

## High School Standards

### Science

- Biology
  - LS4.C: Adaptation: Evolution is a consequence of the interaction of four factors: (1) the potential for a species to increase in number, (2) the genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for an environment's limited supply of the resources that individuals need in order to survive and reproduce, and (4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment.
    - Discussion how animals respond to eclipse
      - Discuss in terms of natural response to stimulus
- Chemistry
  - PS1.C: Nuclear Processes: Nuclear processes, including fusion, fission, and radioactive decays of unstable nuclei, involve release or absorption of energy. The total number of neutrons plus protons does not change in any nuclear process.
    - Discussion of nuclear process in Sun
      - At least can mention eclipse
  - PS3.A: Definitions of Energy: At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy.
    - Discussion of how eclipse causes temperature change
- Earth and Space Sciences
  - PS3.D: Energy in Chemical Processes and Everyday Life: Nuclear fusion processes in the center of the sun release the energy that ultimately reaches Earth as radiation.
    - Discussion of nuclear process in Sun
      - At least can mention eclipse
  - ESS1.B: Earth and the Solar System: 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.
    - Discussion of orbits naturally leads to how the Earth orbiting the Sun and Moon orbiting the Earth allows for eclipse to occur
- Integrated Chemistry and Physics
  - PS1.C: Nuclear Processes: Nuclear processes, including fusion, fission, and radioactive decays of unstable nuclei, involve release or absorption of energy. The total number of neutrons plus protons does not change in any nuclear process.
    - Discussion of nuclear process in Sun
      - At least can mention eclipse

- PS3.A: Definitions of Energy: At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy.
  - Discussion of how eclipse causes temperature change
- Physics
  - PS2.B: Types of Interactions: Newton's law of universal gravitation and Coulomb's law provide the mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects. Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. Magnets or electric currents cause magnetic fields; electric charges or changing magnetic fields cause electric fields.
    - Discussion how gravity influences the orbits of Earth and Moon, which allows for eclipse to occur
  - PS3.A: Definitions of Energy: At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal energy.
    - Discussion of how eclipse causes temperature change

## Math

- PS.4: Model with mathematics: Mathematically proficient students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace using a variety of appropriate strategies. They create and use a variety of representations to solve problems and to organize and communicate mathematical ideas. Mathematically proficient students apply what they know and are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and formulas. They analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
  - Talk about how mathematical models of the solar system naturally predict eclipses and allow us to predict the time and place of an eclipse 100s of years in the future.
- Geometry
  - G.T.6 Use trigonometric ratios (sine, cosine, tangent, and their inverses) and the Pythagorean Theorem to solve real-world and mathematical problems involving right triangles.
    - Prove that the size and distance of Sun and moon make them both look to be the same angular size in our sky
  - G.CI.3 Solve real-world and other mathematical problems that involve finding measures of circumference, areas of circles and sectors, and arc lengths and related angles (central, inscribed, and intersections of secants and tangents).

- Discussion of Kepler's laws of planetary motion
  - Orbits of Earth and moon and how they relate to eclipses.

### Literacy

- 11-12.RC.9 Synthesize and evaluate multiple sources of information presented in different mediums in order to address a question or solve a problem.
  - Look up different papers/books with explanation of eclipse
- 9-10.LST.1.1: Read and comprehend science and technical texts within a range of complexity appropriate for grades 9-10 independently and proficiently by the end of grade 10.
  - Read scientific papers about eclipse
    - Both current and historical
- 11-12.LST.1.1: Read and comprehend science and technical texts within a range of complexity appropriate for grades 11-CCR independently and proficiently by the end of grade 12.
  - Read scientific papers about eclipse
    - Both current and historical
- 9-10.LST.2.1: Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
  - Read scientific papers about eclipse
    - Both current and historical
- 11-12.LST.2.1: Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
  - Read scientific papers about eclipse
    - Both current and historical
- 9-10.LST.4.1: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
  - Read scientific papers about eclipse
    - Both current and historical
- 11-12.LST.4.1: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
  - Read scientific papers about eclipse
    - Both current and historical