ASTROEDU

Peer-reviewed Astronomy Education Activities

Orion constellation in 3D

Let's make a simple model of the Orion constellation

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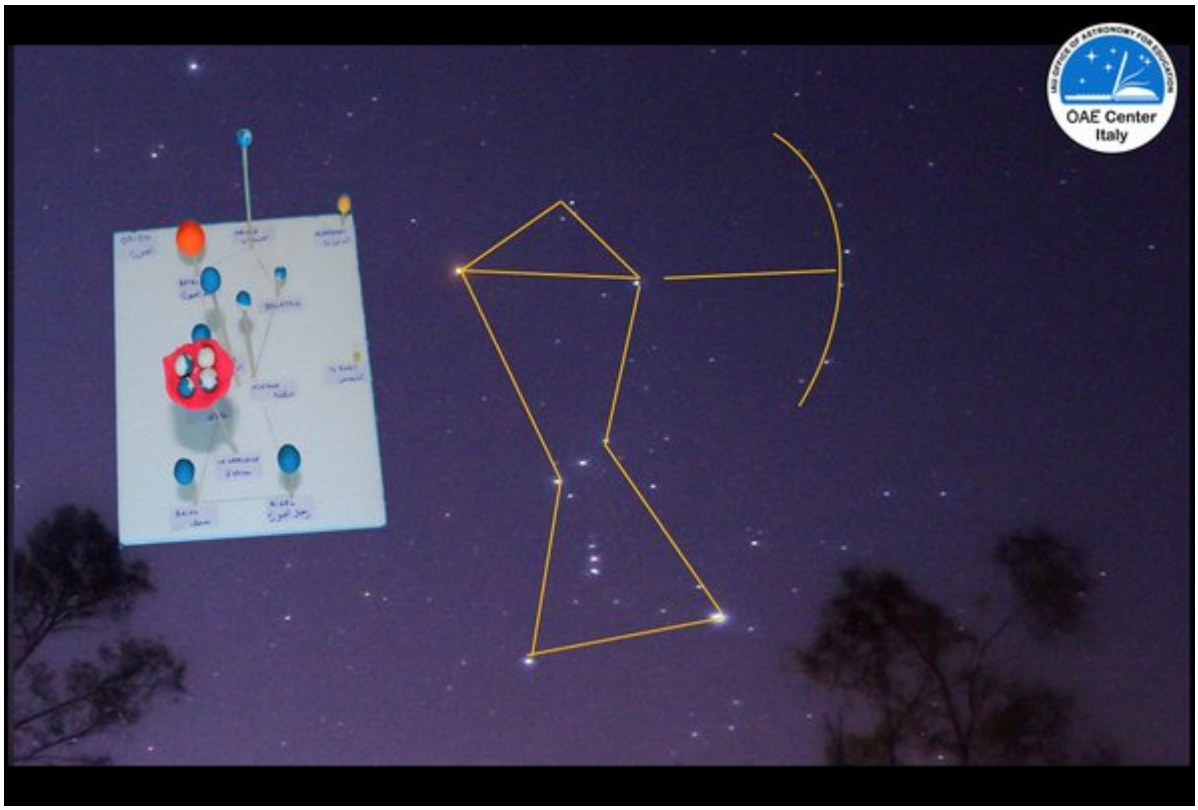

KEYWORDS

constellation, distance, model, orion, hands-on, mythology

CATEGORY

<QuerySet [<SciCategory: Observational astronomy>, <SciCategory: Other>, <SciCategory: Stars>]>

LOCATION

Does not matter

AGE

8 - 12

LEVEL

<QuerySet [<Level: Primary>]>

TIME

2h

GROUP

Group

SUPERVISED

Yes

COST

Low Cost

SKILLS

<QuerySet [<Skills: Analysing and interpreting data>, <Skills: Asking questions>, <Skills: Developing and using models>]>

TYPE OF LEARNING

<QuerySet [<Learning: Guided-discovery learning>, <Learning: Modelling>, <Learning: Structured-inquiry learning>]>

MATERIALS

- There are 4 attachments provided: **Orion-presentation.pdf** to be used for the introduction presentation in classroom; **Orion-Drawing.pdf** to be printed and distributed (one for each 3D model to be built); **Orion-Handout.pdf** to be printed and distributed (one for each student) and **Astroedu-2306-Quiz.pdf** to be printed and used as a final test (one for each student);
- Styrofoam board a little bigger than the size of an A4 paper, thickness 1 to 3 cm (it can be cut from packaging Styrofoam sheets, see image below).
- 10 BBQ wood spikes (20 - 30 cm long)
- Modeling clay (colors: white, blue, light blue, orange, and red).
- Ruler, meter
- Scissors or cutter to cut the sticks.
- Tape or glue.

