Student guide

Erasmus+

Title IO

Jupiter moon orbit resonance

Norwegian translation

Material List:

Outline

In this activity, we will demonstrate and model the solar system motions with our selves as objects.

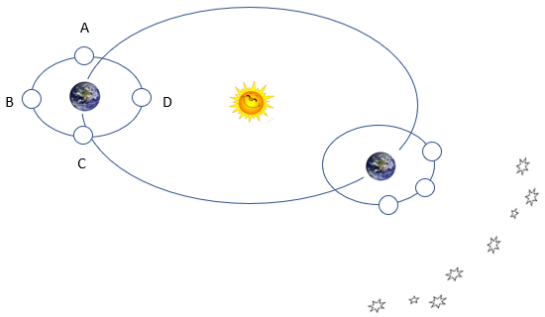
In this activity, we will try to find what is the directions of motion and rotation of the the moon and inner planets.

How can we “shift” our perspective of the solar system between a stationary observer and an observer standing on a rotating Earth?

Procedure

1 The Moon

Start with observing the phases of the moon, how and in which “direction” they change from new, half, full, half and new.



Draw in the phases on the occasions you see them, into the circles to your right (labelled A, B, C, D). Try to use this to describe which direction the moon is rotating around our Earth.

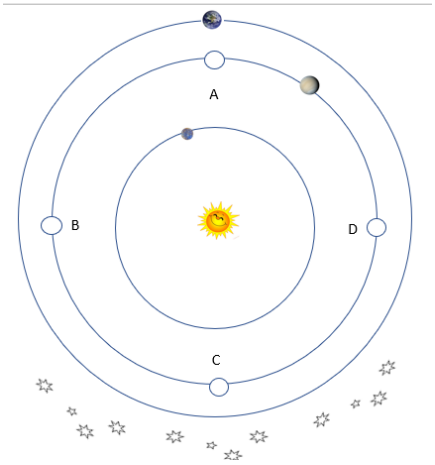
You can also use the starry background and follow what direction the moon moves from one night to the other. Use the circles in the left of the drawing and draw lines-of-view to the starry background. Demonstrate the motions of the moon with three people, where each person takes the role as one of the objects.

The online observatory collaboration consists of the following partners: Baldone Observatory, Brorfelde Observatory, Cardiff University, Harestua Solar Observatory, Helsinki Observatory. See onlineobservatory.eu for more activities and information.

2

Mercury and Venus

The inner planets of our solar system also show phases just like our moon. Draw how you believe the phases of Venus will appear, as seen from above the solar system, in the empty circles in the drawing to your left.



Now, in the circles below, draw how you believe the phases will appear seen from Earth, which is in the top position throughout this exercise.

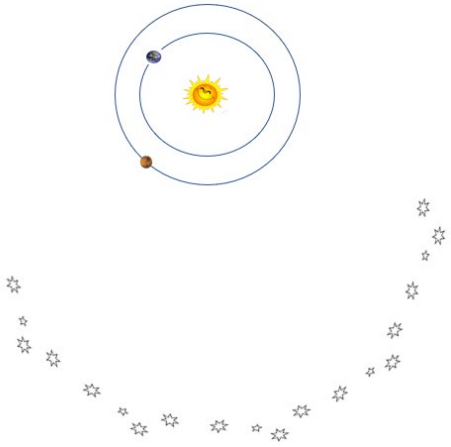
Mercury spends 88 Earth-days to orbit the Sun once, and it rotates around itself three times in the same period. How long is a Mercury day measured in Earth-days?

What is the longest on Mercury, a Mercury-year or a Mercury-day?

3

Mars' retrograde motions

Once every second Earth-year, Earth catches up with Mars. Since Earth has a higher speed than Mars, this makes it appear that Mars is slowing down, and actually moving backwards, when we observe Mars' positions measured against the starry background.



Model their orbits with your friends, where you choose roles as the sun, Earth and Mars, and see if you can demonstrate how retrograde orbits work.

Visit stellarium-web.org and set the date and time to September 13th 2020, and see how the planets moves from one night to the other until September 18th.