

### DCI: Matter and Its Interactions

#### HS.PS1.C: Nuclear Processes

Spontaneous radioactive decays follow a characteristic exponential decay law. Nuclear lifetimes allow radiometric dating to be used to determine the ages of rocks and other materials. (HS-ESS1-5), (HS-ESS1-6)

### DCI: Energy

#### HS.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. (HS-ESS1-1)

### DCI: Waves and Their Applications in Technologies for Information Transfer

#### HS.PS4.B: Electromagnetic Radiation

Atoms of each element emit and absorb characteristic frequencies of light. These characteristics allow identification of the presence of an element, even in microscopic quantities. (HS-ESS1-2)

### DCI: Earth's Place in the Universe

#### HS.ESS1.A: The Universe and Its Stars

The star called the sun is changing and will burn out over a lifespan of approximately 10 billion years. (HS-ESS1-1)

### DCI: Earth's Place in the Universe

#### HS.ESS1.A: The Universe and Its Stars

The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth. (HS-ESS1-2), (HS-ESS1-3)

### DCI: Earth's Place in the Universe

#### HS.ESS1.A: The Universe and Its Stars

The Big Bang theory is supported by observations of distant galaxies receding from our own, of the measured composition of stars and non-stellar gases, and of the maps of spectra of the primordial radiation (cosmic microwave background) that still fills the universe. (HS-ESS1-2)

### DCI: Earth's Place in the Universe

#### HS.ESS1.A: The Universe and Its Stars

Other than the hydrogen and helium formed at the time of the Big Bang, nuclear fusion within stars produces all atomic nuclei lighter than and including iron, and the process releases electromagnetic energy. Heavier elements are produced when certain massive stars achieve a supernova stage and explode. (HS-ESS1-2), (HS-ESS1-3)

### DCI: Earth's Place in the Universe

#### HS.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. (HS-ESS1-4)

### DCI: Earth's Place in the Universe

#### HS.ESS1.C: The History of Planet Earth

Continental rocks, which can be older than 4 billion years, are generally much older than the rocks of the ocean floor, which are less than 200 million years old. (HS-ESS1-5)

### DCI: Earth's Place in the Universe

#### HS.ESS1.C: The History of Planet Earth

Although active geologic processes, such as plate tectonics and erosion, have destroyed or altered most of the very early rock record on Earth, other objects in the solar system, such as lunar rocks, asteroids, and meteorites, have changed little over billions of years. Studying these objects can provide information about Earth's formation and early history. (HS-ESS1-6)

## DCI: Earth's Systems

### **HS.ESS2.B: Plate Tectonics and Large Scale System Interactions**

Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geologic history. Plate movements are responsible for most continental and ocean floor features and for the distribution of most rocks and minerals within Earth's crust. (HS-ESS1-5)

