

**New Jersey High School Science  
Curriculum Standards Mapping**

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Earth Systems Science	Boardworks High School Earth Science Presentations
<b>A. Objects in the Universe</b>	
5.4.12.A.1 <i>Prior to the work of 17th-century astronomers, scientists believed the Earth was the center of the universe (geocentric model).</i>	–
5.4.12.A.2 The properties and characteristics of solar system objects, combined with radioactive dating of meteorites and lunar samples, provide evidence that Earth and the rest of the solar system formed from a nebular cloud of dust and gas 4.6 billion years ago.	Planets of the Solar System
5.4.12.A.3 Stars experience significant changes during their life cycles, which can be illustrated with an Hertzsprung-Russell (H-R) Diagram.	Properties of Stars
5.4.12.A.4 The Sun is one of an estimated two hundred billion stars in our Milky Way galaxy, which together with over one hundred billion other galaxies, make up the universe.	Structure of the Universe
5.4.12.A.5 The Big Bang theory places the origin of the universe at approximately 13.7 billion years ago. Shortly after the Big Bang, matter (primarily hydrogen and helium) began to coalesce to form galaxies and stars.	Astronomical Distances
5.4.12.A.6 According to the Big Bang theory, the universe has been expanding since its beginning, explaining the apparent movement of galaxies away from one another.	Doppler Effect Observing the Universe
<b>B. History of Earth</b>	
5.4.12.B.1 The evolution of life caused dramatic changes in the composition of Earth's atmosphere, which did not originally contain oxygen gas.	The Atmosphere
5.4.12.B.2 <i>Relative dating uses index fossils and stratigraphic sequences to determine the sequence of geologic events.</i>	–
5.4.12.B.3 Absolute dating, using radioactive isotopes in rocks, makes it possible to determine how many years ago a given rock sample formed.	Fossil Record Radioactive Dating
<b>C. Properties of Earth Materials</b>	
5.4.12.C.1 Soils are at the interface of the Earth systems, linking together the biosphere, geosphere, atmosphere, and hydrosphere.	Soil
5.4.12.C.2 The chemical and physical properties of the vertical structure of the atmosphere support life on Earth.	The Atmosphere The Impact of Using CFCs
<b>D. Tectonics</b>	

5.4.12.D.1 Convection currents in the upper mantle drive plate motion. Plates are pushed apart at spreading zones and pulled down into the crust at subduction zones.	Earth's Structure Earthquake Causes Earthquake Effects Plate Tectonics Volcanoes
5.4.12.D.2 Evidence from lava flows and ocean-floor rocks shows that Earth's magnetic field reverses (North – South) over geologic time.	Plate Tectonics
<b>E. Energy in Earth Systems</b>	
5.4.12.E.1 The Sun is the major external source of energy for Earth's global energy budget.	Heat Transfer and Global Interactions Recycling Nutrients Solar Energy
5.4.12.E.2 Earth systems have internal and external sources of energy, both of which create heat.	Heat Transfer and Global Interactions
<b>F. Climate and Weather</b>	
5.4.12.F.1 Global climate differences result from the uneven heating of Earth's surface by the Sun. Seasonal climate variations are due to the tilt of Earth's axis with respect to the plane of Earth's nearly circular orbit around the Sun.	The Rotation of the Earth Weather and Climate
5.4.12.F.2 Climate is determined by energy transfer from the Sun at and near Earth's surface. This energy transfer is influenced by dynamic processes, such as cloud cover and Earth's rotation, as well as static conditions, such as proximity to mountain ranges and the ocean. Human activities, such as the burning of fossil fuels, also affect the global climate.	Climate Change Fossil Fuels Greenhouse Gases Heat Transfer and Global Interactions The Rotation of the Earth Weather and Climate
5.4.12.F.3 Earth's radiation budget varies globally, but is balanced. Earth's hydrologic cycle is complex and varies globally, regionally, and locally.	The Water Cycle
<b>G. Biogeochemical Cycles</b>	
5.4.12.G.1 Natural and human-made chemicals circulate with water in the hydrologic cycle.	Water Pollution
5.4.12.G.2 Natural ecosystems provide an array of basic functions that affect humans. These functions include maintenance of the quality of the atmosphere, generation of soils, control of the hydrologic cycle, disposal of wastes, and recycling of nutrients.	The Atmosphere The Carbon Cycle Formation of Fossil Fuels The Nitrogen Cycle Recycling Nutrients Soil The Water Cycle

5.4.12.G.3 Movement of matter through Earth's system is driven by Earth's internal and external sources of energy and results in changes in the physical and chemical properties of the matter.	The Carbon Cycle The Nitrogen Cycle The Rock Cycle The Water Cycle
5.4.12.G.4 Natural and human activities impact the cycling of matter and the flow of energy through ecosystems.	The Carbon Cycle The Nitrogen Cycle
5.4.12.G.5 Human activities have changed Earth's land, oceans, and atmosphere, as well as its populations of plant and animal species.	Air Pollution Climate Change Extinction Human Impact on the Environment Loss of Diversity The Impact of Mining The Atmosphere Water Pollution
5.4.12.G.6 Scientific, economic, and other data can assist in assessing environmental risks and benefits associated with societal activity.	-
5.4.12.G.7 Earth is a system in which chemical elements exist in fixed amounts and move through the solid Earth, oceans, atmosphere, and living things as part of geochemical cycles.	The Carbon Cycle The Nitrogen Cycle