ASTROEDU

Peer-reviewed Astronomy Education Activities

Solar System Model

Make models of the solar system planets using household materials.

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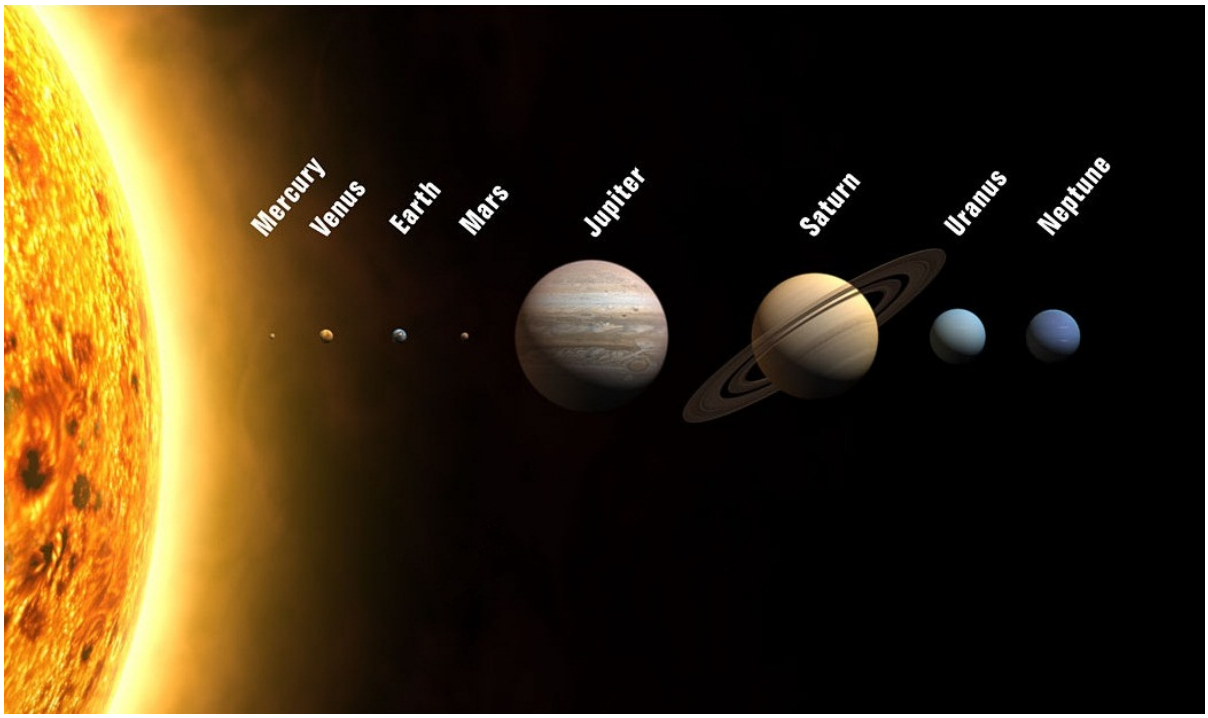


AGE

4 - 8

LEVEL

Pre-school, Primary

TIME

30min

GROUP

Group

SUPERVISED

Yes

COST PER STUDENT

Low Cost

LOCATION

Small Indoor Setting (e.g. classroom)

CORE SKILLS

Asking questions, Developing and using models, Analysing and interpreting data, Communicating information

TYPE(S) OF LEARNING ACTIVITY

Creative Expression, Modelling, Fun activity

KEYWORDS

Sun, Planets, Solar system

SUMMARY

GOALS

- Make a model of the solar system using plastic balls and materials like clay or papier mâché.
- Learn to collaborate and work in a group to achieve an objective by following instructions.

LEARNING OBJECTIVES

- To name the planets of the solar system.
- To arrange the solar system planets in order from the Sun.
- To illustrate the planets of the solar system using physical models.

EVALUATION

- The teacher will guide the students through the activity.
- The teacher will not directly assist them but will confirm that they are following the instructions correctly.
- After the models are made separately, the students will organise them in the correct order from the Sun.
- The teacher will then ask each student to name the planets and organise them one by one.

MATERIALS

This activity requires materials from the 'Universe in a Box' resource kit: http://www.unawe.org/resources/universebox/

From the box: * Plastic planets * SunBall * Paint and brush * Planet pictures (flat)

If you do not have access to ‘Universe in a Box’ resource kit, use similar materials: (one set per student or group) * 8 plastic balls in different sizes to represent the planets * 1 larger ball (yellow if possible) to represent the Sun * Paint and brush * Planet pictures (download) * Clay or Papier mâché (check additional information) * Cotton

BACKGROUND INFORMATION

The Solar System, in which we live, consists of the Sun as its central star, eight planets with their moons and several dwarf planets. Together with hundreds of thousands of asteroids (boulders) and comets, these celestial bodies orbit the Sun.

The Earth is a very special planet among these celestial bodies. It is our home! And the only world we know to have life on it. In order to understand its uniqueness, children need to compare the Earth to the other planets in the Solar System. As the Earth is located about 150 million kilometres from the Sun, the temperature is exactly right for liquid water to be present on the surface, unlike on most other planets. This proved crucial for the development of life!

The Solar System as a whole is part of the Milky Way Galaxy, a collection of about 200 billion stars that are arranged in a spiral, along with gas and dust. Billions of these stars have planets and these, in turn, have moons. This suggests that we are probably not alone in the Milky Way, but the distances between the stars are so big that a visit to another world is very difficult.
Even the star nearest to us, Proxima Centauri, is 4.22 light years (i.e., over 40 trillion km) away from us. This is so distant that a journey there would take generations of human lives.
Planets that orbit other stars than our Sun are called extrasolar planets or exoplanets for short. Astronomers have already discovered more than 2500 of these exoplanets.

