



# JC Schools Astronomy I Yearly Standards

## Overarching Standards (Taught in all units)

### 9-12.ETS1.A.1

Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

### 9-12.ETS1.A.2

Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

### 9-12.ETS1.B.1

Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

### 9-12.ETS1.B.2

Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

Unit	Priority Standards	Supporting Standards
<b>Unit 1</b>  Introduction to Astronomy  23 Days	<b>11-12.AST1.LO.01</b> Engage in arguments from evidence about how the development of astronomy in the pre-telescopic age laid the groundwork for modern astronomy.	<b>11-12.AST1.LO.02</b> Demonstrate an understanding of the metric system.  <b>11-12.AST1.LO.16</b> Identify differences between Astronomy and Astrology.  <b>11-12.AST1.LO.03</b> Explain the scientific method and how it affects modern day observations and theories.

		<b>11-12.AST1.LO.04</b> Identify major contributors and contributions to the field of Astronomy in relation to the evolution of Astronomy.
<b>Unit 2</b>  Force and Light  23 Days	<b>9-12.PS2.B.1</b> Use mathematical representations of Newton's Law of Gravitation to describe and predict the gravitational forces between objects. [Clarification Statement: Emphasis is on both quantitative and conceptual descriptions of gravitational fields.]  <b>9-12.PS4.A.2</b> Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. [Clarification Statement: Emphasis is on how the experimental evidence supports the claim and how a theory is generally modified in light of new evidence. Examples of a phenomenon could include resonance, interference, diffraction, and photoelectric effect.]  <b>9-12.ESS1.A.2</b> Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. [Clarification Statement: Emphasis is on the astronomical evidence of the red shift of light from galaxies as an indication that the universe is currently expanding, the cosmic microwave background as the remnant radiation from the Big Bang, and the observed composition of ordinary matter of the universe, primarily found in stars and interstellar gases (from the spectra of electromagnetic radiation from stars), which matches that predicted by the Big Bang theory (3/4 hydrogen and 1/4 helium).]	<b>9-12.PS2.A.1</b> Analyze data to support and verify the concepts expressed by Newton's 2nd law of motion, as it describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. [Clarification Statement: Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force, such as a falling object, an object rolling down a ramp, or a moving object being pulled by a constant force.]  <b>11-12.AST1.LO.05</b> Apply knowledge of gravity to its impact on (1) the velocity of launched objects, (2) the velocity of objects in orbit, (3) objects on the surface of a planet, (4) the structure of our solar system.  <b>11-12.AST1.LO.06</b> Compare and contrast wave and particle properties.  <b>11-12.AST1.LO.07</b> Observe and explain red shift in terms of wavelength and frequency.
<b>Unit 3</b>	<b>11-12.AST1.LO.08</b> Compare and contrast the composition and utilization of various types of telescopes.	<b>11-12.AST1.LO.10</b> Identify physical differences between types of telescopes.

<p>Telescopes</p> <p>19 Days</p>	<p><b>11-12.AST1.LO.09</b> Decide the most useful telescope to buy and defend the position using characteristics of telescopes and costs.</p>	<p><b>11-12.AST1.LO.11</b> Identify differences in optical capability between types of telescopes.</p> <p><b>11-12.AST1.LO.12</b> Explain the advantages and disadvantages of optical and non-optical telescopes.</p>
<p><b>Unit 4</b></p> <p>Origin of the Solar System</p> <p>17 Days</p>	<p><b>9-12.ESS1.A.2</b> Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. [Clarification Statement: Emphasis is on the astronomical evidence of the red shift of light from galaxies as an indication that the universe is currently expanding, the cosmic microwave background as the remnant radiation from the Big Bang, and the observed composition of ordinary matter of the universe, primarily found in stars and interstellar gases (from the spectra of electromagnetic radiation from stars), which matches that predicted by the Big Bang theory (3/4 hydrogen and 1/4 helium).]</p>	<p><b>11-12.AST1.LO.13</b> Obtain, evaluate, and communicate information about the patterns of size and scale of the solar system, our galaxy, and the universe.</p> <p><b>11-12.AST1.LO.14</b> Identify aspects of the Solar Nebula theory.</p> <p><b>11-12.AST1.LO.15</b> Relate characteristics of our solar system as evidence of Solar Nebula Theory</p>