

# Cornwall-Lebanon School District Curriculum Overview

## Deep Space Astronomy: Grades 10 – 12

20 length of time in weeks	Concepts & Competencies	Common Assessments	Academic Standards (PA Core if applicable)
Unit 1 2	<p align="center"><b><u>Deep Space Observations</u></b></p> <p>Students will explain apparent motions in the night sky. Students will compare various astronomical size and distance scales. Students will identify how astronomical observations are made using the full Electromagnetic Spectrum. Students will describe the function and abilities of various telescopes.</p>	<ul style="list-style-type: none"> <li>➤ Unit 1 Quiz 1: Motion in the Night Sky</li> <li>➤ Unit 1 Test 1: Telescopes &amp; Astronomical Observations</li> </ul>	<p>3.3.5.B1 3.3.8.B1 3.3.10.B2</p>
Unit 2 3	<p align="center"><b><u>Light &amp; Spectroscopy</u></b></p> <p>Students will analyze blackbody curves and calculate the surface temperature and peak intensity of a star using Wien's Law. Students will link Kirchhoff's Laws and gas tube spectroscopy. Students will link atomic structure to the production of spectra. Students will identify unknown gas compositions via spectral patterns.</p>	<ul style="list-style-type: none"> <li>➤ Unit 2 Quiz 1: The Electromagnetic Spectrum</li> <li>➤ Unit 2 Test 1: Electromagnetic Spectrum &amp; Atmospheric Opacity</li> <li>➤ Unit 2 Quiz 2: Wien's Law</li> <li>➤ Unit 2 Test 2: Blackbody Radiation &amp; Spectra Unit Test</li> </ul>	<p>3.2.7.B5 3.3.8.B1 3.3.10.B2 3.2.10.B5 3.2.12.B5</p>
Unit 3 3	<p align="center"><b><u>Exoplanets</u></b></p> <p>Students will estimate the number of intelligent species in a galaxy by using the Drake Equation. Students will explore the differences between various extrasolar planets. Students will apply the Goldilocks Principle in deciding whether a planet is habitable. Students will calculate the size and orbital period of extrasolar planets by using the transit method.</p>	<ul style="list-style-type: none"> <li>➤ Unit 3 Quiz 1: The Transit Method</li> <li>➤ Unit 3 Test 1: Exoplanets Unit Test</li> </ul>	<p>3.3.12.B1 3.3.10.B1 3.3.10.B2</p>
Unit 4 3	<p align="center"><b><u>Stellar Properties</u></b></p> <p>Students will calculate the distance to nearby stars via the parallax method. Students will link proper motion of stars to their motion around the center of the galaxy. Students will compare and contrast the appearance of stars in the night sky based upon distance and luminosity.</p>	<ul style="list-style-type: none"> <li>➤ Unit 4 Quiz 1: Stellar Parallax</li> <li>➤ Unit 4 Quiz 2: Proper Motion</li> <li>➤ Unit 4 Quiz 3: Brightness &amp; Luminosity</li> <li>➤ Marking Period Exam</li> </ul>	<p>3.3.7.B1 3.3.10.B2 3.3.12.B1</p>

<b>Unit 5</b> <div style="border: 1px solid red; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin: 5px auto;">3</div>	<p style="text-align: center;"><b><u>Stellar Evolution</u></b></p> <p>Students will plot and analyze stars on an HR Diagram. Students will identify the proton-proton chain as the main form of stellar energy production. Students will explain why stars evolve off the Main Sequence and link mass to the sequence of evolutionary stages. Students will compare and contrast open and globular clusters and use them to estimate age via their Main Sequence turn off.</p>	<ul style="list-style-type: none"> <li>➤ Unit 5 Quiz 1: HR Diagram Analysis</li> <li>➤ Unit 5 Quiz 2: Stellar Structure</li> <li>➤ Unit 5 Quiz 3: Mass &amp; Stellar Evolution Diagram</li> <li>➤ Unit 5 Test 1: Stellar Evolution Unit Test</li> </ul>	3.3.12.B1
<b>Unit 6</b> <div style="border: 1px solid red; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin: 5px auto;">2</div>	<p style="text-align: center;"><b><u>The Milky Way Galaxy</u></b></p> <p>Students will link observations of stars and star clusters in the Milky Way to the appearance of the galaxy at large. Students will identify key features of the Milky Way Galaxy's structure.</p>	<ul style="list-style-type: none"> <li>➤ Unit 6 Test 1: Milky Way Structure Unit Test</li> </ul>	3.3.4.B1 3.3.10.B2 3.3.12.B1 3.3.12.B2
<b>Unit 7</b> <div style="border: 1px solid red; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin: 5px auto;">2</div>	<p style="text-align: center;"><b><u>Galaxy Classification</u></b></p> <p>Students will compare and contrast major galaxy types found in the universe. Students will identify galaxies based upon appearance using the traditional Hubble classification scheme. Students will investigate the likely steps of galaxy evolution.</p>	<ul style="list-style-type: none"> <li>➤ Unit 7 Quiz 1: Galaxy Identification</li> <li>➤ Unit 7 Test 1: Galaxies Unit Test</li> </ul>	3.3.4.B1 3.3.10.B2 3.3.12.B1 3.3.12.B2
<b>Unit 8</b> <div style="border: 1px solid red; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin: 5px auto;">2</div>	<p style="text-align: center;"><b><u>Cosmology</u></b></p> <p>Students will use Doppler shifts to explain changes in wave frequency. Students will infer Hubble's Law by plotting distance and recessional velocities of a number of galaxies. Students will link Hubble's Law to the expansion of the universe. Students will explore evidence supporting the universe began according to the Hot Big Bang model.</p>	<ul style="list-style-type: none"> <li>➤ Unit 8 Quiz 1: Hubble's Law and Redshift</li> <li>➤ Marking Period Exam #2</li> </ul>	3.3.8.B2 3.3.10.B2 3.3.10.B1 3.3.12.B2