WCSD High School Astronomy

Unit Resources

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| The Astronomy classes must focus on student mastery of the Performance Expectations listed below. The Units and Topic Overviews are provided solely as guidelines. If time permits, additional units and extensions to the topics listed may be introduced.  The following Earth and Space Science Standards (and one Physical Science standard) will be covered throughout the year:  HS-ESS1-4, HS-ESS 2-1, ESS 1-1, ESS 1-2, ESS 1-3, PS 4-5. | | | | |
| **Semester 1: Planetary System** | | | | |
| **Unit Title: Ancient Astronomy** | | | | |
| **Guiding Questions** | | **Performance Expectations Addressed**  (PEs are *summarized*, not quoted) | | **Resources**  NOTE: Links may not always be up to date. Please contact Sylvia Scoggin ([SScoggin@washoeschools.net](mailto:SScoggin@washoeschools.net)) to address inoperative links. |
| Guiding Question:  How did observations of the celestial bodies influence the ancients’ understandings of their place in the universe? | | ESS1-4 Use mathematical representations to predict the motion of orbiting objects in the solar system. Use patterns to predict celestial motion. | | * [Cave Man Test](https://drive.google.com/open?id=1QmtrYKwdCiugL9oWiAaKAwAtFQVk2UHr9eWhjwB4Ntc) * [Star Wheel](http://www.aosny.org/starwheel.pdf) * [Path of Sun from Reno](https://drive.google.com/drive/u/0/folders/0Bz-rwrpKW2aINTMxNS1STy11alE) ([tutorial](http://www.reedwrestling.com/classes/astro/pathofsun.html)  & [quiz](https://drive.google.com/file/d/0Bz-rwrpKW2aISUdsVjFsU2Q5Vnc/view)), [Stars](https://drive.google.com/open?id=1qpLb-ur2AHP0QmzhPstmWXNpML1heL9X6Eoxm1uom6M) ([tutorial polar](http://www.reedwrestling.com/classes/astro/star%20movement.html), [ecliptic](http://www.reedwrestling.com/classes/astro/planets.html)) * [Motion Around globe](https://docs.google.com/document/d/1PwfDyeHUmrJC-U0ZSU5W8QgLUsapvkAKm7wAkK5t2rI/edit) ([quiz](https://docs.google.com/document/d/15x9NnY6kx33mGF9FtbOVX7Ot82graUFPiR3Qkh_J914/edit)) [(summary.pdf](https://drive.google.com/drive/u/0/folders/0Bz-rwrpKW2aINTMxNS1STy11alE)) * [Altitude and Azimuth](https://drive.google.com/drive/u/0/folders/0Bz-rwrpKW2aINTMxNS1STy11alE) * [Sky Watchers](http://www.discoveryeducation.com/teachers/free-lesson-plans/sky-watchers-ancient-astronomers.cfm) * [Non-Western Astronomy](http://www.starteachastronomy.com/archaeoastronomy.html) |
| **Unit Title: Classical Astronomy** | | | | |
| Guiding Question:  How did classical astronomers use mathematics and observations to explain the motion and shape of objects in our solar system?  Guiding Question:  How did classical astronomers use technology and mathematics to investigate and predict the motion and shape of objects in the solar system? | | ESS1-4 Use mathematical representations to provide evidence the Earth is round, rotating and revolving. | | * Evidence the earth is [round](https://drive.google.com/open?id=0Bz-rwrpKW2aITmhXR1oxZlhTbG8), [rotates](https://drive.google.com/open?id=1fxCeF2CYvBoBijc1wNncRf6T0Z4TRtJ2MOesmZ9xttU), [revolving](https://drive.google.com/drive/u/0/folders/0Bz-rwrpKW2aIMFFCMFFtM0FGNGc) ([Assessment](https://docs.google.com/document/d/1kvRzsSW37pd3Pilqn2gE1RUShpMOzLpk53i2nB_J7Ao/edit)) * [What if the Earth were Flat?](https://www.youtube.com/watch?v=1xwmqEUMWRI) * [Classical Exam](https://docs.google.com/document/d/1moydo4Q-JQpuS_cYL4ysKB8Q-zRjgeXLIpv91uFGzf0/edit) * Eratosthenes ([model](https://docs.google.com/document/d/14q0cIhpa7EAnuU4XMnv2FMYyxrjMr9mP2t5Zi4K0zMI/edit) & [rubric](https://drive.google.com/drive/u/0/folders/0Bz-rwrpKW2aIMFFCMFFtM0FGNGc)), Aristarchus ([lab](https://drive.google.com/drive/u/0/folders/0Bz-rwrpKW2aIblRwMThqcGFFb0U)), Copernicus, Galileo, Brahe, * [Retrograde](http://www.reedwrestling.com/classes/astro/retrograde.html) |
| ESS1-4 Use mathematical representations and technology to predict orbital motion. | | * Kepler ([worksheet](https://drive.google.com/drive/u/0/folders/0Bz-rwrpKW2aIblRwMThqcGFFb0U)) * [Explaining Lunar](http://www.reedwrestling.com/classes/astro/moonnew.html) , * [Classical Exam](https://docs.google.com/document/d/1moydo4Q-JQpuS_cYL4ysKB8Q-zRjgeXLIpv91uFGzf0/edit) * [Timeline Project](https://drive.google.com/open?id=1WKtzgvvnklyP6QPv2dN-51TbVeu5mmiu) |
| **Unit Title: Scientific Revolution and the Solar System** | | | | |
