

03 MISSION PREP ZONE

Training for Life in Space



Challenge Question: How Might It Feel to Make Music in Microgravity?

Key Themes: Learning about physical training for astronauts; making personal connections to humans' physical relationship to gravity on earth

- » **Challenge Activity:** Use physical and mental experiments to bring awareness to how gravity influences the human body at all times on earth and ways gravity is a part of performing on a musical instrument.
Note: It's suggested learners use musical instruments for this challenge, but singing or a different physical activity can be substituted, as needed.
- » **Standards:** CASEL Self-Awareness; NCAS Anchor Standards #5, #10, #11
- » **STEM Highlights:** Polaris Training Adventures; Earth's Gravity vs. Microgravity; Creating Microgravity with Parabolic Flights; Instruments on the International Space Station; A Music Teacher in Parabolic Flight



15 mins



Activity framing to share with learners:

Even before joining the Polaris Dawn crew, Sarah Gillis was literally an expert in astronaut training. As part of her work at SpaceX, Gillis helps train all the astronauts who will go to Space in the Dragon spacecraft, so she knows a ton about how to operate and live in the spacecraft safely. However, Gillis' new role as a Polaris Dawn crew member means she will be heading into space herself. Along with this new job comes quite a bit of new training—and astonishing adventures!

Some parts of crew training involve skill-building and acquiring new knowledge, like studying essential medical care, or learning how to capture data and use equipment for the dozens of in-space experiments the crew will carry into orbit. Other parts of training focus on the intense physical challenges that come along with space travel. The crew will experience tremendous forces of acceleration, significant changes in air pressure, and of course a completely different relationship with gravity. In orbit, the crew will live in a **microgravity** environment where objects (including themselves) float through the air as if they were weightless!





Explore the **Mission Highlights** and accompanying videos to learn more about what the Polaris Dawn Crew has been doing to prepare for their new experiences with microgravity, as well as some of the questions they still have about how a microgravity environment might affect their day-to-day activities.



[Polaris Training Adventures](#)



[Earth's Gravity vs. Microgravity](#)



[Creating Microgravity with Parabolic Flights?](#)

Challenge Activity

For the Polaris Dawn crew, preparing to live and work in microgravity involves a combination of on-earth preparation and experimentation. Here on earth, you, too, can experiment as if you're preparing for a microgravity adventure of your own. While gravity affects nearly all day-to-day activities—eating, writing, even sleeping—this challenge is going to focus on gravity and making music. So, grab an instrument and tackle your own microgravity mini-training session using the physical and mental experiments below. Try them out and see if you can answer this Zone's Challenge Question:

How Might It Feel to Make Music in Microgravity?

→ (Note: If a musical instrument isn't available, try making music by singing, or substitute a different playful activity like dancing, drawing, bouncing a ball, etc.)

01 Start by standing or sitting in a comfortable space--no musical instruments needed yet! Try each of the thought experiments below to first bring your focus to your body's interactions with gravity.

Gravity Awareness Experiment #1

- » Find a comfortable sitting or standing position.
- » Notice where your body is making contact with a surface, like your feet on the ground or your seat on a chair.
- » Imagine relaxing the weight of your body and sinking down into those surfaces.
- » Take 3-5 slow breaths. Feel heavy. Feel Grounded.

Gravity Awareness Experiment #2

- » From a comfortable sitting or standing position, notice again where your body is making contact with a surface.
- » This time, imagine the ground and the surfaces you are touching are giving you support by pushing you up.
- » Picture that your body is lightly balanced, with energy pressing up through you from the ground all the way to the top of your head.
- » Take 3-5 more slow breaths. Feel your spine expanding upwards.

02 Now that you've turned up your awareness of gravity here on earth, grab your musical instrument. Start playing and bring your focus to your connection with gravity as you move.

- » What are some ways you already think about gravity as you play?
- » Are there parts of playing that need to feel heavy, or parts that need to feel support from below?
- » How does gravity help you? What's more challenging because of gravity's pull or push?

03 Next, disrupt your normal playing position and explore new interactions with gravity by **lying down** on your back. (If lying down flat isn't possible, experiment with lying on your side or leaning dramatically at an angle.) Try playing your instrument from this new position.

- » Where do you feel heaviness now? Where do you feel support?
- » How have your movements changed? What's easier—and what's harder, or maybe even impossible?



Learning Idea

Steps 1-3 can be used as a recurring "Gravity Challenge" warm-up routine to strengthen learners' mind-body connection or as an energy intervention on those challenging days when some extra movement and silliness is needed!

04 Finally, return to a comfortable position for your last experiment (and this one will just be a "thought experiment"—something you do with your mind.) Try to imagine playing in microgravity without those familiar feelings of weight and support your experience on earth.

- » Where might you notice these changes the most as you play?
- » How might you have to adjust in order to create sound or use your instrument comfortably?



Want to share what it was like to experiment with gravity while playing? Tell us or share photos by posting on social media using the hashtag [#space4music](#). We will be sharing selected submissions in this Zone's **Challenge Accepted!** space.