

## MISSION X

TRAIN LIKE AN ASTRONAUT

# THE ASTRONOMICAL CLOCK



### MISSION DESCRIPTION

Working and living conditions on board the International Space Station (ISS) are very different from those on Earth. In particular, the station orbits the Earth so fast that it takes just 1.5 hours to circle it. This means astronauts can see 16 sunsets and sunrises a day.

The students' mission here is to simulate the movement of the ISS around the Earth, while developing their coordination and teamwork skills.

### **Learning objectives:**

- Improving coordination and speed;
- Cooperating as a team to succeed;
- Discovering numbers and time;
- Making individual progress for the benefit of the team.

### SUMMARY

**Theme:** Physical Education & Sports

**Age:** 3-6

**Session duration:** 30 min

**Location:** outdoors or classroom



## MISSION CONTEXT

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### The International Space Station, the astronauts' home

Teamwork, stress management, coordination – on board the ISS astronauts are subjected to an environment that is very different from that on Earth, requiring a great deal of physical and psychological preparation!

### IN SPACE

- Space stations are large laboratories orbiting the Earth some 400 km above our heads. There are currently two stations: the Chinese Space Station and the International Space Station. This is where all European, and therefore French, astronauts go to carry out various scientific experiments to analyse the effects of microgravity.
- At 108 metres long and 74 metres wide, and weighing in at around 450 tonnes, the ISS is by far the largest satellite in orbit around the Earth. It orbits the Earth at a speed approaching 28,000 km/h, which means that it takes just 1.5 hours to complete one revolution around the Earth. By way of comparison, the Moon takes around 28 days to circle the Earth. This speed means astronauts can see 16 sunsets and sunrises a day.
- Despite this, life on board the ISS is not all plain sailing. The astronauts are locked in a 400m<sup>2</sup> space for several months and must be ready to intervene quickly in the event of an incident. It is thus essential for them to be able to manage stress and difficult situations. That's why they are selected partly on the basis of their emotional stability so that they are prepared to withstand the pressure of an unforeseen event.



Life on board the ISS © NASA © ESA © CNES

## ON EARTH

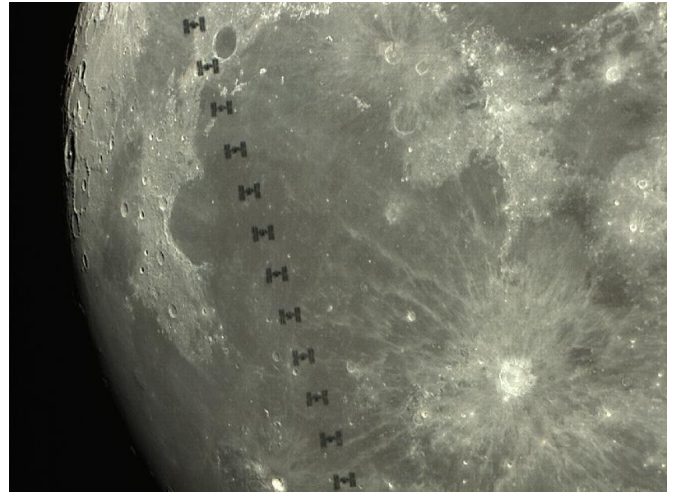
Because of its size, the ISS is easy to observe from the Earth's surface at night. To the naked eye, it will appear as a bright white dot moving relative to the other stars. However, with the increase in the number of satellites in space, it is now possible to observe a large number of satellites every night. So it's best to use an app to find out the precise time when the station will next be passing by.

Links between the lives of astronauts aboard the ISS and the world of sport and disabled sport:

- Cooperation is essential in many sporting activities;
- Stress management at major sporting events;
- Physical and mental preparation of athletes.

For more information:

- [How to become an astronaut \(with \*ROBERT Knows\*\)](#) ;
- [Paxi on board the ISS](#)



## MISSION PREPARATION

### For the facilitator

- Provide enough space to divide the teams up
- One ball per team

### Organising the activity with the students

- Class divided into teams of 6 to 8 students
- The groups each form a circle



### Options if you need to adapt

- Print or colour large pictures of Earth to place in the centre of the circles
- To increase the difficulty, you can vary the size of the ball
- You can move the students closer together or further apart to change the degree of difficulty

## MISSION SEQUENCE

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

### Explanation of the reference situation

The class is divided into teams of 6 to 8 students. For each team, the students form a circle so that they are one arm's length apart. The students then throw the ball to each other counter-clockwise, which is the true direction of rotation of the ISS. The size of the ball can be adapted to suit the age and/or dexterity of the students.

*Bonus: The balls can be decorated to evoke the ISS (a picture to cut and paste is available in the appendix) and Earths can be coloured or made in class to be placed in the centre of the circle to enhance immersion.*

### Contextualisation of the situation to be given to the students

Each group of students represents a crew aboard the space station. They will spend a whole day on board the ISS, represented by the ball. They'll therefore need to complete 16 laps with the ball as quickly as possible, with one lap representing 1 hour 30 minutes. Be careful, the space station is in orbit around the Earth and must not fall. The aim will be to work as a team to finish the day as quickly as possible.

