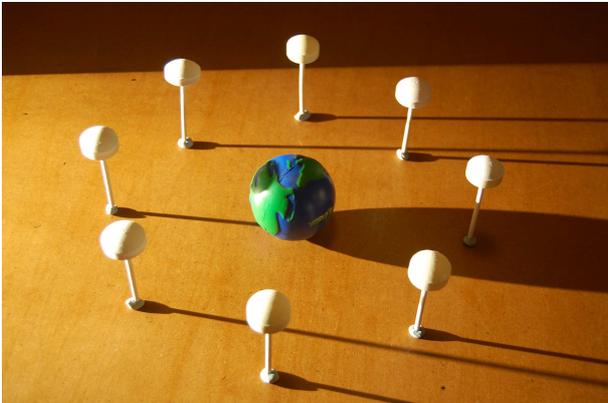


Lollipop moon

Modelling the phases of the moon with a ball, lollipops and a bright light

Put a tennis-ball-sized ball on a flat surface by balancing it on a roll of tape. Then set up a bright light like a projector or a desk lamp, to shine on the ball. Take eight lollipops and use clay, modelling clay or Blu tac™ to place them as shown in the photos. One lollipop should be between the light and the ball, two at right angles to the ball and one behind it. Put the others in between to make a circle around the ball. It is essential that the beam of light goes over the top of the ball to illuminate the lollipop at the back - the Earth ball must not cast its own shadow onto the rear lollipop, which would represent an eclipse and not the regular phases of the moon. It may be necessary to raise up the projector or desk lamp to ensure this.

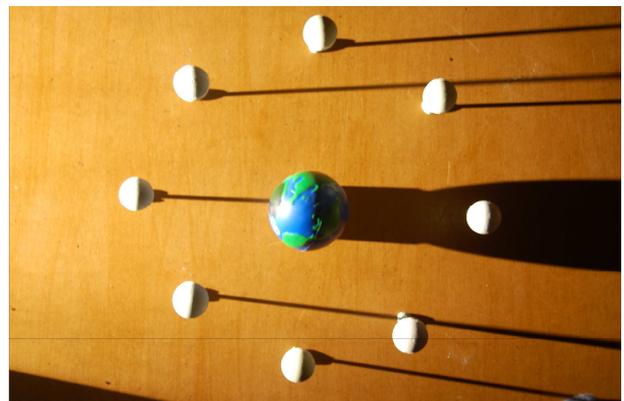


Tell the pupils that the light represents the Sun, the ball is the 'Earth' and the lollipops show how the moon circles around the Earth anticlockwise (when seen from above the Northern Hemisphere).

Ask the pupils to draw a series of eight circles. Then, use the model to draw in the circles the bright part of the moon as **seen from the Earth**, when the moon:

- is at right angles to a beam of sunlight, to the right of the Sun (as seen in the model);
- has travelled 45° anticlockwise from this position;
- is behind the Earth
- has travelled another 45°
- is at right angles to the beam of sunlight, on the other side of the Earth;
- has gone another 45°
- is in front of the Earth
- has travelled another 45°

It may help them to view the model from directly above, as below:



Finally, ask them to name their drawings, using these labels:

- Full moon
- New moon
- Waxing crescent moon
- Waning crescent moon
- First quarter moon
- Third (last) quarter moon
- Waxing gibbous moon
- Waning gibbous moon

The back up

Title: Lollipop moon.

Subtitle: Modelling the phases of the moon with a ball, lollipops and a bright light.

Topic: Pupils use a model to appreciate what the phases of the moon look like when viewed from outside the Earth.

