

# MISSION X

TRAIN LIKE AN ASTRONAUT



## PLANET YOU GO, GRAVITY YOU FIND

### Team Leader Guide

#### MISSION OVERVIEW

Students will perform exercises with balls of different weights, as if they were in different gravitational conditions on different planets.

#### LEARNING OBJECTIVES:

- Build and improve movement skills, coordination, and speed.
- Record observations about improvements in coordination and core and arm muscle strength.

**Skills:** strength, coordination, stabilization, teamwork.

#### FAST FACTS

**Subject:** Physical Education

**Age:** 8-12

**Lesson Time:** 10-15 min

**Location:** a flat surface such as a gym floor or anywhere you can bounce a ball

#### INTRODUCTION

Mass is the amount of matter an object is made of. It is always the same, but its weight changes depending on where or on which planet it is. The force of gravity is also present on the Moon. Because the Moon's gravity is one-sixth of the Earth's gravity, the Moon's gravitational pull is not as great as that of the Earth. This is the reason an astronaut jumping on the surface of the Moon is automatically a long-jump champion. Astronauts on the moon can jump further than ten meters!

On Mars, gravity is less than half the gravity here on Earth but on Jupiter, it is more than double. This means that on Jupiter's surface, you would have a hard time climbing the stairs because the gravity on Jupiter would hold you to the ground much more than the Earth does.



↑ ESA astronaut Paolo Nespoli floating in the Quest Airlock on the International Space Station.

In the astronaut's training, they consider the influence of gravity. When in a spacecraft, like the International Space Station, they are in a free-fall microgravity environment, which looks like they are floating in space. When astronauts return to Earth, they feel tired, as if everything is extremely heavy. Astronauts need to train for several hours every day to maintain their muscles. To do that they can use medicine balls of different weights.

# LET'S TRAIN LIKE AN ASTRONAUT!



## MATERIALS

### Team Leader

- At least 3 balls (medicine etc.) of different weights: e.g. 1 kg, 1.5 kg, 2 kg
- A clock, timer or stopwatch

### Student

- Mission Journal and pencil

### Optional to be used in Mission Adaptations

- Music player
- Different kinds of balls

## PROCEDURE

### Jump

1. Squat with the ball in the hands.
2. Jump extending the body and lifting the ball above the head.
3. Squat again
4. Cover a length of 3 meters while jumping with the ball in the hands.
5. Pass the ball to a friend

### Balls in a circle

1. Students form a circle with 10 people.
2. Students stand with legs shoulder-width apart.
3. The ball rolls on the ground towards a student. The ball must remain on the floor and not be thrown.
4. Students must prevent the ball from passing through their legs by continuously pushing it towards another student.
5. If the ball passes through a student's legs, they are out of the circle.



Redo the two exercises with heavier balls. Students can record observations before and after this physical experience in their Mission Journal.



## THINK SAFETY

- Avoid obstacles, hazards, and uneven surfaces.
- Exercise in a gym with enough space for throwing balls and jumping and appropriate heating conditions.
- Appropriate clothes and shoes should be worn.
- Keep hydrated before, during, and after any physical activity.
- A warm-up/stretching and cool-down period is always recommended.
- Choose balls with adequate weight (not too heavy).

## MISSION ADAPTATIONS



### Increase Difficulty

- Use balls with more weight.
- Create intervals where students alternate between squat and jump.
- Increase the number of squats and jumps.
- The students jump 4 meters.
- Create a circle with the entire class instead of 10.
- Use more balls in one circle.
- Create a circle where the students face away from each other.



### Increase Accessibility

- Perform this activity while seated.
- Students don't jump but lift the ball over their head and make themselves as long as possible.
- Adapt the jumps and squats according to the physical abilities of the students.
- Use adequate movements according to the abilities of the students, i.e., lifting the ball up over the head.
- Create a circle with fewer students.
- Students pair up and throw/hand and catch the ball to their partner.
- Use music and created dances with the balls.



### Decrease Difficulty

- Reduce the weight of the balls.
- Students jump 1-2 meters.
- Reduce the number of squats and jumps. Allow rest in between.
- Create a circle with fewer students or use pairs of students.



This resource has been adapted from NASA's "Planet You Go, gravity You Find".

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