

Unit 1: The Cosmic Landscape

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

Summary

In this unit, students will become familiar with the ISLE Cycle and practice foundational skills to help them study astronomy such as scientific notation and SI units.

Introduction: The goals of this unit are to understand the scientific practices that will be used in the course, grasp the scale of distances across the cosmos, and become familiar with some of the things we can see in the night sky.

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-ESS1-1	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-ESS1-3	Communicate scientific ideas about the way stars, over their life cycle, produce elements.
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-ESS1-2	Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.
SCI.HS-ESS1-4	Use mathematical or computational representations to predict the motion of orbiting

	objects in the solar system.
SCI.HS-ESS1	Earth's Place in the Universe
SCI.HS-PS1-8	Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.
TECH.9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.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.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 do scientific practices and methods help astronomers and astrophysicists learn about our universe?

How can the scale of the universe be explained or modeled?

Objectives

Students will know the definitions of important terms: astronomy, light year, observable universe, astronomical unit.

Students will know how to use the ISLE cycle to solve a problem or answer a question.

Students will be skilled at using scientific notation and the metric system.

Students will know our cosmic address.

Students will be able to differentiate between planets, moons, asteroids, and meteors.

Students will know the difference between a solar system and a galaxy.

Students will know how to describe the structure of the universe.

Students will be able to use the speed of light as a measuring tool for both distance and time.

Learning Plan

Meaningful participation in guided question/answer sessions, individual/group discussions, demonstrating an understanding of the purpose of the unit lesson(s), key terms, and concepts.

Preview the essential questions, provide answers, and connect to learning throughout the unit.

Present and discuss the video "Powers of Ten and the Relative Size of Things in the Universe."

Illustrate the vastness of the universe through a series of images that gradually step further away from earth.

Briefly discuss the structure of the universe: planets, moons, stars, solar systems, galaxies, clusters, and superclusters of galaxies.

Discuss the nature and speed of light. Recount the numerous attempts to measure the speed of light.
Explain the use of the metric system and scientific notation and have students practice using both.
Discuss our use of the English system of measurement and compare and contrast with the metric system.
Explain scientific units of measurement that are specific to astronomy.
Discuss look-back time and how it allows us to study the early universe.
Solve mathematical problems using scientific units of measurement specific to astronomy.

Assessment

Formative Assessment:

Student use of scientific notation and SI units

Quizzes throughout chapter

Summative Assessment:

End of Chapter Test

Benchmark: Final Exam

Materials

-
quantitative/qualitative lab equipment for activities, experiments
related astronomy maps, charts
supplementary interactive multimedia, internet websites, videos
Astronomy Textbook - Foundations of Astronomy

Integrated Accommodation and Modifications

https://docs.google.com/spreadsheets/d/1243s4Clz7zHx_VnPe-hYDP06QSoHb0jKJY2NuNYySSc/edit#gid=1426178898