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Mars Weighs In
Part One

Purpose

The purpose of this activity is to learn about weight, gravity, center of gravity, and balance. (This should be used in conjunction with other science lessons about this field, as it only touches on related terms/concepts.) Further, the activity will provide practice using scales, as well as some practice with multiplication for the purpose of measurement conversions. Discussion questions, brainstorming exercises, and oral presentations (in small groups) allow for cognitive skills development, verbal skills development, and teamwork and communication skills development.

Students will be able to

1. Explore the concepts of weight, gravity, center of gravity, and balance.
2. Note terms related to gravity and weight, especially units used to measure both.
3. Compare and contrast Earthly and Martian gravity and weight.
4. Explore the effects of gravity on falling objects.

Important Vocabulary/Key Terms (essential terms in bold)

Mars	**gravity**	**weight**	pounds
Earth	**balance**	force	kilograms
center of gravity			

The Gravity of the Situation

Discuss the concepts of weight and gravity, defining the terms. Hand out the activity sheet, so students can calculate the weight of themselves and of things one might take to Mars. This activity can be done individually, as a whole class, in small "lab groups" or pairs.

*(** See below for printable page for this activity.)*

Groovy Gravity

Students will gather in small groups to design a room in a house that might be able to exist on Mars. Their design should include drawings and a brief, but detailed written description. Each group will choose a slip of paper from a hat to determine which room they will design. They will use a brainstorming sheet (below) to begin. Upon completion of their designs, each group will present their design to the class. Optional: Each group can build a model of their room. (Note: Graphing paper would be very useful for this activity.)

*(** See below for printable page for this activity.)*

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The Gravity of the Situation

Match.

1. gravity	a. .375 that of Earth
2. one pound	b. that point of a body about which all its parts are balanced
3. weight	c. most common measurement for gravity and weight
4. kilogram	d. 2.66 times that of Mars
5. Earth's Gravity	e. a measure of the heaviness of an object
6. center of gravity	f. .45 kilograms
7. Mars' Gravity	g. the natural force of attraction between two objects; the pull toward the center of an object

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Comparing Weight and Gravity on Earth and Mars

How much do you weigh? Is there any change if you were to weigh yourself on Mars? Weigh yourself and then calculate your weight on Mars. Compare your weight on Earth with your weight on Mars. Then calculate the weight of things one might take to Mars, and compare those findings.

1. Yourself	_____pounds	_____kilograms
2. Book	_____pounds	_____kilograms
3. Pencil	_____pounds	_____kilograms
4. T-shirt	_____pounds	_____kilograms
5. Candy bar	_____pounds	_____kilograms
6. Toilet paper (1 roll)	_____pounds	_____kilograms
7. Mp3 player	_____pounds	_____kilograms
8. laptop computer	_____pounds	_____kilograms
9. digital camera	_____pounds	_____kilograms
10. _____	_____pounds	_____kilograms

Bonus Question

Which planet has a stronger gravitational force? How might an extended visit to Mars affect an astronaut's body?

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Groovy Gravity

Do you think that a manned mission to Mars is ever going to be possible? Imagine that your home is going to be transported the Red Planet. Design one room that might be able to exist there, including both drawings and a brief, but detailed written description. Use this sheet to brainstorm first.

Consider the effects of gravity on the function of the room on Earth; and then think about how the different 'level' of gravity on Mars might affect it. For example, will you have to take special measures to keep your cookies and milk on their plate and in its cup? Will you need any special equipment to stay in bed while sleeping, or to get out of bed each day? What else do you need to consider?

Design Team: _____ _____

_____ _____

Room: _____