



# LIVING SPACE (LET'S TALK SCIENCE)



SCIENCE AND  
TECHNOLOGY

## MISSION DESCRIPTION

Participants will begin by studying the key environmental conditions that are monitored and managed to keep astronauts healthy on the International Space Station (ISS). Then participants will measure environmental conditions such as temperature, relative humidity, and CO2 in their learning environment and submit the data to the Let's Talk Science national database. This will enable participants to compare their data with information from other participating groups across Canada, as well as data from the ISS. After developing their understanding of optimal ranges for environmental conditions, and collecting data on their current environment, participants will develop a plan for improving environmental conditions in their learning environment. Once the improvement action plan has been implemented, participants will reflect on the findings of their investigation in a digital report.

Difficulty: **MODERATE**

Duration: **FOUR TO EIGHT  
50-MINUTE CLASSES**

## TIMELINE

Description	Duration*
<b>Inquiry:</b> Identify, measure and record the environmental variables that affect physical and mental health on Earth and on the ISS.	50–100 minutes + time for data collection
<b>Improvement:</b> Analyze data and develop an action plan for improving conditions.	50–100 minutes + time to implement action plan
<b>Report:</b> Consolidate and reflect upon the data gathered during the investigation in order to communicate findings using a digital format.	50–100 minutes + time to prepare and present findings
<b>Digital Literacy Activities (optional):</b> Develop computational thinking skills by programming research instruments related to the Living Space project.	50–75 minutes per activity
<b>Total</b>	<b>150–300 minutes for lessons</b>

\*Timing will vary depending on participant experience and interest. Each lesson can be scaled up or down depending on grade level and readiness



# BACKGROUND

Long-duration space exploration requires astronauts to spend extended periods of time living in a confined, indoor environment. Because of this, it has become increasingly important to understand the impacts of environmental conditions such as temperature, humidity and carbon dioxide on human health. When astronauts are sent to the International Space Station (ISS), the environmental conditions aboard the Station are closely monitored by ground personnel using sensor technologies that can alert them to potentially dangerous conditions.

The Living Space project explores how indoor environmental conditions influence health. Participants identify the best conditions for healthy living, and recommend changes to improve their learning environment. This knowledge is important on Earth, on the ISS, and for the future of long-duration space travel.

## LEARNING ACTIVITIES

- Explore how environmental conditions influence physical and mental health
- Use environmental measurement tool(s)
- Collect and record data about environmental conditions in your learning environment and aboard the ISS
- Develop an improvement action plan based on initial findings
- Share project results in a digital format

## LEARNING GOALS

- Understand Canadian contributions to space research
- Understand how environmental factors can affect physical and mental health, both on Earth and in space
- Make data-driven decisions about the conditions of the learning environment
- Use a digital format to communicate findings

# MISSION PREPARATION

## MATERIALS

- Materials for each lesson are itemized in the online lesson description.
- Participants can take environmental readings with common tools such as thermometers, scientific air quality monitoring devices, or programmable micro-controllers with sensor arrays. Educators can choose their preferred option.
- The digital literacy activities require access to micro:bits and sensor arrays. These activities are at the discretion of the educator and are not required for completion of the project.

## SET-UP

- Preparation instructions for each lesson are described in the lesson descriptions online.

# MISSION PARTICIPATION

Visit the Let's Talk Science Living Space project page to learn more and enroll in the project:

[letstalkscience.ca/livingspace](http://letstalkscience.ca/livingspace)