Age range of pupils: 10 – 16 years

Time needed to complete activity: 15 mins

Pupil learning outcomes: Pupils can:

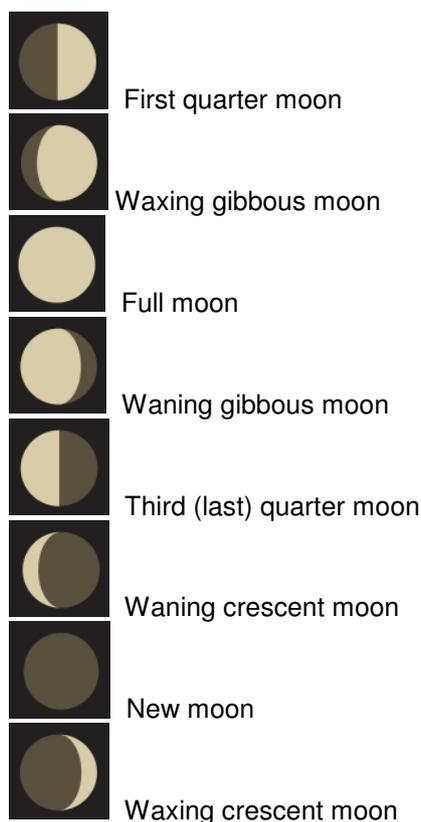
- use a ball model showing the phases of the moon to draw them on a series of circles;
- name their drawings.

Context:

This activity can be used to follow the 'Jaffa moon' and 'Polystyrene moon' Earthlearningidea activities designed to progressively teach the phases of the moon; here pupils view the model from 'outside'.

Pupils are shown a ball model, using a tennis-sized ball for the Earth and lollipops to represent the different positions of the moon as it travels anticlockwise around the Earth (when viewed from above the Northern Hemisphere). They are asked to visualise the phases of the moon as seen from outside the Sun/moon/Earth system – a more abstract exercise than the previous two Earthlearningidea 'moon' activities.

The correct sequence of moon drawings is:



This file of phases of the moon drawings is licensed by Mond_Phases.jpg and Gregors.under the Creative Commons Attribution-Share Alike 3.0 Unported license.

Note that these phases are reversed for the Southern Hemisphere.

Following up the activity: Carry out the 'Eclipse the lollipop' activity to see how the regular phases of the moon covered in this activity are not related to eclipses.

Underlying principles:

- The changing shape of the bright part of the moon can be explained because only half the moon is illuminated by the Sun; we see the half-illuminated moon from different perspectives as the moon circles the Earth in a counter-clockwise direction, seeing different phases as the lunar month progresses.

Thinking skill development:

Visualising the phases of the moon from the model requires three-dimensional thinking ability and the pattern produced in the drawings involves construction. Linking the model to reality requires bridging skills.

Resource list:

- a tennis-ball-sized ball, or similar
- a roll of tape, to balance the ball upon
- 8 round pale-coloured lollipops, or similar
- clay, modelling clay or Blu tac™ to support the lollipops vertically
- a strong light source, such as a projector or desk lamp
- a darkened room

Useful links:

Type 'lunar animation' into a search engine like Google™ to find animations of the phases of the moon, with explanations of the cause of the phases seen.

Source: Devised by Chris King of the Earthlearningidea Team.

With thanks to Steve Adams, Sheffield Astronomical Society, for his advice.



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The progression of thinking skills shown by the Earthlearningidea 'Moon' exercises

Earthlearningidea	Strategies and skills developed
Jaffa moon: modelling the phases of the moon using Jaffa Cakes™	<ul style="list-style-type: none"> • concrete observational, recording and modelling skills • predicting from a pattern – using construction skills
Polystyrene moon: visualising the phases of the moon using a ball on a stick	<ul style="list-style-type: none"> • 3D spatial skills, viewed from 'inside' the model
Lollipop moon: modelling the phases of the moon with a ball, lollipops and a bright light	<ul style="list-style-type: none"> • 3D spatial skills, viewed from 'outside' the model
Eclipse the lollipop: modelling eclipses of the moon and the Sun with a ball, lollipops and a bright light	<ul style="list-style-type: none"> • 3D spatial skills, viewed from 'outside' the model
Why does the Sun disappear? Demonstrate what happens when the Moon hides the Sun	<ul style="list-style-type: none"> • 3D spatial skills, viewed from 'inside' the model