MISSION X

TRAIN LIKE AN ASTRONAUT

AN ASTRONOMICAL SIZE

MISSION DESCRIPTION

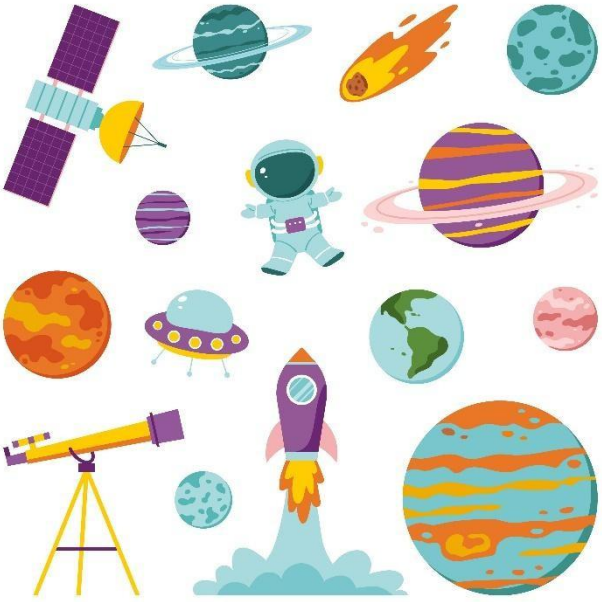
Sometimes it's hard to realize how big things are, especially when they're in space. Is the International Space Station bigger than a truck? My house? The Moon?
Let's compare different astronomical objects to better understand the size of objects in space.

Learning objectives:

- Discovering the world and space;
- Discovering the concepts of size and distance;
- Discovering numbers;
- Learning to express oneself and describe objects.

SUMMARY

Theme: Space
Age: 3-6
Session duration: 45 min
Location: Classroom



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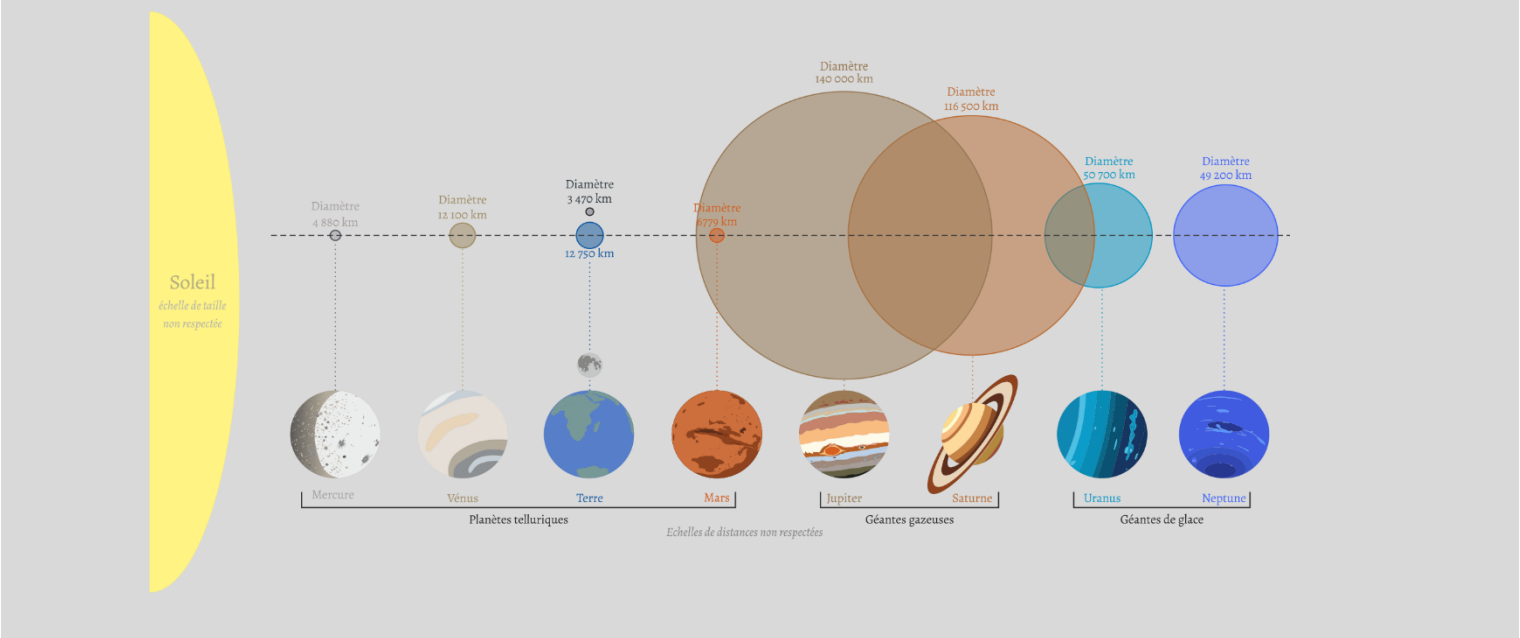
MISSION CONTEXT