### Organisation

The students stand side by side, forming a circle. Students throw the ball to their right-hand neighbour and try to count the number of turns (adults can help them count).

Please note that the student groups do not compete. The teacher triggers the start of the mission for all the teams simultaneously. You can repeat the exercise, changing the teams.

## SAFETY

- The groups must be at least 5 m apart;
- Do not use objects that are too hard or too heavy.

## ADAPTING THE MISSION

### Increase Difficulty/Intensity

- Increase the distance between students.
- Vary the size of the ball.
- Have the groups compete.

### Reduce Difficulty/Intensity

- Reduce the distance between students.
- Don't count the turns.
- Choose a soft ball.

### Increase accessibility

- Mix the groups so that the most confident students help the others.
- Don't throw the ball, pass it from hand to hand.
- We'd love to hear your suggestions!

### Possible extension

- Discuss the ISS and astronauts with the students.
- Discover the concept of time (hours, minutes, seconds).
- Discover numbers.

## LEARNING AREAS

- Acting, expressing themselves and understanding through physical activity
- Acquiring the first mathematical tools
- Exploring the world
- Bonus: acting, expressing themselves and understanding through artistic activity

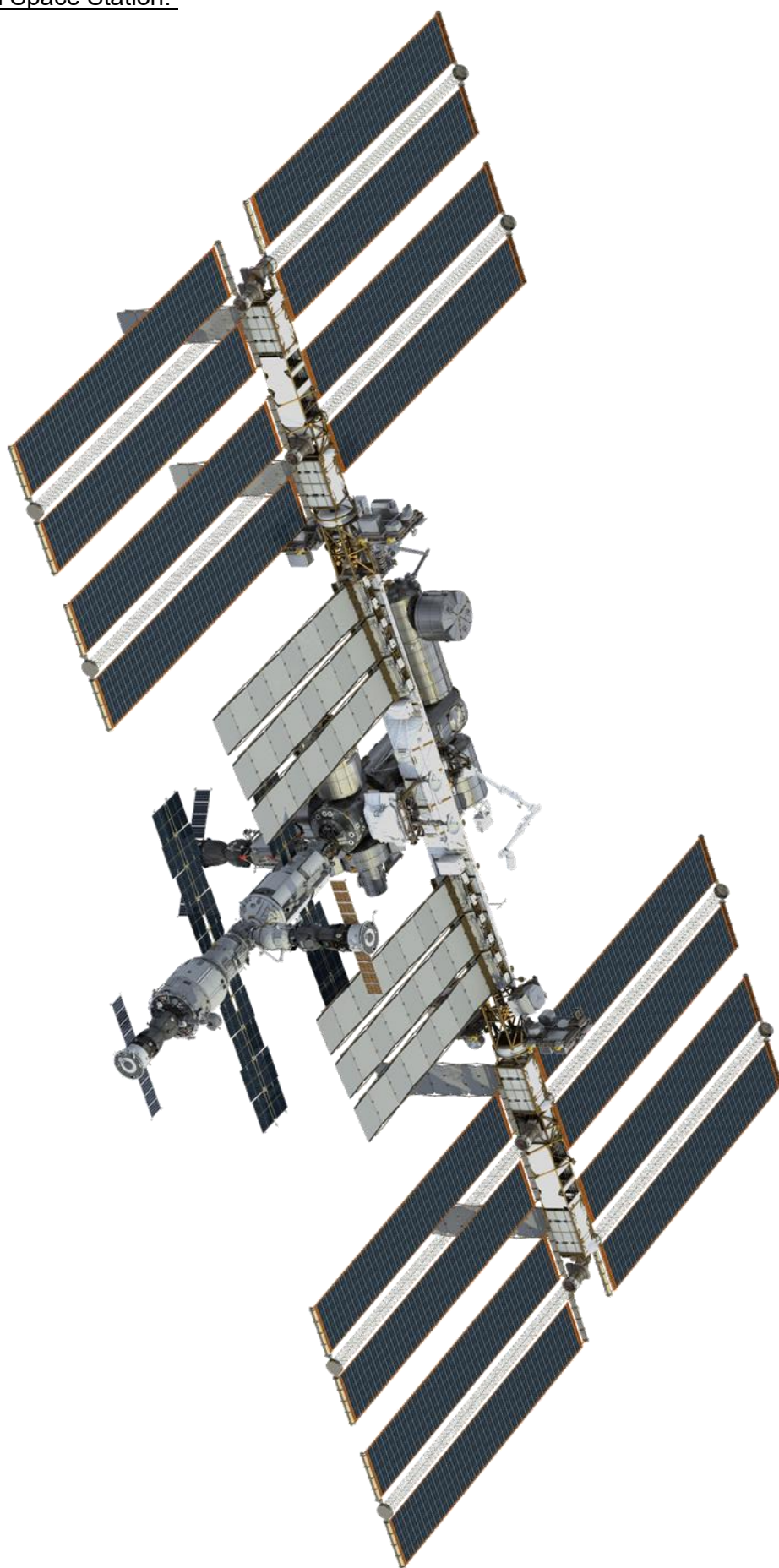




## PRINTABLE APPENDICES

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- The International Space Station:



© 3DSculptor



➤ The Earth (to print):



➤ The Earth (to colour in):



© Aluna1