2019 Unit 6 Universe

Content Area: **Science**
Course(s): **Environmental Science**
Time Period: **April**
Length: **30**
Status: **Published**

Enduring Understandings:

- A scientific theory is a substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment, and the science community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence.
- Atoms of each element emit and absorb characteristic frequencies of light. These characteristics allow identification of the presence of an element, even in microscopic quantities.
- Energy cannot be created or destroyed, only moved between one place and another place, between objects and/or fields, or between systems.
- 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.
- Nuclear fusion processes in the center of the sun release the energy that ultimately reaches Earth as radiation.
- Other than the hydrogen and helium formed at the time of the Big Bang, nuclear fusion within stars produces all atomic nuclei lighter than and including iron, and the process releases electromagnetic energy. Heavier elements are produced when certain massive stars achieve a supernova stage and explode.
- Science assumes the universe is a vast single system in which basic laws are consistent.
- Scientific knowledge is based on the assumption that natural laws operate today as they did in the past and will continue to do so in the future.
- The Big Bang theory is supported by observations of distant galaxies receding from our own, of the measured composition of stars and nonstellar gases, and of the maps of spectra of the primordial radiation (cosmic microwave background) that still fills the universe.
- The significance of the energy transfer mechanisms that allow energy from nuclear fusion in the sun's core to reach Earth is dependent on the scale, proportion, and quantity at which it occurs.
- The star called the sun is changing and will burn out over a lifespan of approximately 10 billion years.
- The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth.
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Essential Questions:

- How can chemistry help us to figure out ancient events?
- How do stars produce elements?

- How is Kepler's Law used to explain elliptical orbits?
- If there was nobody there to Tweet about it, how do we know that there was a Big Bang?
- Is the life span of a star predictable?

Lesson Titles:

- Doppler Effect
- Electromagnetic Spectrum
- Element Formation
- Heliocentric vs. Geocentric Theory History
- Red/Blue Shift
- Solar System Fomation
- Star Formation
- The Big Bang Theory

Career Readiness, Life Literacies & Key Skills

WRK.K-12.P.1	Act as a responsible and contributing community members and employee.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
WRK.K-12.P.9	Work productively in teams while using cultural/global competence.

Inter-Disciplinary Connections:

LA.RL.9-10.1	Cite strong and thorough textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferentially, including determining where the text leaves matters uncertain.
LA.RL.9-10.2	Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details and provide an objective summary of the text.
LA.RL.9-10.4	Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language evokes a sense of time and place; how it sets a formal or informal tone).
LA.RH.9-10.7	Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text, to analyze information presented via different mediums.
MA.A-REI.A	Understand solving equations as a process of reasoning and explain the reasoning
MA.A-REI.C	Solve systems of equations
LA.WHST.9-10.6	Use technology, including the Internet, to produce, share, and update writing products, taking advantage of technology's capacity to link to other information and to display

	information flexibly and dynamically.
LA.WHST.9-10.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
MA.A-REI.D.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
SOC.9-12.1.4.1	Take a position on a current public policy issue and support it with historical evidence, reasoning, and constitutional analysis in a written and/or oral format.
SOC.9-12.1.4.2	Demonstrate effective presentation skills by presenting information in a clear, concise, and well-organized manner taking into consider appropriate use of language for task and audience.

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK:

- Expanding Universe Lab
- Asteroid Chromebook Act.
- Asteroid Lab
- Big Bang Misconceptions Act. Sht.
- Doppler Chromebook Act.
- Electromagnetic Chromebook Act.
- Elements from Stars Chromebook Act
- Elliptical Orbit Activity
- Formation of the Solar Sys. Act.
- How Many Stars Lab
- HR Diagram Act.
- HR Diagram Chromebook Act.
- Hubble's Law Graph Act.
- Red/Blue Shift Act. Sht.
- Spectral Lines Lab
- Stellar Evolution Act. Sht.

Modifications

Benchmark Assessments

Skills-based assessment

Reading response

Writing prompt

Lab practical

Formative Assessment:

- Anticipatory Set
- Closure
- Lab Reports: Expanding Universe, How many stars, Spectral Lines, Elliptical Orbits
- Warm-Up

Summative Assessment:

- End of the Year Project on Solutions to the World's Current Issues
- Lab Practical reviewing measurement, metric, microscopes,
- Marking Period 4 Assessment
- Unit Exam for Universe

Alternative Assessments

Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Reflective pieces

Concept maps

Case-based scenarios

Portfolios

Resources & Materials:

- Adding Machine Tape
- How Stars are made and how they make elements https://www.youtube.com/watch?v=80eMTnnLjhs
- How Stars Make the Elements http://tinyrul.com/grcndeq

- Light Boxes, Gas Tubes
- Spectroscopes
- Star Life Cycle Chart
- Star Map, Milky Way Map
- Text on Big Bang
https://drive.google.com/open?id=1MMVfANn7VC8ehazLGCrbUsP4845SX4ZeZbZtLmdSClA
- The Big Bang Theory https://www.youtube.com/watch?v=bbSEZZCiMFE