

Stackable Instructionally- embedded Portable Science (SIPS) Assessments

Grade 8 Unit 2
Gravity and Motion of Objects in the Solar System
Storyline Overview
May 2023



SIPS Grade 8 Unit 2: Storyline, Phenomena, and Segments

Storyline Overview

Students make sense of the key disciplinary ideas of orbital motion as the basis of how objects in the solar system and in the universe appear and move within the visible sky, including how gravitational forces affect the relative position of objects in orbit.

Anchor Phenomenon

In this unit, the anchor phenomenon is about the movement of objects within the solar system, including artificial satellites such as the James Webb Space Telescope (JWST).

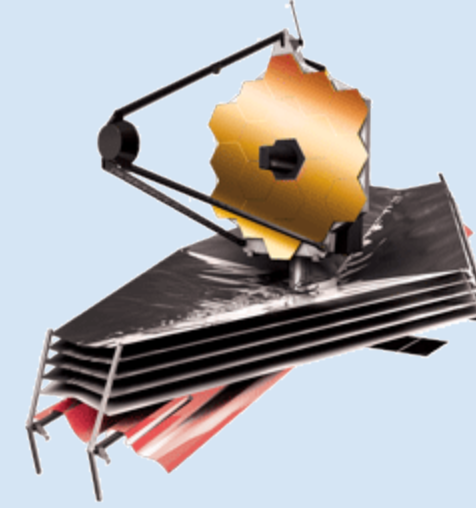


Image Credit: NASA

This image is a starting point for discussions about how the JWST is able to stay in orbit in outer space and how it is used to study other parts of the universe.

Measurement Target

Students are able to apply science and engineering practices with emphasis on analyzing and interpreting data and using evidence in support of arguments to illustrate different characteristics, including differences in scale, mass, and gravitational pull, of objects in the solar system, and developing and using physical, graphical, or conceptual models to explain the role of gravity and patterns in the apparent motion of the sun, moon, and stars in the Earth's sky.

Relationship to Prior and Subsequent Learning

Unit 2 focuses on space systems, especially those within the sun / Earth / moon system and across the solar system, with particular focus on the role of gravitational forces on motion. This builds on ideas related to forces and motion in Unit 1. Unit 3 focuses on changes in life and land over Earth's history, including the influence of astronomic events in leading to major changes in the Earth and life.

Segment 1: Students analyze and interpret data, develop models, and construct arguments related to the description of gravitational forces and of how gravitational forces interact with objects in the solar system.

Engage with a phenomenon involving orbital motion of a satellite

Analyze and interpret data on relative masses and uniform circular motion

Obtain, evaluate, and communicate information about the role of gravitational forces at the human scale

Obtain, evaluate, and communicate information about orbital motion of the satellite discussed in the anchoring phenomenon

Develop models demonstrating how gravitational force affects the motion of a two body system

Obtain information about discovering planets outside of the solar system

Segment 2: Students analyze and interpret data, construct explanations, develop models, and engage in argument from evidence about the sun / Earth / moon system.

Develop and use models about heat and light in the sun / Earth / moon system

Analyze and interpret data about the motion of the Earth, sun, and moon

Analyze data on temperature patterns and daylight hours relative to Earth's orientation and motion

Examine data on the phases of the moon to determine its relative motion

Revise the sun / Earth / moon system model using information obtained from other sources

Segment 3: Students develop models, engage in argument from evidence, and communicate information on how gravitational forces impact observable patterns of orbital motion in the solar system and related to the presence and locations of objects and systems within the universe and/or within the Milky Way galaxy.

Ask questions about the structure of the Milky Way galaxy

Investigate the role of gravity in stellar formation

Investigate the relationship between the structure of objects in space and orbital motion

Obtain, evaluate, and communicate information about the solar system within the larger setting of the galaxy and universe