Image: Styrofoam boards for the activity.

GOALS

Learn what stars and constellations are and the fact that there are different names and mythologies around the world. In particular, learn about the Orion constellation and its mythology.

LEARNING OBJECTIVES

Learn about:

- the Orion constellation, the size of its major stars, their colors and ages, and how far they are from Earth.
- scaling: Stars distance from earth, sizes;
- stars and their life: star colors, temperatures and ages, star evolution.

BACKGROUND

Constellations

A constellation is a group of stars that appear to be close together and form an imaginary pattern, while they can also be very far away, from us and from each other.

To know more or to explain constellations in classroom, follow these links:
Constellations for kids: link

The Orion constellation

The Orion Constellation is one of the largest and most famous constellations. It is located on the celestial equator, and it can be seen from any place on Earth. Its name comes from a hero from Greek mythology – "The Hunter." The Orion constellation is known in many different cultures around the world.

To know more or to talk about the Orion constellation in classroom, follow these links:
What's In The Orion Constellation? link
Information about the Orion constellation link

Image: the Orion constellation identified in the sky

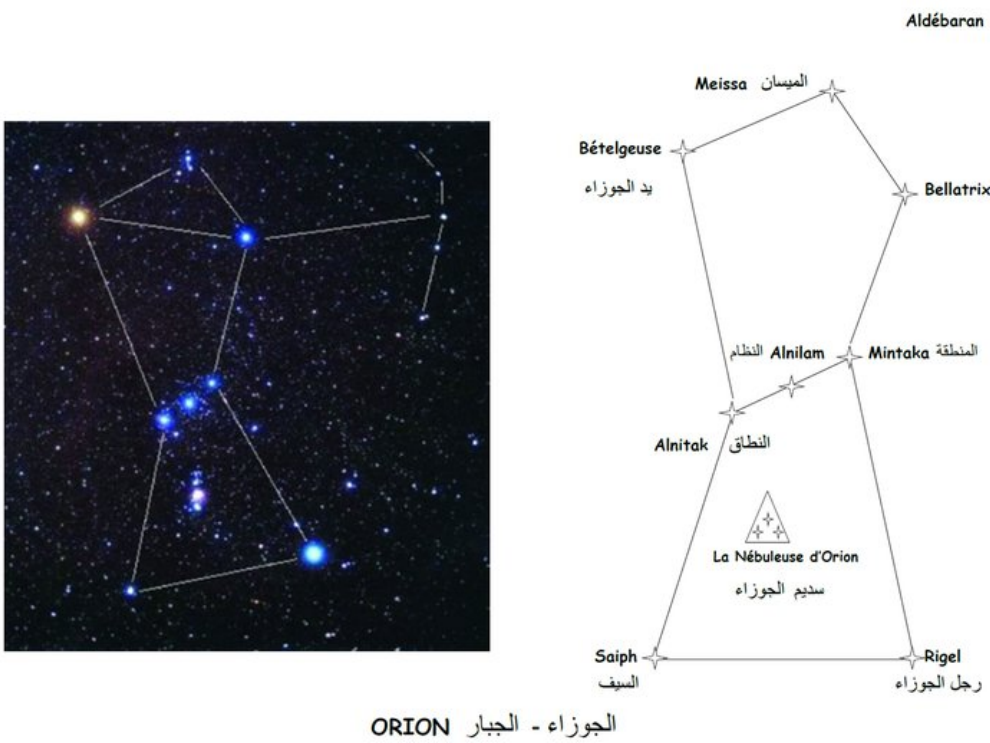

Image: the names of the stars that form Orion constellation in latin and arabic

Life cycle of stars

Stars can be of different colors; the color of a star depends on its surface temperature, red stars being colder than blue ones. Stars also have a life cycle; forming stars and dying stars are both visible in the Orion Constellation.

To know more or to explain the life cycle of stars in classroom, follow these links:
Life cycle of Stars for kids: link

FULL DESCRIPTION

Introduction

The facilitator gives a presentation about the Orion constellation, its different stars, their Arabic names, their sizes, their colors, their temperatures, their ages, and their distances from us. The facilitator can use the **Orions-presentation.pdf** in attachment or the videos provided in the background.

Build the 3D model of Orion constellation

- Print the **Orion-drawing.pdf** and glue it or tape it on the Styrofoam board (or draw the constellation directly on the Styrofoam board).
- Check in the **Orion-handout.pdf** the colors of the different stars of the constellation and use the modeling clay to make spheres that correspond to the different stars.
- In the **Orion-handout.pdf**, given the scaling ratio, for each star calculate the length of a wood spike proportionally to its true distance from Earth. then, for each star, cut one wood spike of the calculated length.
- Stick each wood spike on the corresponding star of the drawing on the Styrofoam plate.
- Put the corresponding sphere (star) on top of each stick.
- Make a small container with the clay which corresponds to the Orion nebula and put inside it a few newborn stars (the Trapezium).