Planets, satellites, rockets – which is bigger than what?

The solar system contains a wide variety of objects and stars ranging in size from millimetres to millions of kilometres.

IN SPACE

- The largest object in the solar system is the star at its centre, the Sun, with a diameter of 1,400,000 km. It is around 10 times larger than the planet Jupiter, which is the largest of the eight planets in the solar system.
- The planets vary greatly in size. For example, the diameter of Jupiter is 11 times that of the Earth. However, the Earth is almost 3 times bigger than Mercury, the smallest planet in the system. The size of the latter is closer to that of the Moon, the Earth's natural satellite.
- Finally, while the Moon is the Earth's only satellite, there are also many artificial satellites. The largest of these is the International Space Station, spanning 107 metres, while the smallest, Sprite, measures just 3.5 cm.



The planets of the solar system, portrayed to scale © Terres du Passé

ON EARTH

On the surface of our planet, we can also see space "objects" of different sizes. Rockets in particular are objects that can exceed a hundred metres in length, whereas an astronaut can be between 1.55 and 1.90 metres tall.

There are also meteorites, rocks from outer space that have crossed the trajectory of the Earth, ranging in size from 2.7 m for the largest ever found, the Hoba meteorite, to a few millimetres for the smallest.

For more information:

- Solar system exhibition

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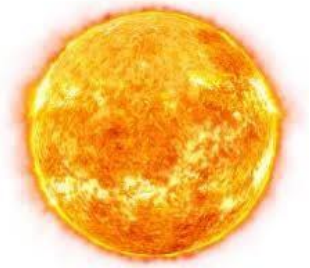
MISSION PREPARATION

For the facilitator

- Print a set of pictures (see appendices) for each group
- Provide a board to display and classify objects by size

Organising the activity with the students

- Divide the class into small groups or individually according to their development
- Distribute a set of pictures to each group



Options if you need to adapt

- Take the most common everyday objects
- Present the activity directly on the board without any individual reflection phase

MISSION SEQUENCE

Suggested step-by-step instructions for carrying out the activity

Explanation of the reference situation

In this activity, students will have to sort space objects by size. Give each student or group the different images. First, they will have to identify each image and then try to sort them by the size of the objects they portray. You can also do this activity directly with the whole class to help them with objects they may not be familiar with. They can then stick the images in the right order on a sheet of paper.

Contextualisation of the situation to be given to the students

Space is immense, with a huge number of objects ranging from the very large to the very small. It's difficult to know everything and to know which is the biggest. Is the Moon bigger than the Earth? Is a rocket bigger than a truck? Is a meteorite bigger than an astronaut?
Your task will be to recognise the objects in front of you and work out which are the largest and which are the smallest.

Organisation

In a classroom, students are divided into small groups of 3 or 4 or are assigned individually according to their age and development. You can also present this activity directly on the board.
The activity consists of three phases. First, the pupils try to recognise and describe the different objects. Then they sort the objects from smallest to largest. Finally, after their work has been corrected, they glue the objects in the right order on a sheet of paper.

