

## TRAIN LIKE AN ASTRONAUT MISSION HANDOUT

### YOUR MISSION: Explore and Discover

You will safely carry weighted objects from the Exploration Area back to your Base Station to improve aerobic and anaerobic fitness. You will also record observations about improvements in aerobic and anaerobic fitness during this physical experience in your Mission Journal.

Whether you are walking a mile or moving slowly to help someone carry a heavy object, your body must regulate oxygen levels. Your body uses oxygen for energy as aerobic activity, whereas anaerobic exercise makes the body produce energy without oxygen. Certain activities will strengthen both aerobic and anaerobic systems at the same time.

### MISSION QUESTION:

What is a physical activity that would help your heart and lungs become stronger as you increase your aerobic and anaerobic activity?



### Think Safety!

Astronauts know that using correct lifting techniques are important both on Earth and in space.

- ☐ Bend your knees to lower yourself. As you lift an object, keep your back straight and use your legs to stand up straight.
- ☐ Do not run at any time during this mission.
- ☐ Avoid obstacles, hazards, and uneven surfaces.
- ☐ Remember that drinking plenty of water is important before, during, and after physical activities.

By doing regular aerobic activity, your heart and lungs will become stronger. This allows you to do more physical activities longer without having to stop and rest. Regular anaerobic activity can make your muscles stronger and allow you to do more activities with strength and speed. Your mission purpose is to strengthen both.

## MISSION ASSIGNMENT: Aerobic/Anaerobic Training

**○ Pre-Activity: Heart Rate**

- ⇒ Calculate and record your Target Heart Rate (THR) in your Mission Journal.

**○ Exploration Mission One**

One team member will be the mission control medic.

One team member will be the mission explorer.

- ⇒ Begin at the Base Station.
- ⇒ The medic will help take the explorer's heart rate and record it in the explorer's Mission Journal.
- ⇒ The medic will ask the explorer how they feel and record responses in the explorer's Mission Journal.
- ⇒ When instructed, the explorer will walk to the Exploration Area to collect mission samples. It is important that the explorer does not run during this mission.
- ⇒ The explorer will safely lift one mission sample and take it to the Base Station.
- ⇒ The explorer will continue to collect six mission samples of different sizes and weights, safely lifting one mission sample at a time and taking it to the Base Station.
- ⇒ After all mission samples are at the Base Station, the explorer will return all mission samples one at a time to the Exploration Area.
- ⇒ When all mission samples are back in the Exploration Area, return to the Base Station.
- ⇒ With the medic's help, the explorer will take their heart rate after Exploration Mission One and record it in their Mission Journal.
- ⇒ The medic will ask questions about the explorer's physical condition and record answers in the explorer's Mission Journal.
- ⇒ The explorer should prepare to start Exploration Mission Two without sitting down.

**○ Exploration Mission Two**

- ⇒ Begin at the Base Station.
- ⇒ The explorer will stand as they squeeze two stress balls, one in each hand, for 30 seconds.
- ⇒ The medic will tell the explorer when 30 seconds are up.
- ⇒ After 30 seconds, the explorer will walk to the Exploration Area to collect mission samples. It is important that the explorer does not run during this mission.
- ⇒ The explorer will safely lift one mission sample and take it to the Base Station.
- ⇒ The explorer will continue to collect six mission samples of different sizes and weights, safely lifting one mission sample at a time and taking it to the Base Station.
- ⇒ Every time they return to the Base Station, the explorer will squeeze the stress balls for 30 seconds. The explorer will remain standing while squeezing the stress balls.
- ⇒ After all mission samples are at the Base Station, the explorer will return all mission samples one at a time to the Exploration Area. Do not squeeze the stress balls this time.
- ⇒ With the medic's help, the explorer will take their heart rate after Exploration Mission Two and record it in their Mission Journal.
- ⇒ The medic will ask questions about the explorer's physical condition and record answers in the explorer's Mission Journal.

Follow these instructions to train like an astronaut.

## It's a NASA Fact:

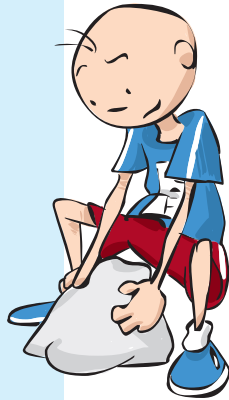
**Oxygen:**  
A colorless gas found in air. It is one of the basic elements on Earth and is needed by all living things.

**Aerobic:**  
A physical activity which uses the arm and leg muscles and gives the heart and lungs a continuous workout.

**Anaerobic:**  
A physical activity which improves your muscle tone but does not depend on oxygen.

**Base Station:**  
A home-base on the Moon or Mars where astronauts will be stationed.

**Target Heart Rate:**  
A heart rate that is attained during aerobic exercise and represents the minimum level of exertion at which cardiovascular fitness can increase for an individual in a given age group.



To explore the surfaces of the Moon and Mars, astronauts must be able to physically complete the tasks required of them. This includes walking to collection sites, taking core samples of soil, collecting rocks, and safely lifting other objects they find. Astronauts also need to carry science experiments from the base station out to the lunar surface for collecting and sending information back to Earth. Astronauts are already doing work similar to this on the International Space Station (ISS). Astronauts are doing spacewalks to install new modules to the ISS, putting in new experiment racks, moving equipment, and doing daily chores. In order to complete this hard work, astronauts must be physically prepared. To prepare, astronauts regularly practice aerobic activities such as walking, running, or swimming. They also work their anaerobic system by lifting weights.

## Mission Explorations:

- ☐ Create a class graph that includes the heart rates of each explorer at the beginning of their mission and the end of their mission. Compare your data with the class. How did the heart rate change throughout this Train Like an Astronaut mission?
- ☐ Create a list of clues for finding a hidden object of your choice. Give these clues to other class members and have them explore for that hidden object.

## FITNESS ACCELERATION: Test Yourself!

- In a large defined area search for five hidden mission samples. Try to find and return five objects to your Base Station in two minutes. Make sure to check your heart rate before and after the exploration.
- Each group should try to find a specified amount of mission samples in a given amount of time. These mission samples must have a combined weight of at least 15 lbs (6.8kg). For example, you have five minutes to find four mission samples that have a combined weight of 15 lbs (6.8kg).

**Status Check: Have you updated your Mission Journal?**