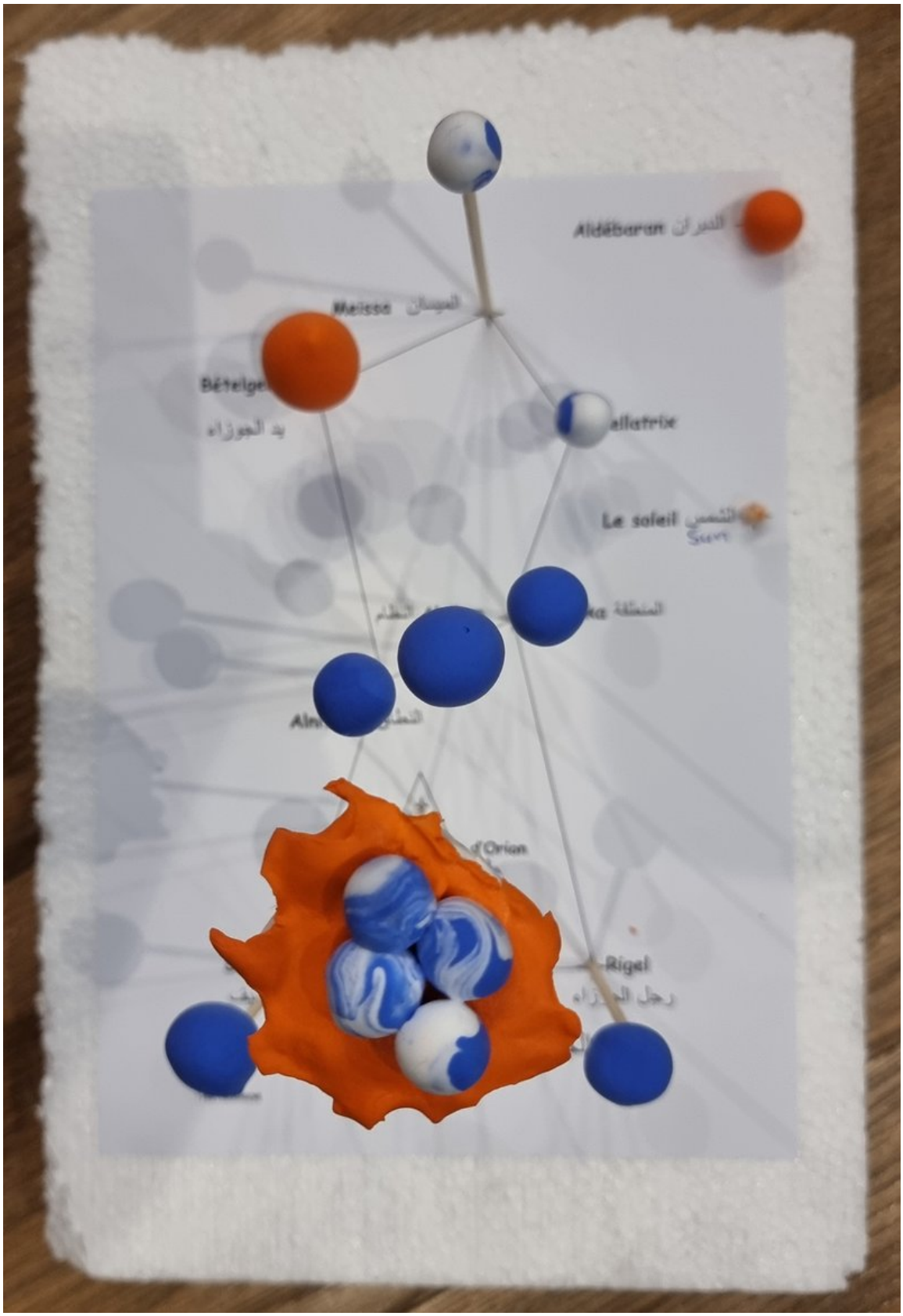

Image: the resulting representation of the Orion constellation seen from above. The small container represents the Orion Nebula, containing newborn stars.

