SPACE awareness

VISUALISING THE LUNAR PHASES

Discover the cause behind the lunar phases

, Haus der Astronomie

Tópico curricular
Solar System

Grande ideia científica

Palavras-chave
Islamic Heritage

Faixa etária
6 - 14

Nível de ensino
Primary School, Middle School

Duração
1h30

Dimensão do grupo
Group

Controlo de segurança
Supervised

Custo
Low (< ~5 EUR)

Localização
Indoors (small, e.g. classroom)

Competências básicas
Asking questions

Tipo de atividade de aprendizagem
Partial enquiry

BREVE DESCRIÇÃO

During this activity children visualise the lunar phases using a set-up of Sun, Earth, and Moon models. This phenomenon was correctly explained by the Greek philosopher Anaxagoras in 500 BCE.

OBJETIVOS

Using simple items, the children simulate the Sun-Earth-Moon system to understand the change in lunar phases. In addition, the children will understand the difference between celestial objects that emit light and heat on their own and the ones that just reflect the sunlight. This activity reinforces the children's skill of attaining different perspectives of observation.

OBJETIVOS DE APRENDIZAGEM

After this activity, the children will be able to explain the difference between celestial bodies that emit light and celestial bodies that reflect light. explain the cause of the lunar phases. use models to explain large scale cosmic phenomena.

AVALIAÇÃO

Ask the children the following questions:

1. Does the Moon shine by itself?
2. Place Anaxagoras on the UNAWE Earthball (or a globe), switch on the flashlight or the lamp, and move the Moon model around the Earth. Ask the children when Anaxagoras sees:
3. Full Moon
4. New Moon
5. Waning Moon
6. Waxing Moon

MATERIAL

- A flashlight or lamp
- A UNAWE Earthball or globe
- A model of the Moon, for example a Styrofoam ball
- A paper figure of Anaxagoras, to placed on the Earthball
- A sheet of white paper

INFORMAÇÕES DE REFERÊNCIA

In 500 BCE, and 100 years after Thales, another Greek natural philosopher called Anaxagoras, born in the city of Clazomenae (today's Turkey), searched for explanations for astronomical phenomena. He succeeded in finding the causes of the lunar phases. Anaxagoras was the first to bring philosophy to Athens. He understood that the Moon reflects the light of the Sun and that the Moon phases are the illuminated portions of the Moon that vary when the Moon moves around the Earth, as seen by an observer on Earth.

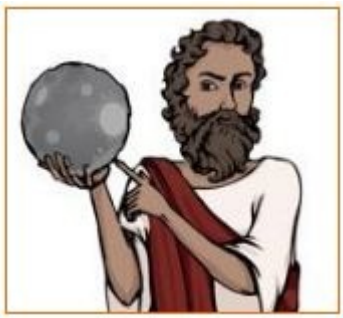

Fig. 2 Anaxagoras (Credits: Provot)

DESCRIÇÃO DA ATIVIDADE COMPLETA

Objects reflect the sunlight The first step consists in showing that the Moon does not emit light by itself but only reflects the sunlight. For this purpose, the children should stand in a dark room near the model of the Moon. When the flashlight is switched off, the Moonmodel is not visible. When the flashlight is switched on again and is aimed at the model of the Moon, part of the Moon-model becomes visible!

Note: We can only see all the objects surrounding us because they reflect the light of the Sun during day time or the light of the lamps, during night time!

The lunar phases In the second step, children can visualise the Moon phases. The best way for them to do this is to play the role of the Earth and the Moon:

- Darken the room and make sure the light source is pointed towards the centre of the room.
- Now ask one volunteer to stand in the centre holding the Earthball or globe, and another child to hold the Moon at the edge of the room.

- Fix the figure of Anaxagoras on the Earthball/globe and let the rest of the class stand around the Earth to observe the Moon from the Earth's perspective. Ask the child holding the Moon-model to revolve around the Earth. Notice that the Moon orbit is tilted and that in position 1 it stands slightly above the Earth. What do the children say about the shape of the illuminated part of the Moon? What happens? The shape changes!

From the perspective of the Earth, Anaxagoras and the children will see the following lunar phases at the positions 1,2,3 and 4 around the Earth:

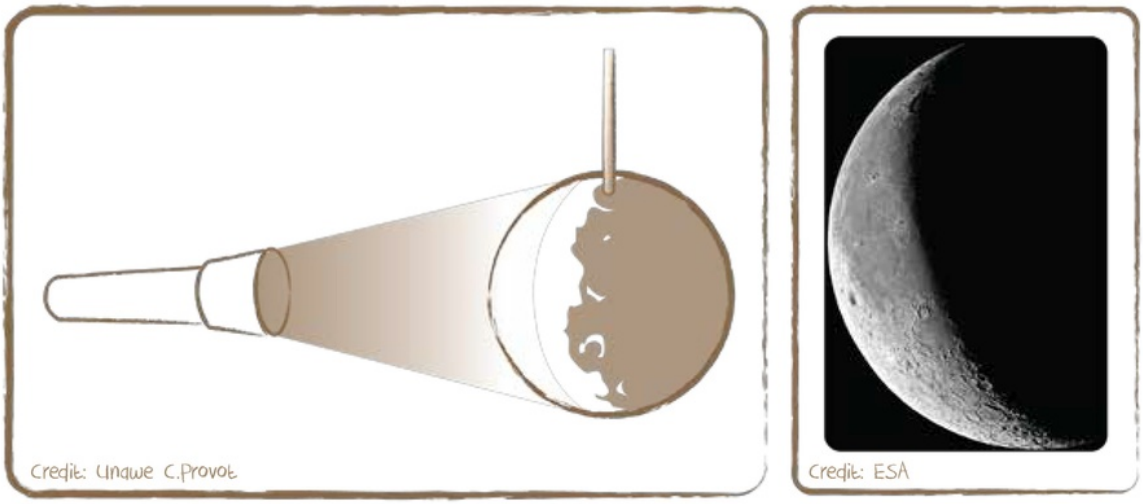

Fig. 5 The lunar phases as seen by the children and Anaxagoras at the position 1,2,3, and 4 (Credits: Scorza)

CURRÍCULO

Space Awareness curricula topics (EU and South Africa)

The journey of ideas, Solar System

CONCLUSÃO

With this activity, the children learn how the lunar phases are generated. In the course of that activity, they also realise that celestial objects are visible because they either reflect or radiate light themselves. This is ancient knowledge that the Greek philosopher Anaxagoras deduced around 500 BCE.

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