ADAPTING THE MISSION

Increase Difficulty/Intensity

- Increase the number of objects to be sorted.
- Let the pupils rank the objects independently.
- Hand out the objects on a sheet of paper for cutting out.

Reduce Difficulty/Intensity

- Reduce the number of objects to be sorted.
- Do the activity directly on the board.

Increase accessibility

- Mix the groups so that the most confident students help the others.
- Replace space objects with everyday objects.
- We'd love to hear your suggestions!

Possible extension

- Discuss the solar system with the students.
- Discovering the concept of size.

LEARNING AREAS

- Making full use of language
- Acting, expressing themselves and understanding through artistic activity
- Acquiring the first mathematical tools
- Exploring the world

PRINTABLE APPENDICES

- Ariane 6 rocket:

  - Dimensions: 62 m high
  - Description: The European Space Agency's new launcher, which lifted off for the first time on 9 July 2024

© CNES

- The International Space Station:

  - Dimensions: 107 m long and 74 m wide
  - Description: Satellite in orbit approximately 400 km above the Earth. The space station is occupied by an average crew of 7 people of different nationalities. It is designed to carry out scientific experiments in microgravity.


© NASA © ROSCOSMOS

- An aircraft:

  - Dimensions: 46.7 m long and with a wingspan of 43.9 m
  - Description: "Zero G" aircraft.
    This aircraft is used to simulate the effect of microgravity by performing bell-shaped trajectories. This means that scientific experiments can be carried out without being on the ISS.

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➢ Thomas Pesquet

- Dimensions: 1m84
- Description: Thomas Pesquet is a French astronaut with the European Space Agency who flew two missions in the ISS in 2016 and 2020.

© ESA

➢ Sophie Adenot

- Dimensions: 1m70
- Description: Sophie Adenot is a French astronaut in the European Space Agency's latest group, who will carry out her first mission aboard the ISS in 2026.

© ESA

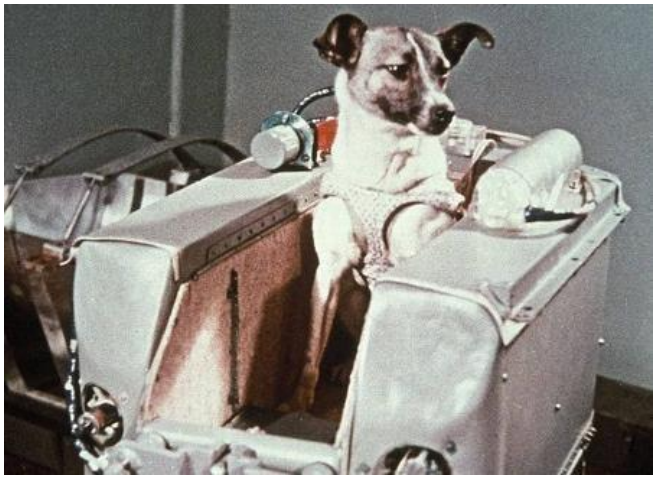
➢ The Hoba meteorite:

- Dimensions: 2.7 m
- Description: The Hoba meteorite, found in Namibia, is the largest known meteorite, weighing in at 60 tonnes. It is thought to have crashed to Earth less than 80,000 years ago.


© Eugen Zibiso

➢ <u>The dog Laïka:</u>

- Dimensions: 30cm
- Description: Laïka was sent into orbit around the Earth by the USSR in 1957. It was the first living being to be placed in orbit.



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➢ <u>City of Paris:</u>

- Dimensions: Approximately 10 km
- Description: French capital.

© CNES © Airbus

➢ <u>A camera:</u>

- Dimensions: 80 cm
- Description: Nikon camera and lenses used by Thomas Pesquet on board the ISS to photograph the Earth.

