

Unit 4: The Moon

Content Area: **Science**
Course(s):
Time Period: **Marking Period 1**
Length: **7 days**
Status: **Published**

Summary

In this unit, students will learn about the Moon's structure and origins, as well as its impact on human life.

Introduction: The Moon and the changes it undergoes in appearance monthly and during special events like eclipses have influenced human life for millennia. Calendars have been based on the Moon's phases, and tides on Earth are caused by gravitational interactions between the Moon and Earth. In this unit, students will learn how the Moon formed, what its structure is now, what causes the tides on Earth, and what happens during a lunar eclipse.

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-ESS1-6	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-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-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-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-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-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.
TECH.9.4.2.CT.1	Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).
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.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).
TECH.9.4.2.IML.4	Compare and contrast the way information is shared in a variety of contexts (e.g., social, academic, athletic) (e.g., 2.2.2.MSC.5, RL.2.9).

Essential Questions/Enduring Understandings

How has the Moon influenced human history and Earth’s cycles?

How do the Moon's properties affect its current appearance and position?

Objectives

Students will know key terms: maria, waxing, waning, gibbous, crescent, eclipse, umbra, penumbra, neap, spring, Apollo, lunar/command module.

Students will know how craters are formed.

Students will know the details of the Moon's orbit and compare lunar calendar to Gregorian calendars.

Students will know how the Moon’s position relative to the earth and sun produces lunar phases.

Students will know how the Moon causes tides on earth.

Students will know why tidal effects are seen elsewhere in the solar system.

Students will know how lunar eclipses occur.

Learning Plan

Model lunar phases and lunar eclipses

ISLE cycle: Formation of Moon

History of theories of tides

Calculating relative sizes of craters from Moon images

Lab: Crater Formation

Engineering Project: Lunar Lander

Assessment

Formative Assessment: understanding during ISLE Cycle activities

Quizzes during chapter

Lunar Lander Assessment

Summative Assessment:

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-hYDP06QSoHb0jKJY2NuNYySSc/edit?usp=sharing

