

Unit 5: Survey of the Solar System

Content Area: **Science**
Course(s):
Time Period: **Marking Period 2**
Length: **8 days**
Status: **Published**

Summary

In this unit, students will identify and describe objects in our solar system.

Introduction: Objects in the solar system are our nearest neighbors, and humans have been studying them and charting their motions for a very long time. Planets, asteroids, meteors, and the Kuiper Belt will all be studied, as will the origins of our solar system and how it formed.

Revision Date: July 2019

LA.RST.9-10	Reading Science and Technical Subjects
LA.WHST.9-10	Writing History, Science and Technical Subjects
MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
SCI.HS-ESS1	Earth's Place in the Universe
SCI.HS-ESS1-6	Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.
SCI.HS-ESS1-4	Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.
SCI.HS-ESS1-1	Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.

SCI.HS-ETS1-4	Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.
SCI.HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
SCI.HS-ETS1-1	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
SCI.HS-ETS1-3	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.
SCI.HS-PS2-2	Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.
SCI.HS-PS3-2	Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).
SCI.HS-PS2-3	Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.
SCI.HS-PS2-4	Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.
SCI.HS-PS2-1	Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.
SCI.HS-PS3-1	Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.
TECH.9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
TECH.9.4.2.GCA.1	Articulate the role of culture in everyday life by describing one's own culture and comparing it to the cultures of other individuals (e.g., 1.5.2.C2a, 7.1.NL.IPERS.5, 7.1.NL.IPERS.6).
TECH.9.4.2.IML.1	Identify a simple search term to find information in a search engine or digital resource.
TECH.9.4.2.IML.2	Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).
TECH.9.4.2.IML.3	Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).

Essential Questions/Enduring Understandings

How can scientists use Newton's Laws to determine the origin of our solar system and the objects in it?

How do scientists decide how to classify the objects in our solar system?

Objectives

Students will know the definitions of key terms: interstellar medium, accretion disk, terrestrial, jovian, retrograde, Kuiper Belt, Oort Cloud.

Students will be skilled at identifying and categorizing the planets in our solar system.

Students will be skilled at comparing planetary properties to Earth.

Students will know how to analyze the moons of our solar system and which candidates are suitable for colonization.

Students will know the difficulties of traveling to our solar system neighbors.

Students will be skilled at differentiating meteors, asteroids, and comets.

Students will know how studying these celestial objects can help astronomers better understand the evolution of our solar system.

Students will know what reasons scientists have for reclassifying Pluto and why there is continued debate surrounding it and other Kuiper Belt objects.

Learning Plan

History of discovery of planets

Evidence for formation of solar system and planets

Categorizing planets based on observational data

Project: Planet Posters

Video: The Pluto Files

Assessment

Formative:

Planet Posters Assessment

Quiz

Summative:

Chapter Test

Materials

- quantitative/qualitative lab equipment for activities, experiments

related astronomy maps, charts

supplementary interactive multimedia, internet websites, videos

Foundations of Astronomy Textbook

Integrated Accommodation and Modifications

https://docs.google.com/spreadsheets/d/1243s4Clz7zHx_VnPe-hYDP06QSoB0jKJY2NuNYySSc/edit?usp=sharing