Educational Resources from *Phenomenon Science Education*

Student Proficiency Goals for Performance Expectation **5-PS2-1**

Information about Performance Expectation 5-PS2-1

Performance Expectation 5-PS2-1.
Support an argument that the gravitational force exerted by Earth on objects is directed down.

Clarification Statement.
"Down" is a local description of the direction that points toward the center of the spherical Earth.

Assessment Limits.
Assessment does not include mathematical representation of gravitational force.

Science and Engineering Practice (Engaging in Argument from Evidence)

- Support an argument with evidence, data, or a model.

Disciplinary Core Idea (PS2.B: Types of Interactions)

- The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.

Crosscutting Concept (Cause and Effect)

- Cause and effect relationships are routinely identified and used to explain change.

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SEP (Engaging in Argument from Evidence):

- Students identify and describe evidence that explains phenomena or models of phenomena, related to the idea that the gravitational force exerted on objects by Earth is directed down.
- Students identify and describe data that explains phenomena, or models of phenomena, related to the idea that the gravitational force exerted on objects by Earth is directed down.
- Students identify or are given the claim "The gravitational force exerted by Earth on objects is directed down."
- Students identify strengths and weaknesses in the collected evidence, data, or model including the validity and reliability of the evidence, data, or model and the ability of the evidence or model to support the claim.
- Students use reasoning to link the collected evidence to the given claim.

DCI (PS2.B Types of Interactions):

- Students know that Earth is spherical.
- Students know that "down" is towards the center of the planet.
- Students know that objects dropped everywhere near Earth's surface or within Earth's atmosphere are pulled toward the center of the planet.
- Students know that the gravitational force that Earth exerts on an object causes that object to be pulled toward the center of the planet.
- Students know that Earth exerts an attractive force towards the center of the planet on all objects, whether they are moving toward the center of the planet or are not moving at all.

CCC (Cause and Effect):

- Students consider the reason why objects dropped near Earth's surface or within Earth's atmosphere are pulled toward the center of the planet.
- Students consider the cause and effect relationship resulting in objects being pulled toward the center of the Earth.