| Guiding Question:  What are the physical characteristics of the objects (e.g. planets, moons, comets, asteroids and other objects) orbiting our sun? | | ESS1-4 Use technology to aid in explaining orbital motion. | * [Programming the solar system](https://www.tynker.com/hour-of-code/solar-system) * [Craters Lab](https://drive.google.com/open?id=1R8IRjw7RXZwwypk6PYBhUIBNJSpzBOkr) * [My Solar System PhET](https://phet.colorado.edu/en/simulation/legacy/my-solar-system) (Runs on Flash) | |
| Guiding Question:  How did astronomers use developing mathematics and physics to explain the motion of objects in our solar system? | | PS 2-1 Analyze data to aid in explaining orbital motion, and use Newton’s Theory of Universal Gravitation to explain orbital motion. | * [Gravity and Orbits PhET](https://phet.colorado.edu/en/simulation/gravity-and-orbits) | |
| **Semester 2: Stellar Astronomy** | | | | |
| **Guiding Questions** | **Performance Expectations Addressed**  (PEs are *summarized*, not quoted) | | **Resources** | |
| **Unit Title: Sun & Stars** | | | | |
| Guiding Question:  How can we predict stellar evolution based on the initial mass of the star?  Guiding Question:  How do we measure the composition, motion and distance to the stars? | ESS 1-1 Develop a model to illustrate the life span of the sun and the role of fusion.  ESS 1-3 Communicate scientific ideas about the way stars, over their life cycle, produce elements. | | * [Lesson Plan - Nuclear Fusion & Processes of the Sun](http://streaming.discoveryeducation.com/teacherCenter/lessonPlans/pdfs/9-12_Science_NuclearFusionThePowerOfTheSun.pdf) * [HR Diagram Activity](http://www.mrsgeology.com/hertzsprung-russell-diagram/) * [Composition of the Universe](https://www.spacetelescope.org/science/composition_of_universe/) * [Fusion Activities](https://imagine.gsfc.nasa.gov/educators/lessons/xray_spectra/activity-fusion.html) | |
| ESS 1-2 Construct an explanation of the Big Bang theory based on light spectra, motion of distant galaxies, and composition of matter. | | * [Big Bang Article](https://www.symmetrymagazine.org/article/five-facts-about-the-big-bang) * [Light Spectra Interactive](http://www.learner.org/teacherslab/science/light/color/spectra/) * [Big Bang Evidence](http://astronomy.swin.edu.au/cosmos/B/Big+Bang) * Parallax and Standard Candles activity (by WCSD teacher Michael Klapp) | |
| **Unit Title: Galaxies, Clusters & Nebulae** | | | | |
| Guiding Question:  How does gravity provide structure to the universe? | ESS 1-2 Construct an explanation of the Big Bang theory based on light spectra, motion of distant galaxies, and composition of matter. | | * [PHET Simulation Gravity & Orbit](https://phet.colorado.edu/sims/html/gravity-and-orbits/latest/gravity-and-orbits_en.html) * [Test Tube Games Gravity Simulation](http://testtubegames.com/gravity_full.html) * [Gravity Provides Structure to Universe](https://science.howstuffworks.com/environmental/earth/geophysics/question232.htm) * [Distant Galaxies Activities](http://www.universeadventure.org/big_bang/expand-galaxy.htm) | |
| **Unit Title: Evolution of the Universe** | | | | |
| Guiding Question:  How does the Red Shift affect our understanding of the evolution of the Universe? | ESS 1-2 Construct an explanation of the Big Bang theory based on light spectra, motion of distant galaxies, and composition of matter. | | * [Model of the Universe](https://www.cfa.harvard.edu/seuforum/mtu/) * [Motion of Galaxies (Red Shift)](http://www.universeadventure.org/big_bang/expand-galaxy.htm) * [Doppler Shift Simulation](http://www.space-exploratorium.com/doppler-shift.htm) * [Einstein's Galaxy](https://www.cfa.harvard.edu/seuforum/einstein/resources/JourneyExpand/JourneyExpandManual.pdfhttps:/www.cfa.harvard.edu/seuforum/einstein/resources/JourneyExpand/JourneyExpandManual.pdf) | |
| **Unit Title: Exploration** | | | | |
| Guiding Question:  How does our evolving understanding of the universe drive our exploration of it?  Guiding Question:  How does our exploration of the Universe drive our understanding of it? | HS PS 4-5 Communicate technical information about electronic devices us the principles of wave behavior to transmit and capture information and energy. | | * [Telescope Wavelengths](https://science.nasa.gov/science-news/science-at-nasa/1999/features/ast20apr99_1) * Mars Rover Video – To be placed in TEAMS folder * [Mars Exploration](https://www.nasa.gov/topics/journeytomars/index.html) * [Khan Academy Searching for Life](https://www.khanacademy.org/partner-content/nasa/searchingforlife) * [Cassini Legacy](https://www.nasa.gov/mission_pages/cassini/main/index.html) * App: NASA 3DV (iphone/apple/android) – Space Launch System | |