



Guaranteed and Viable Curriculum (GVC) for: Earth Systems

1st Quarter:

GVC #1:Standard ESS.1.1

Develop a model based on evidence to illustrate the life span of the Sun and the role of nuclear fusion releasing energy in the Sun's core. Emphasize energy transfer mechanisms that allow energy from nuclear fusion to reach Earth. Examples of evidence for the model could include observations of the masses and lifetimes of other stars, or non-cyclic variations over centuries. (PS1.C, PS3.D, ESS1.A, ESS1.B)

GVC #2:Standard ESS.1.2

Construct an explanation of the Big Bang theory based on astronomical evidence of electromagnetic radiation, motion of distant galaxies, and composition of matter in the universe. Emphasize redshift of electromagnetic radiation, cosmic microwave background radiation, and the observed composition and distribution of matter in the universe. (PS4.B, ESS1.A)

2nd Quarter:

GVC #3:Standard ESS.3.1

Plan and carry out an investigation of the properties of water and its effects on Earth materials and surface processes. Examples of properties could include water's capacity to expand upon freezing, dissolve and transport material, or absorb, store, and release energy. (ESS2.C)

GVC #4:Standard ESS.3.4

Analyze and interpret patterns in data about the factors influencing weather of a given location. Emphasize the amount of solar energy received due to latitude, elevation, the proximity to mountains and/ or large bodies of water, air mass formation and movement, and air pressure gradients. (ESS2.D)

3rd Quarter:

GVC #5:Standard ESS.2.3

Construct an explanation for how plate tectonics results in patterns on Earth's surface. Emphasize past and current plate motions. Examples could include continental and ocean floor features such as mountain ranges and mid-ocean ridges, magnetic polarity preserved in seafloor rocks, or regional hot spots. (ESS2.B)

GVC #6:Standard ESS.2.6

Evaluate **design solutions** that reduce the effects of natural disasters on humans. *Define the problem, identify criteria and constraints, analyze available data on proposed solutions, and determine an optimal solution.* Examples of natural disasters could include earthquakes, tsunamis, hurricanes, drought, landslides, floods, or wildfires. (ESS3.B, ETS1.A, ETS1.B, ETS1.C)

4th Quarter:

GVC #7:Standard ESS.4.1

Construct an explanation for how the availability of natural resources, the occurrence of natural hazards, and changes in climate affect human activity. Examples of natural resources could include access to fresh water, clean air, or regions of fertile soils. Examples of factors that affect human activity could include that rising sea levels cause humans to move farther from the coast or that humans build railroads to transport mineral resources from one location to another. (ESS3.A, ESS3.B)

GVC #8:Standard ESS.2.1

Analyze and interpret data to construct an explanation for the changes in Earth's formation and 4.6 billion year history. Examples of data could include the absolute ages of ancient Earth materials, the size and composition of solar system objects like meteorites, or the impact cratering record of planetary surfaces. (ESS1.C)