

Red Planet:

Read, Write,
Explore!

Extension Activity The Gravity on Mars

Teaching Time: 20-40 minutes

Background:

The gravity of a planet is determined by the mass of the planet. Mass is a fixed quantity, but weight is not. Weight is a value defined by how much the planet is pulling you down! If you traveled to Mars, you would weigh less because Mars is a less massive planet than Earth and is not pulling as much on you.

Motivation:

The gravity on Mars is roughly $\frac{1}{3}$ the gravity on Earth. That means objects would weigh about $\frac{1}{3}$ of their Earth weight if you brought them to Mars.

Materials:

- Two opaque containers of equal size and shape (stainless steel water bottles, spreadable butter container, etc.)
- Something to fill the containers, such as rocks, pennies, sand, or marbles
- Gram scale
- Duct tape

Procedure:

- Fill two identical opaque containers with sand, pennies, rocks, etc., so that one weighs about $\frac{1}{3}$ the weight of the other. Use a gram scale to help weigh the items. For example, have the “Earth container” equal to 1.2 kilograms and the “Mars container” equal to 400 grams. Make sure the gram scale you use supports these weights.
- Seal the containers with duct tape so students are not tempted to peek.
- Tell students to imagine they are astronauts about to leave on a mission to Mars. They will need to pack a container of equipment. (Feel free to improvise here).
- Pass around the heavier “Earth container.”
- Tell students to now imagine they’ve arrived at Mars, and must move the container out of the spaceship.
- Pass around the lighter “Mars container.”

Example Discussion Questions:

- What did you notice about the weight of the container? A. *The weight of the container on Mars is less heavy.*
- Would your body feel heavier or lighter on Mars? Why? A. *There is less gravity on Mars, so you would feel lighter.*
- Can you think of things you could do on Mars that you could not do on Earth? A. *You could jump about three times higher. You could move*

objects (like big rocks) that would be too heavy to lift on Earth. You could throw things farther than you could on Earth.

- *Would you float away on Mars? A. No, there is still plenty of gravity to hold you down.*

Extension activity:

Your Weight on Other Worlds online calculator:

<http://www.exploratorium.edu/ronh/weight/index.html>