Dipper, Orion, Southern Cross, and Scorpio.
- Constellations are used to:
 - show directions.
 - indicate seasons.



MIND TEST

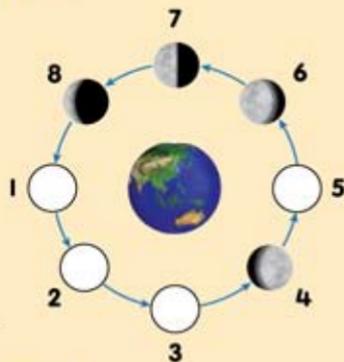
Answer all questions in the Science exercise book.

1. The diagram shows a phenomenon.

- State the phenomenon.
- Why does this phenomenon happen?
- Shade the section of the Moon that is visible at positions 1, 2, 3 and 5.
- Write the observation and the reason to explain the phase of the Moon at location 3.

Observation: _____

Reason : _____



(e) Below is an excerpt from a radio announcement.

“In two weeks,
Malaysians will be
celebrating Hari Raya
Aidilfitri ...”



State the phase of the Moon when this radio announcement was made.
Explain your answer.

2. The following is the information about the function of constellation X.



Constellation X: Indicates the presence of planting season.

- Based on the information above, state other uses of constellation X.
- State three other constellations besides constellation X above.