© ESA © NASA

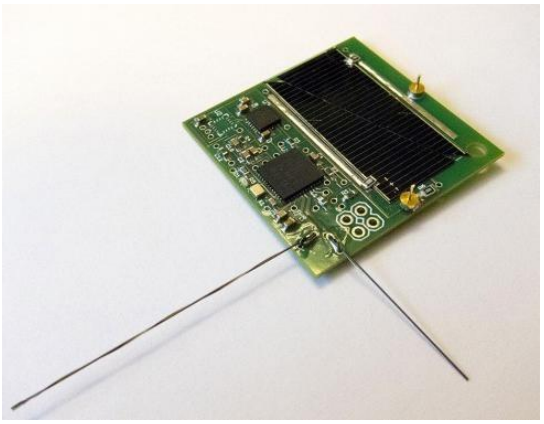
- A football:

  - Dimensions: 22 cm
  - Description: This ball accompanied the crew of the Challenger shuttle in 1986. It was recovered following the accident and was sent back into space 30 years later in 2016!

© ESA

- Sprite satellite:

  - Dimensions: 3.5 cm
  - Description: Nanosatellite from KickSat. It is the smallest satellite in orbit around the Earth.



© Cornell University

- The Moon:

  - Dimensions: 3,500km
  - Description: Earth's natural satellite

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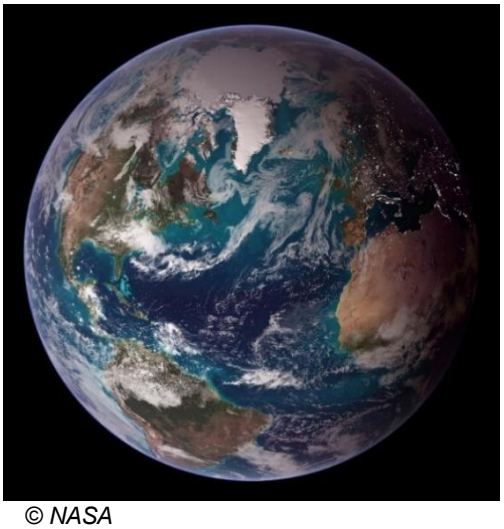
- The Earth:

  - Dimensions: 12,800km
  - Description: Largest rocky planet



© NASA

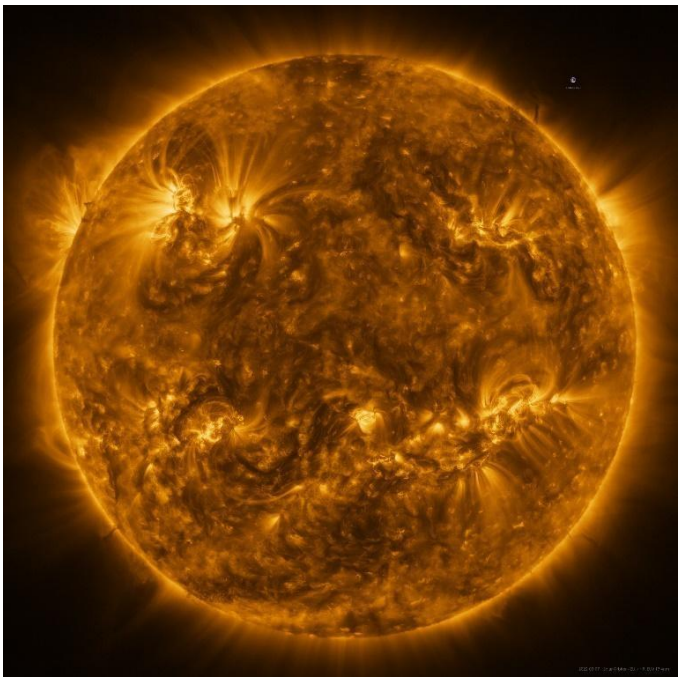
- Jupiter:

  - Dimensions: 140,000km
  - Description: Largest gaseous planet

© NASA

- The Sun:

  - Dimensions: 1,400,000km
  - Description: The star at the centre of the Solar System



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