

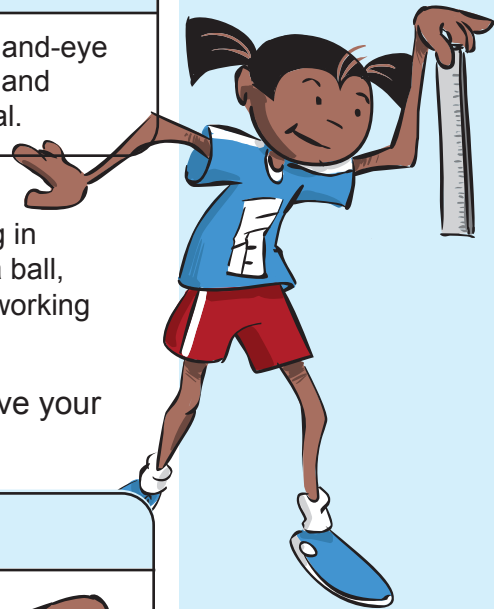
## TRAIN LIKE AN ASTRONAUT MISSION HANDOUT

### YOUR MISSION: **The Speed of Light**

You will perform a time reaction activity using a ruler to practice your hand-eye reaction time and improve your concentration. You will collect, record, and analyze data during the skill-based experience on your Mission Journal.

Reacting quickly and having good concentration can be very important in life. A quick hand-eye reaction time can allow you to catch something in mid-fall. When you learn and/or practice a new skill, such as catching a ball, crossing the street, riding a bicycle, or someday driving a car, you are working on your concentration and your ability to react.

**MISSION QUESTION:** How can you perform a test and improve your concentration and hand-eye reaction time?



### MISSION ASSIGNMENT: **Hand-eye Reaction Training**

**You will complete this mission with a partner.**

One will be the crew member the other the trainer.

- You will sit or stand directly across from each other. Your teacher will give you specific instructions.
- The crew member will do the following:
  - Extend your dominant arm out in front of your body.
  - Make a fist with your hand, thumb side up.
  - Point your thumb and index finger forward, keeping them about 2 cm apart.
  - Use your index finger and thumb to catch the ruler immediately after it has been released by the trainer.
- The trainer will do the following:
  - Hold the ruler between the outstretched index finger and thumb of the crew member's dominant hand.
    - Line the top of the crew member's thumb level with the zero centimeter line on the ruler.
  - Without warning, release the ruler letting it fall between the crew member's thumb and index finger. When the crew member catches the ruler, determine the distance between the bottom of the ruler and the top of the crew member's thumb.
- Record the measurement in centimeters in the Mission Journal.
- Repeat and record for a total of ten times.
- Switch roles and repeat the procedure above for a total of ten trials.
  - Measure each time score using the Distance and Time chart.
  - Note: There are 1,000 milliseconds (ms) in 1 second.
  - Record your best time in the Mission Journal.
- Record observations before and after this skill-based experience in your Mission Journal.

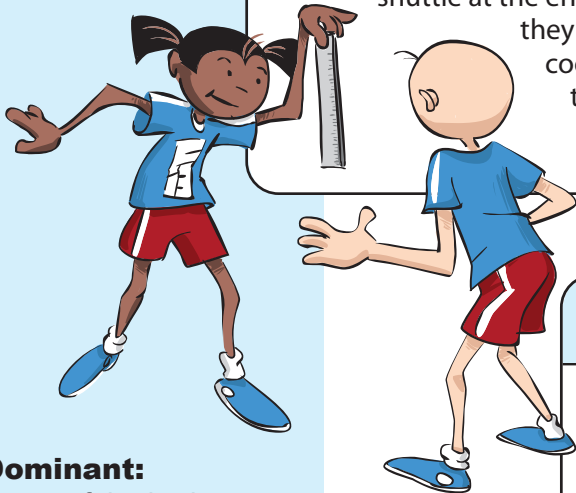


With practice and concentration you can improve your hand-eye coordination which will increase your reaction time. This will prepare you to react when something unexpected happens. This is especially important if you can prevent an accident.

**Follow these instructions to train like an astronaut.**

## It's a NASA Fact:

In preparation for space travel, astronauts invest many hours with NASA ASCR's and instructors to practice their hand-eye reaction time. Operating the robotic arm on the International Space Station (ISS) or landing the space shuttle requires crew members to have quick reaction times. Crew members must also be prepared for environmental hazards such as lighting and solar winds which could have a negative impact on reaction times. Fatigue, physical stamina and noise levels can also have a detrimental effect on an astronaut's reaction time. One responsibility of space shuttle pilots is to safely land the shuttle at the end of the mission. Pilots must practice landing techniques before they go into space. They use simulators on Earth to improve hand-eye coordination and sharpen concentration skills. Experience has shown that shuttle pilots with better hand-eye coordination and sharper concentration skills have more success landing the shuttle after a 12 to 14 day mission.



### Dominant:

A part of the body that instinctively takes the lead over another.

### Robotic arm:

A programmable, robot manipulator, that has functions similar to a human arm.

### Fatigue:

A lack of energy.

### Trials:

The act or process of trying and testing.

### ASCR:

Astronaut Strength, Conditioning, and Rehabilitation Specialists; a fitness specialist that provides training pre- and post-flight for NASA astronauts.

## Fitness Acceleration

- ☐ Squeeze a stress relief ball 15 times and then try the Speed of Light activity. Did this affect your time? Explain.
- ☐ Ride in an elevator while doing the ruler catch activity. Did this affect your reaction time? Explain.
- ☐ Do twenty jumping jacks and then try the Speed of Light activity. Did this affect your reaction time? Explain.

### Think Safety!

Researchers and NASA ASCR's work with the astronauts by providing a safe environment to practice and master skills so astronauts are not injured. You must always practice safety!

- ☐ Sit or stand in a comfortable position during this activity.
- ☐ Use tools and equipment in the appropriate manner for this activity.
- ☐ Avoid obstacles, hazards, and uneven surfaces.
- ☐ Wear appropriate clothes and shoes that allow you to move freely and comfortably.

## Mission Explorations:

- ☐ Practice a video or computer game that requires quick decision making.
- ☐ Participate in quick-moving sports such as volleyball, tennis, table-tennis, or racquetball.
- ☐ Visit an internet site approved by your teacher that has a reaction time test. Some involve changing lights, sounding buzzers, and even driving cars.

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