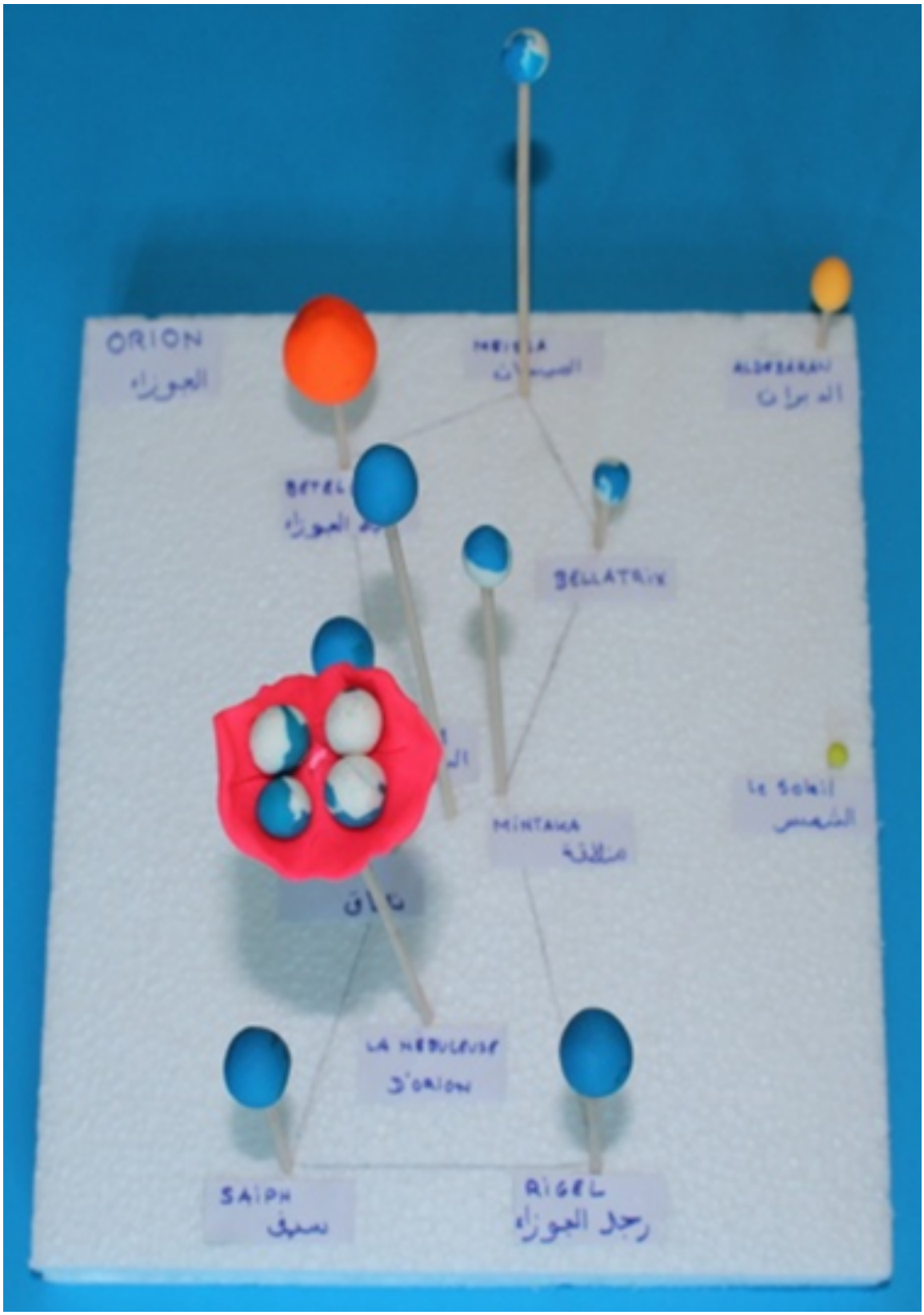

Image: the same representation seen from a different perspective. From this perspective, you can notice that the sticks representing the distance of the stars from Earth are of different length.

Other activities

- Using the same method, make 3D models of other constellations (Big Dipper, Cassiopea, Taurus, Scorpius, etc..). Each group of students will pick a constellation and make a 3D model.
- Make a hanging constellation (instead of sticks, use strings).

EVALUATION

In the attachments a Quiz to be used as a final evaluation.
Questions 8-10 are related to the life cycle of a star.
Solutions to the quiz are: 1-a; 2-d; 3-b; 4-c; 5-d; 6-b; 7-a; 8-a; 9-a; 10-a.

CURRICULUM

- Science: Stars, Constellations, Temperature, Colors, Light year, star evolution.
- Geometry: spheres, 3D
- Maths: scaling, measurements
- History and Technology: Arabic names of stars, mythology
- Art: colors, use of modeling clay, imagination and decoration of Orion Nebula

ADDITIONAL INFORMATION

For more information about the STEAM-Med co-design project : Read this Link

This activity is available in other languages: Link (to be provided soon).

CITATION

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