We can categorise the planets of our Solar System into two types: the rocky planets, which are nearest to the Sun and have a solid surface, and the gas giants, which are farther from the Sun and are more massive and mainly composed of gas. Mercury, Venus, Earth and Mars appear in the former category, and Jupiter, Saturn, Uranus and Neptune make up the latter. Pluto, our formerly outermost planet, has been considered one of the dwarf planets since 2006. Between Mars and Jupiter is a so-called an asteroid belt, which circles the Sun like a ring. It consists of thousands of smaller and larger boulders. The largest of these have their own names, just like the planets. One of them, Vesta, is so large that it is also considered a dwarf planet.

FULL ACTIVITY DESCRIPTION

Step 1:

The instructor and a small group of children should initially paint the plastic spheres according to the pictures of the planets: Mercury (3.5 mm), Venus (10 mm), Earth (10 mm), Mars (5 mm), Jupiter (100 mm), Saturn (85 mm), Uranus (35 mm) and Neptune (35 mm), and Sun (150 mm). The sizes of the planetary spheres are not at all to scale, so that the students can handle them better.

Step 2:

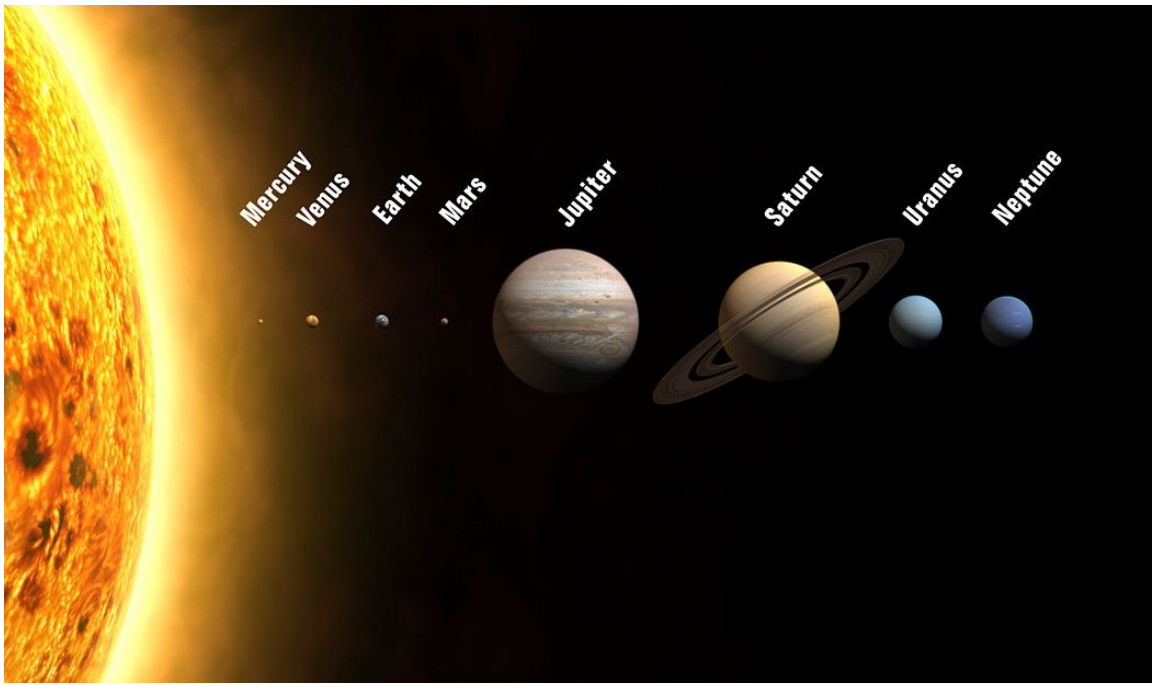
Let all spheres dry. Introduce the solar system and planets to the students. Use the information in the background and additional information sections. Show students images of the planets.

Step 3:

Draw concentric circles at the outer edge of Saturn's plastic ring. Pull the ring over Saturn and fix it at its equator.

Step 4:

Using the plastic spheres and the pictures of the planets, together with the children, create models of the planets and Sun by making balls of cotton, clay, or papier mâché.



(Image credit: Wikimedia commons, WP)

Step 5:

Let students place all planets on the table in the right order. Ask them to check if other groups or students have the planets in the same order. Ask students to rearrange the planets in the order of size.

Step 6:

Invite a student or a group to pick one planet and introduce it to the class.

CURRICULUM

Country | Level | Subject | Exam Board | Section
— | — | — | —
UK | KS2: Year 5 | Science | - | Earth and Space
UK | KS1 and 2 | Art and Design | - |

ADDITIONAL INFORMATION

- How to Create Papier Mâché: http://www.wikihow.com/Create-Papier-M%C3%A2ch%C3%A9
- NASA Solar System Exploration: http://solarsystem.nasa.gov/planets/

CONCLUSION

Students will prepare a roughly proportionate to-scale model of the solar system and arrange the planets in the correct order. They will work in small groups with the supervision of a teacher. After they complete the activity, they will learn about the size ratio and order of the planets of the solar system. They will also learn how to build simple physical models using materials like clay, cotton, etc.

CITATION

Ahad, S. L., 2016, *Solar System Model*, astroEDU, doi:https://doi.org/10.11588/astroedu.2015.3.81624

ACKNOWLEDGEMENT

UNAWE, Universe in a Box