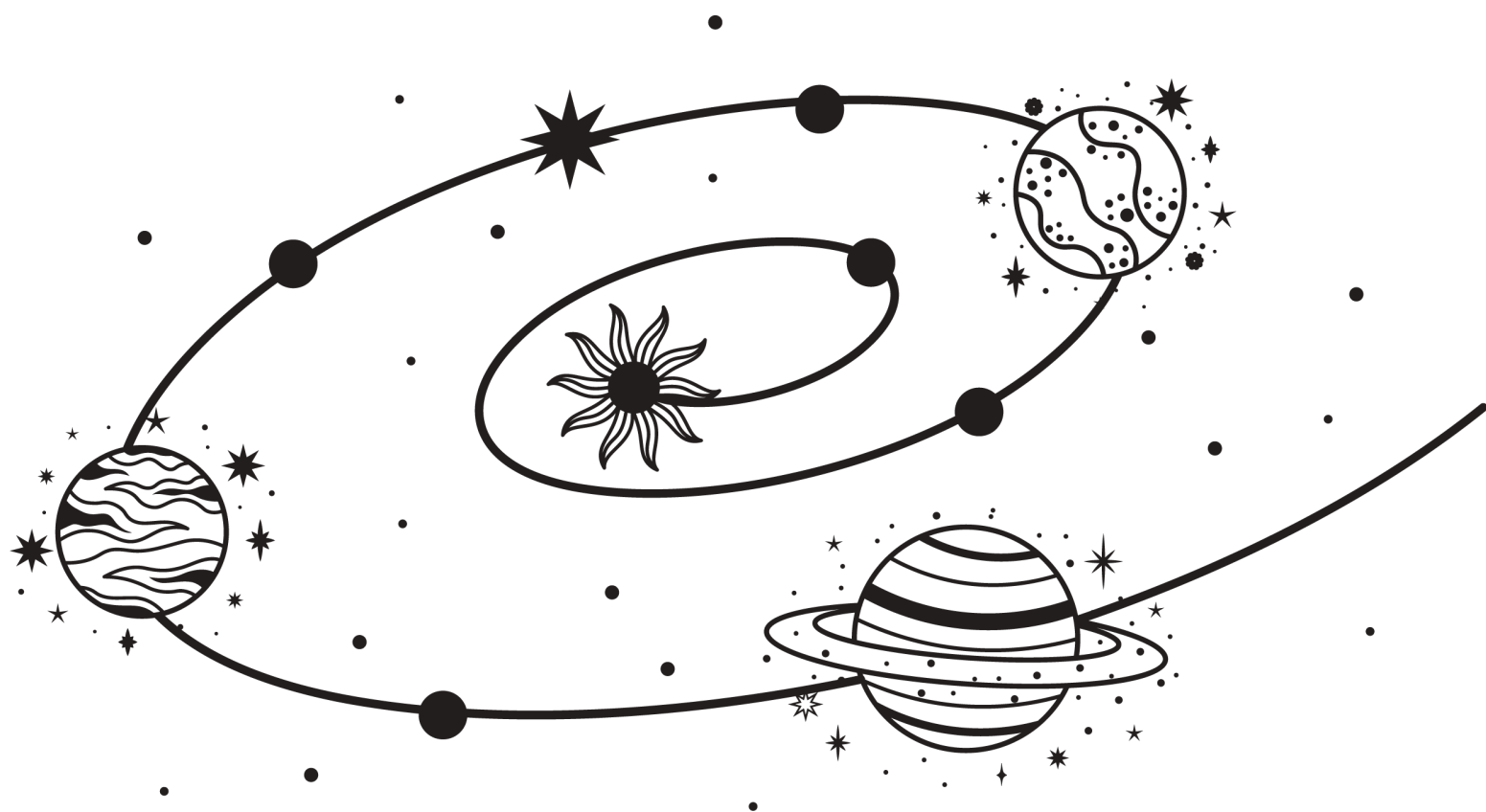


ARISTARCHUS

When is my birthday?

Sequence 4



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When is my birthday?

Timing: 50 minutes

Age: 6-8 years old (cycle 2) and 8-14 (cycle 3-4) to go further

Goals:

1. Relation between birthday and revolution around the Sun.
2. Define unit of time related to the revolution of one planet around the Sun, namely the “year”
3. Distinguish “terrestrial year”, “mercurial year”, etc.
4. Distinguish Sidereal day, Terrestrial day and synodic day

Materials: nice drawing of birthday cake and birthday gifts, tokens for printing orrery

Prerequisite

The learners have to know:

- How to walk on the Human Orrery, or how to move a coin on a Printed Orrery (introductory session).
- The meaning of Birthday in terms of terrestrial year
- The relation between the revolution and one year (from 9 years) .
- Comparing number, notions of multiple and usual arithmetic operations
- In addition for higher Level: multiplicative problem and proportionality

Pedagogy

This sequence proposes then to relate birthday and revolution around the Sun. The birthday is connected here to gift and cake.

A possible challenge to engage the learners: “on which planet would you prefer to live so that you enjoy your birthdays as much as possible” (*the chosen wording is so as not to focus immediately on the number of birthdays... You may use your own wording!*)

Introduction

If required, start with a reminder of the objects in the Orrery and of the choreography.

Then, the teacher brings pictures of birthday cakes, one cake per planet with the associated color.

A birthday cake on Earth

One learner “A” places himself on the earth picture (initial disc). The teacher puts the cake on it.

Instruction: You (learner “A”) must walk around the orbit and stop after one year. Any one may say “stop” as soon as he believes it has been one year since the start.

On HO: the learner “A” is on the initial disc and starts moving around the orbit of Earth.

On PO: all the class puts a token on the initial disc and starts moving it around the orbit of Earth.

One may repeat this with one or two more learners. One may also count the age of the learner “A” assuming it is born as the choreography starts...

One year on Earth

The teacher removes the cake. Another birthdate is chosen, the learner (HO) or all (PO) start the revolution on the same disc (date) and have to stop after one year. This may be repeated with different birthdates, and different durations. This episode should end up with the idea that one year is the duration to do one revolution around the Sun (the name “revolution” may be introduced then).

From 9 years old, students can locate their own birthday date and they can start at different dates, so different positions of the birthday cake on the Orrery.

One year on another planet

The teacher puts the cake of another planet anywhere in the orbit and repeats the same procedure as with Earth.

Then, he asks four learners to place themselves on the pictures of the different planets. Then they walk along the orbit of Mercury, Venus, Earth and Mars. The teacher regularly stops the choreography and asks everyone how old is each learner. They must answer either in their own “planetarian units of years”. If one answer is given in “years” the teacher should ask “which one ?” (terrestrial, mercurial, etc. ...)

Teacher should insist that the unit of time related to the revolution of one planet around the Sun, namely the “year”, is different for the same duration.

To go further

Above 8 years old: Ask to make predictions such as “If with your friend you are born the same day, how old are you on a different planet as your friend is 5 years old on Earth ? What about 50 years old? ”. The prediction requires defining the proportionality relation between one planet and Earth. This may then be confirmed with the choreography at first.