UK SPACE AGENCY

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MISSION X

TRAIN LIKE AN ASTRONAUT

JUMP FOR THE MOON

Team Leader Guide

MISSION OVERVIEW

Students will perform jump training with a rope to improve strength and endurance.

FAST FACTS

Subject: Physical Education
Age: 8-12
Lesson Time: 15-25 min
Location: a flat, dry surface with room to travel

LEARNING OBJECTIVES:

- Improve movement skills and strength and endurance of the heart and other muscles.
- Make and record observations about improvements in jump training.

Skills: coordination, balance, endurance.

INTRODUCTION

On Earth, humans experience the effects of gravity pulling on the human body which applies a constant force or loading effect. This constant force is essential for building the healthy, strong bones we need on Earth. The force can be increased, and bones can be made stronger by doing regular weight bearing physical activities such as jumping, walking, running, or dancing. This is especially important when humans are young because this is when the skeleton is most responsive to exercise loading. Regular exercise done during youth will compensate for the expected bone loss that occurs as we grow older.

↑ Astronaut Luca Parmitano exercising on a treadmill on the International Space Station.

Once in space, bones in the lower torso and legs are most affected by the reduced gravity environment. ISS Crew members are provided with a harness for them to wear that straps them to the treadmills when the astronauts are exercising. When they return to Earth, they continue to exercise and eat properly to build up their bone strength. They have their bone mineral density (BMD) tested up to three years after they return from their mission to ensure their bones are as strong and healthy as they were before their mission. Bone strength, along with other components of fitness (such as cardiovascular endurance and muscular endurance) can be improved just by jumping – or jumping rope.

LET'S TRAIN LIKE AN ASTRONAUT!

MATERIALS

Team Leader
- Watch or stopwatch/timer.
- 1 jump rope per student.

Student
- Mission Journal and pencil.

Optional to be used in Mission Adaptations
- A small step, bench, or box.
- Various objects to jump over.

PROCEDURE

Students should stand at least 2 arm lengths apart from one another and do the following:

SET-UP

Students should stand at least 2 arms lengths apart from one another.

Stationary

1. With a jump rope, jump in place for 30 seconds.
2. Rest for 60 seconds.
3. Repeat 3 times.
4. When mastered, proceed to move.

Moving

1. Try to jump rope whilst moving across a smooth surface for 30 seconds.
2. Rest for 60 seconds.
3. Repeat 3 times.
4. Repeat jump training two more times.
5. Record observations before and after.

THINK SAFETY

- Students should use an appropriate jump rope for their height.
- Students should bend their knees slightly when landing and aim to land on the balls of their feet.
- Always stress proper technique when jumping.
- Be aware of signs of overheating – ensure students are properly hydrated before, during and after an activity.

MISSION ADAPTATIONS

Increase Diffculty

- Double the time you jump rope for in between rests.
- Try hopping on one leg whilst jumping rope.
- Move side to side rather than forwards when moving and jumping.

Increase Accessibility

- Hold on to a table and jump in place.
- Lay a rope on the floor and jump over it in a variety of ways.
- Jump without a rope, or an imaginary rope.
- Use a variety of objects to jump on, or over.
- Jump on trampoline while holding onto wall or partner.

Decrease Difficulty

- Jump for 20 seconds rather than 30 seconds – or less if necessary.
- Jump on and off a small step, instead of jumping a rope.

This resource has been adapted from NASA's "Jump For The Moon".
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.