UK SPACE AGENCY

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MISSION X

TRAIN LIKE AN ASTRONAUT

BASE STATION WALK-BACK

Team Leader Guide

MISSION OVERVIEW

Students will walk or run to improve lung, heart and muscle endurance. As an astronaut, it is important to be in good physical shape to face the physical challenges of a space mission.

FAST FACTS

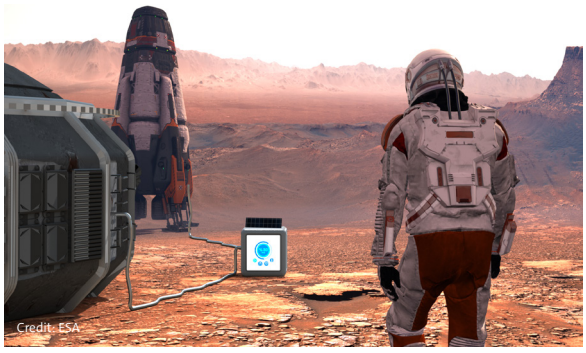
Subject: Physical Education
Age: 8-12
Lesson Time: 30 min
Location: athletics field, football pitch, path or another large outdoor area.

LEARNING OBJECTIVES:

- Understand the importance for an astronaut to be physically fit when going on a space mission.
- Use muscle, heart and lung function and learn about the importance of physical activity for a healthy lifestyle.

Skills: endurance training, muscle strength, awareness of heart, muscle and lung function.

INTRODUCTION



Being physically active is an important way to keep your muscles strong and your heart and lungs healthy. When you are shopping at the mall, touring a museum, or on the way to and from class at school, your muscles, heart, and lungs benefit. They get stronger by being worked for long periods of time.

When astronauts explore the Moon or Mars, they have to perform many physical tasks, such as setting up scientific experiments and various robotic systems around the base. They also have to collect various samples, maintain technology or walk long distances in spacesuits to explore the surface. Astronauts' physiques are examined by experts and, before they go on a mission, astronauts undergo training to ensure they are physically capable of performing normal, as well as unexpected mission tasks, such as a “walk-back”. This can for example happen when the rover that they drive has mechanical problems and stops working at a distance of 10 km from their base station. It is important that all crew members are physically prepared for the mission and can walk long distances back to the base if necessary. Walking or jogging can improve muscular endurance and heart and lung endurance, also known as cardiorespiratory endurance. Regular exercise on Earth, and in space, helps crew members maintain strong physical performance levels.

LET'S TRAIN LIKE AN ASTRONAUT!

MATERIALS

Team Leader

- Tool to measure distance, e.g. smartphone
- Tools for marking distances, e.g. cones or flags
- A clock or stopwatch

Student

- Mission Journal and pencil

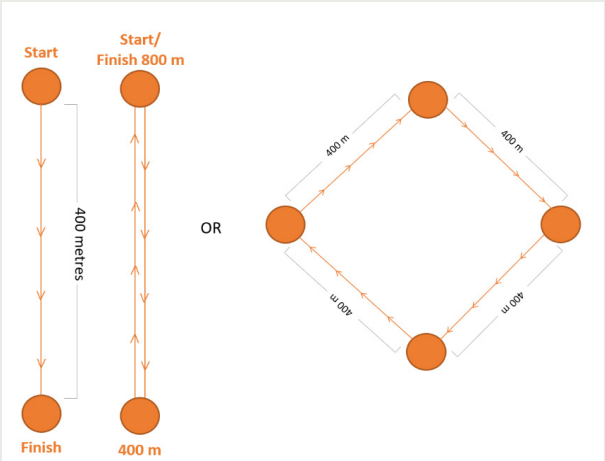
PROCEDURE

The students have arrived on Mars and will live on a space base. From the space base, the students ride in a Martian truck to collect samples from the sands of Mars to conduct experiments that could provide valuable knowledge to mankind. Suddenly, the Mars truck breaks down and the students have to return to the space base. Are they in good enough shape to cover the distance?

1. The students line up at the start.
2. The students walk, jog or run the distance at their own pace. They can start altogether or complete the distance one by one.
3. The students start by trying to complete the first 400 m (¼ mi).
4. The students slowly work to increase the distance by 400 m.
5. Over time, the goal for them should be to complete 1600 m (1 mi).
6. Students record their time and observations about their physical endurance in their Mission Journal, e.g. how their speed or fatigue changed along the way.

SET-UP

There are multiple ways to set-up the course for this activity. Two possible set-ups are proposed in the diagram below. Mark each 400 m with an object such as a cone or flag.



THINK SAFETY

- It is always recommended to provide a warm-up and cool-down period before and after the training.
- Remember to drink sufficient water.
- Avoid obstacles, hazards, and uneven surfaces.
- Students must wear appropriate clothing and shoes so that they can move freely and comfortably.
- Be aware if any students have illnesses or allergies, e.g. asthma or allergy to grass.

MISSION ADAPTATIONS

Increase Diffculty

- Increase the distances or area to walk, jog and run.
- Sprint 100 m then walk 100 m. Repeat this four times.
- Sprint intervals on a basketball court. Sprint to one side, touch the floor with your hand and reverse immediately to where you started and touch the floor. Repeat this multiple times.

Increase Accessibility

- Perform with an assistance partner (push in wheelchair or stabilize walker in support via hand-over-hand assistance).
- Select brightly coloured items: cones, markers; or use sound-emitting columns for the performer to follow.

Decrease Difficulty

- Decrease the distances or area to walk, jog and run.
- (Speed) walk the entire course.
- Rest each time for a few minutes after completing a 400 m distance before continuing with the next 400 m.

This resource has been adapted from NASA's "Base Station Walk-Back".
Original Credits: Lesson development by the NASA Johnson Space Center Human Research Program Education and Outreach team with thanks to the subject matter experts who contributed their time and knowledge to this NASA Fit Explorer project.