

**Southern Cayuga Central School District – Curriculum Map**

Subject: **TC3 Intro to Astronomy**

School Year: 2021-2022

Title or Topics w/ NYS Science Learning Standards	Essential Questions & Vocabulary	Content Skills (Activities to cover Essential Questions)	Major Assessments (Tests, Project, etc.)	Time Frame
<p><b>History and Fundamental Laws</b></p> <p>HS-ESS1-6</p> <p>HS-ESS1-4</p> <p>HS-ESS1-7</p>	<p>Who discovered that the Earth was round?                      Why were early astronomers certain that the Earth was the center of the Universe?                      Why do the planets in the sky move backwards sometimes?                      Why are there tides?</p> <p>Vocab:                      celestial sphere, Polaris, zenith, ecliptic, zodiac, parallax, opposition, conjunction, sidereal period, circumpolar constellation, heliocentric, geocentric, ellipse, eccentricity, astronomical unit, inertia, mass velocity, density, weight, momentum, perihelion, aphelion, apogee, perigee, precession.</p>	<ol style="list-style-type: none"> <li>1. Diagram and explain retrograde motion of the planets according to the Ptolemaic theory.</li> <li>2. Explain the change in positions, rising times and maximum altitude of the sun throughout the year.</li> <li>3. Understand Kepler’s three laws of motion</li> <li>4. List Galileo’s contributions to astronomy</li> <li>5. Understand Newton’s first and third laws of motion and the law of universal gravitation</li> <li>6. Explain the cause of the earth’s precession and the astronomical significance of this.</li> <li>7. Explain how and why the weight of an object changes with position on the Earth’s surface</li> <li>8. Explain the cause of and the action of the earth’s tides</li> <li>9. Explain the phenomenon of weightlessness in an orbiting space capsule</li> <li>10. Explain the launching and observation of artificial earth satellites</li> </ol>	<p>Project – Historical Research Project – Measure the circumference of the Earth</p> <p>Quizzes</p> <p>Test</p>	<p>6-8 Weeks</p>

<p><b>Sky</b></p> <p>HS-PS2-2</p> <p>HS-PS2-4</p> <p>HS-ESS1-4</p> <p>HS-ESS1-6</p>	<p>Why do the planets in the sky move backwards sometimes? Why doesn't the Moon rotate with respect to Earth? Why are all the planets lined up across the sky?</p> <p>Vocab: rotation, revolution, meridian, Tropic of Cancer, Tropic of Capricorn, celestial poles, celestial equator, celestial meridian, equinox, altitude, vernal equinox, universal time, ecliptic, summer solstice, Arctic Circle, gibbous, earthshine, occultation, transit, solar lunar month, lunar day, "shooting star", meteor, asteroid, comet, parsec, light year</p>	<ol style="list-style-type: none"> <li>1. Explain how latitude can be determined by celestial observation.</li> <li>2. Diagram and explain the difference between a solar and a sidereal day</li> <li>3. Explain why the apparent solar day is not constant</li> <li>4. Explain the causes of the seasons</li> <li>5. Explain the phases and eclipse of the moon</li> <li>6. Describe the moon regarding: diameter, rotation rate, orbital inclination, atmosphere, distance for the earth, apparent angular diameter</li> <li>7. Explain why only one side of the moon is visible from earth</li> <li>8. Predict the times of rising, setting and crossing of the local meridian for the moon in the phase of: new, full.</li> <li>9. List the planets that exhibit the maximum and minimum: diameter, distance from the sun, mass, apparent brightness</li> </ol>	<p>Project - Construct a Celestial Sphere Project – Create a Star Chart using SkyView app. Project - Construct an Earth, Moon, Sun model Quizzes Test</p>	<p>6-8 Weeks</p>
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<p><b>Light and Telescopes</b></p> <p>HS-PS4-1</p> <p>HS-PS4-5</p>	<p>Is the Universe Infinite?  How old is the Universe?  What is the nature of light and what does it tell us about celestial objects?</p> <p>Vocab:  inverse square law,  refraction, Doppler effect,  Bohr atomic model,  wavelength, frequency,  spectrum, resolving power,  radio telescope,  Olber's Paradox</p>	<ol style="list-style-type: none"> <li>1. Explain how the Doppler effect is useful in astronomy</li> <li>2. Compare the construction and advantages of refracting and reflecting telescopes</li> <li>3. List the major limitations to optical astronomy caused by the atmosphere</li> <li>4. List the advantages of large objective telescopes.</li> </ol>	<p>Project – Spectra  Project – Quantify the doppler effect  Quizzes  Test</p>	<p>5-6 Weeks</p>
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<p><b>Stars, Galaxies, and the Universe</b></p> <p>HS-ESS1-1</p> <p>HS-ESS1-2</p> <p>HS-ESS1-3</p> <p>HS-PS1-8</p> <p>HS-PS1-9</p>	<p>What are stars?          What is the life cycle of a star?          How big is our galaxy?          What else is out there?</p> <p>Vocab:          corona, sunspot, solar wind, sunspot cycle, main sequence, white dwarf, red giant, black dwarf, supernova, neutron star, pulsar, quasar, black hole, Big Bang</p>	<p>a) Discuss the evolution of a star          b) Explain how astronomical distances are determined using the H-R diagram          c) Discuss how the sun compares to other stars in all of the major stellar characteristics d) List the two most abundant elements in the sun          e) Describe the energy process of the sun: the solar wind, and the sunspot cycle          g) Describe the general shape of our galaxy and list the approximate number of stars in our galaxy          h) Recognize in the night sky the Big Dipper and a few other constellations</p>	<p>Project – Calculate the expansion rate of the Universe          Quizzes          Test</p>	<p>6-8 Weeks</p>
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