

## Jaffa moon

### Modelling the phases of the moon using Jaffa Cakes™

#### Moon log

Ask your pupils to make a log of the shape of the moon over a lunar month, noting the date and time of each observation. They could either do this by direct observation or by research on the internet.

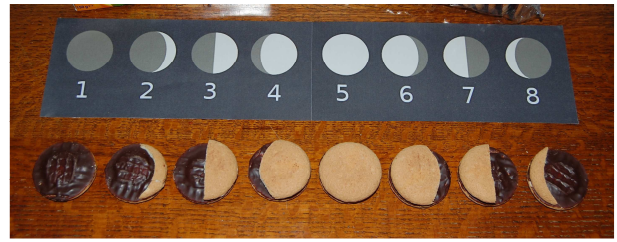
Their results should be as shown at the foot of this sheet (if in the Northern Hemisphere).

#### Jaffa Moon

When their logs have been completed, ask them to model the phases of the moon using Jaffa Cakes. They will have to cut or nibble the Jaffa Cakes carefully to make some of the phases.



They could make each model using single Jaffa Cakes, but to see how the light part of the moon is balanced against the darker part of the moon during the different phases, it is best to use one Jaffa Cake, dark side up, underneath, with the pale moon phases cut from another Jaffa cake and laid on top, as shown in the pictures.



#### Moon names

Ask them, as appropriate for their age, to name/label the phases of the moon, as follows:

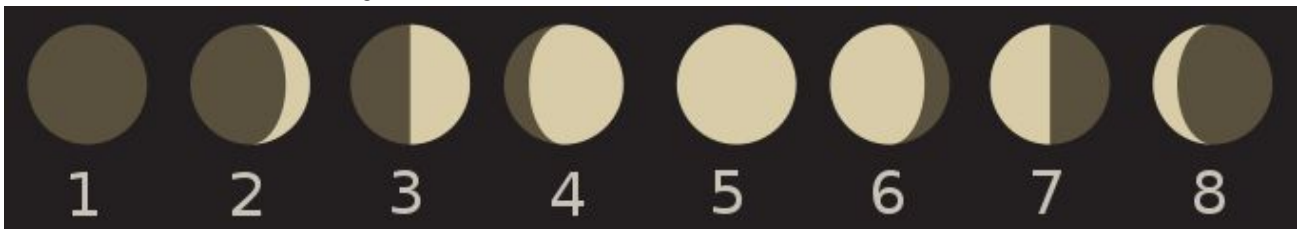
1. New moon
2. Waxing crescent moon
3. First quarter moon
4. Waxing gibbous moon
5. Full moon
6. Waning gibbous moon
7. Third (last) quarter moon
8. Waning crescent moon

#### Moon predictions

Ask them to use their model to complete the following predictions:

- When the moon is waxing, the light part is getting bigger/smaller and the full moon/new moon is approaching.
- I can model the waxing/waning crescent moon by making the letter 'C' with the thumb and index finger of my left hand – when the light part of the moon is this shape, the new moon/full moon is approaching.
- I can model the waxing/waning crescent moon by making the letter 'C' with the thumb and index finger of my right hand – when the light part of the moon is this shape, the new moon/full moon is approaching.

Time →



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All Jaffa Cake™ photos: Chris King.

## The back up

**Title:** Jaffa moon.

**Subtitle:** Modelling the phases of the moon using Jaffa Cakes™.

**Topic:** Cutting Jaffa Cakes to model the waxing and waning moon.

**Age range of pupils:** 5 – 15 years

**Time needed to complete activity:** 20 mins

**Pupil learning outcomes:** Pupils can:

- Describe how the light and dark parts of the moon change shape over a lunar month;
- Use their learning to predict future changes in the shape of the light and dark parts of the moon.

### Context:

Having discovered how the light part of the moon changes shape over a lunar month, pupils are asked to reinforce this learning by cutting Jaffa Cakes into shapes to simulate the light part of the moon. By placing these on second dark-side-up Jaffa Cakes, they can see how the dark part of the moon changes shape at the same time. They then test their understanding by identifying correct versions of predictive sentences.

The correct predictions are as follows.

- When the moon is waxing, the light part is getting bigger/~~smaller~~ and the full moon/~~new moon~~ is approaching.
- I can model the waxing/waning crescent moon by making the letter 'C' with the thumb and index finger of my left hand – when the light part of the moon is this shape, the new moon/~~full moon~~ is approaching (*- in the Northern Hemisphere, it is the opposite in the Southern Hemisphere*).
- I can model the waxing/~~waning~~ crescent moon by making the letter 'C' with the thumb and index finger of my right hand – when the light part of the moon is this shape, the ~~new moon~~/full moon is approaching (*opposite in Southern Hemisphere*).

### Following up the activity:

Carry out the Earthlearningidea 'Polystyrene moon' to teach understanding of how the phases of the moon are caused by the view from the Earth of the moon which is only half illuminated by the Sun. Continue with the 'Lollipop moon' activity to make a three dimensional model of the moon's phases. Finally, carry out the 'Eclipse the lollipop' activity to see how the regular phases of the moon are not related to eclipses. This series of activities begins with concrete observations and then provides explanations at different levels of abstraction.

### Underlying principles:

- The illuminated and darker parts of the moon, as seen from the Earth, change shape over time.
- These changes are predictable, and can be used to predict future changes.

### Thinking skill development:

Noting that the moon changes shape in a predictable manner involves construction.

### Resource list:

- packet of Jaffa Cakes™ (one packet, if the cakes are cut carefully with a knife, can make the whole model above – but more will be needed if pupils make their own moon phases, particularly if they nibble the required shapes)
- a knife (to cut the Jaffa Cakes – but pupils may wish to nibble them instead)
- a plate

**Useful links:** Type 'lunar animation' into a search engine like Google™ to find several animations of the phases of the moon.

**Source:** Devised by Lyndsey Jackson, whilst she was a teacher training student in science at Keele University and Charlton School – based on a TV advertisement for Jaffa Cakes™.

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