

Astronomy Unit 1 - Where are We?

Content Area: **Science**
Course(s): **Astronomy**
Time Period: **Full Year**
Length: **18 days**
Status: **Published**

NJSLS - Science

SCI.HS-ESS1-4 Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.

Science and Engineering Practices

Using Mathematical and Computational Thinking

Use mathematical or computational representations of phenomena to describe explanations. (HS-ESS1-4)

Disciplinary Core Ideas

ESS1.B: Earth and the Solar System

Kepler's laws describe common features of the motions of orbiting objects, including their elliptical paths around the sun. Orbits may change due to the gravitational effects from, or collisions with other objects in the solar system. (HS-ESS1-4)

Crosscutting Concepts

Scale, Proportion, and Quantity

Algebraic thinking is used to examine scientific data and predict the effect of a change in one variable on another (e.g., linear growth vs. exponential growth). (HS-ESS1-4)

Rationale and Transfer Goals

Students will learn where they are in the universe, how to place themselves in the middle of it all (as it appears

to us), and how to find objects in the sky. Students will gain a cosmic perspective--a broad understanding of the nature, scope and evolution of the Universe, and where the Earth and Solar System fit in, the notion that physical laws and processes are universal, the notion that the world is knowable, and that we are coming to know it through observations, experiments and theory (the nature of progress in science), plus exposure to the types, roles and degrees of uncertainty in science.

Enduring Understandings

Objects in the universe can be located in what is called the celestial sphere, as described by drawing an imaginary sphere with the observer at the center.

Our place in the universe can be thought of as our galactic address. All celestial objects have a galactic address.

Essential Questions

Where are we located in the universe?

Are we in the center of the universe?

Content - What will students know?

- Definitions related to the celestial sphere.

Skills - What will students be able to do?

- Describe and explain celestial coordinates as a tool for mapping the sky (poles, equator, azimuth, altitude, ecliptic, local sky, zenith, meridian, right ascension, declination, tropics, circles).

- Explain the daily path of the seasonal constellations.

Activities - How will we teach the content and skills?

- Making a “sextant” to measure.
- Using a compass.
- “Your Galactic Address” activity.
- Sky Sphere model making.

Evidence/Assessments - How will we know what students have learned?

- Assessments can be reviewed for each course in [this folder](#).
- Formative assessments
- Having students find measurements of objects in and around the building from standardized positions.
- Analysis questions after making and using models.
- Quizzes
- Tests
- Astronomy Benchmark #1

Spiraling for Mastery

Content or Skill for this Unit	Spiral Focus from Previous Unit	Instructional Activity
<ul style="list-style-type: none"> • protractor use • solar system (middle school) 		review objects in our solar system (sun, planets, asteroids, comets)

Key Resources

21st Century Life and Careers

WRK.9.2.12.CAP.3	Investigate how continuing education contributes to one's career and personal growth.
WRK.9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
WRK.9.2.12.CAP.5	Assess and modify a personal plan to support current interests and post-secondary plans.
WRK.9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.

Career Readiness, Life Literacies, & Key Skills

TECH.9.4.12.CT.3	Enlist input from a variety of stakeholders (e.g., community members, experts in the field) to design a service learning activity that addresses a local or global issue (e.g., environmental justice).
TECH.9.4.12.TL.2	Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.
TECH.9.4.12.GCA.1	Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political, economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).
TECH.9.4.12.IML.3	Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions (e.g., S-ID.B.6a., 8.1.12.DA.5, 7.1.IH.IPRET.8).
TECH.9.4.12.IML.4	Assess and critique the appropriateness and impact of existing data visualizations for an intended audience (e.g., S-ID.B.6b, HS-LS2-4).
TECH.9.4.12.IML.5	Evaluate, synthesize, and apply information on climate change from various sources appropriately (e.g., 2.1.12.CHSS.6, S.IC.B.4, S.IC.B.6, 8.1.12.DA.1, 6.1.12.GeoHE.14.a, 7.1.AL.PRSNT.2).
TECH.9.4.12.IML.6	Use various types of media to produce and store information on climate change for different purposes and audiences with sensitivity to cultural, gender, and age diversity (e.g., NJSLSA.SL5).
TECH.9.4.12.IML.7	Develop an argument to support a claim regarding a current workplace or societal/ethical issue such as climate change (e.g., NJSLSA.W1, 7.1.AL.PRSNT.4).

Interdisciplinary Connections/Companion Standards

Area	Sub-Area	Key Objectives	Key Performance Indicators (KPIs)	Responsible Party	Timeline
Strategic Planning	Business Strategy	Define long-term vision and mission statement.	Strategic Alignment Score	CEO	Q1-Q4 2024
	Market Analysis	Conduct comprehensive market research and competitor analysis.	Market Share Growth	Marketing Dept	Q1-Q2 2024
	Financial Planning	Develop detailed financial projections and budget.	Budget Adherence Rate	Finance Dept	Q1-Q4 2024
Operational Excellence	Process Improvement	Identify and implement process optimization initiatives.	Process Efficiency Score	Operations Dept	Ongoing
	Quality Management	Implement robust quality control systems.	Customer Satisfaction Index	Quality Assurance	Q1-Q4 2024
	Supply Chain Management	Optimize supply chain operations for cost and reliability.	Supply Chain Resilience Index	Procurement Dept	Q1-Q4 2024
Human Resources	Talent Acquisition	Recruit and hire top talent for key positions.	Time-to-Fill Ratio	HR Dept	Q1-Q4 2024
	Employee Development	Provide training and development opportunities.	Employee Engagement Score	HR Dept	Ongoing
	Performance Management	Implement fair and effective performance evaluation systems.	Performance Improvement Rate	HR Dept	Q1-Q4 2024
Customer Experience	Customer Segmentation	Identify and understand different customer segments.	Customer Retention Rate	Marketing Dept	Q1-Q4 2024
	Service Quality	Enhance customer service quality and response times.	Net Promoter Score (NPS)	Customer Support	Q1-Q4 2024
	Personalization	Implement personalized marketing and service strategies.	Conversion Rate	Marketing Dept	Q1-Q4 2024
Technology & Innovation	Digital Transformation	Implement digital marketing and sales channels.	Digital Adoption Rate	IT Dept	Q1-Q4 2024
	Product Innovation	Develop and launch new products or services.	New Product Launch Success Rate	R&D Dept	Q1-Q4 2024
	IT Security	Ensure robust IT security and data protection measures.	IT Security Incident Rate	IT Dept	Ongoing