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12.001 Introduction to Geology
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A brief timeline of the history of science

Year	Events
384 to 322 B.C.E.	Aristotle states that it is impossible for rocks to fall from the sky, since there is no such material there, and so meteorites must be the tops of distant explosive volcanoes.
77	Pliny the Elder catalogs objects that fell from the sky, including meteorites, wool, bricks, and milk.
1031-1095	Chinese polymath Shua Ken observes fossil shells in a mountain far from the sea, and hypothesizes that land is formed by the erosion of mountains and deposition of sediment.
1610	Galileo Galilei finds four moons of Jupiter, proving that not all bodies orbit the Sun and thereby contradicting the tenets of the Catholic Church.
1638-1686	Danish scientist Nicolas Steno announces three defining principles of stratigraphy: The law of superposition, the principle of original horizontality, and the principle of lateral continuity.
1655	The great experimentalist Robert Hooke suggests that lunar craters are caused by giant bursting bubbles.
1658	Archbishop James Ussher of Armagh calculated from Bible verses that the Earth was made the night before the 23 rd of October in 4004 B.C. (his estimate is similar to others, for example, Dr. John Lightfoot, Vice-chancellor of the University of Cambridge stated in 1642 that the Earth was made on the 17th of September 3928 B.C. at 9 o'clock in the morning).
1661	English physicist Robert Boyle defines an element as a substance that cannot be further broken down.
1687	Sir Isaac Newton publishes his <i>Philosophiæ naturalis principia mathematica</i> , a work that includes the universal laws of gravitation, planetary motion, and fluid motion.
1693	In his book <i>Protogæa</i> , famous mathematician Gottfried Wilhelm von Leibnitz hypothesizes that the Earth was once molten, based on observations he makes while trying to drain water from mines in the Harz mountains.
1774	French natural historian Georges Louis Leclerc Comte de Buffon calculates the time needed to cool the Earth from a molten state and estimates its age at 75,000 years. Oxygen is isolated as an element.
1775	Abraham Gottlob Werner teaches the first class in geology, at a mining academy in Freiburg.
1778	“Geology” first used as a term by Swiss scientist Jean-André Deluc.
1785	Scots chemist James Hutton presents a paper entitled <i>Concerning the system of the Earth, its duration and stability</i> (actually presented by a friend because Hutton was ill) to the Royal Society of Edinburgh in which he posits that the Earth is far older than previously thought.
1795	Hutton publishes <i>Theory of the Earth</i> , but its poor presentation because of his illness prevents its best reception; John Playfair presents his arguments more cogently in his <i>Illustrations of the Huttonian theory of the Earth</i> in 1802. Hutton’s followers, “plutonists,” believed that volcanism creates rocks, as opposed to the “neptunists,” who believed that rocks settled from a gradually shrinking ocean.
1796	French mathematician Pierre-Simon Laplace publishes <i>Exposition du système du monde</i> , in which he posits that the planets condensed from a spinning nebula of incandescent gas. He also suggests that a cometary impact on Earth is inevitable, and would have devastating effects.
1801	Sicilian monk Giuseppe Piazzi discovers the first asteroid, Ceres.
	Motivated by the idea of an initially molten Earth, Jean Baptiste Joseph Fourier develops theories of heat conduction and introduces the idea of an irreversible process, in contrast to Newton’s reversible dynamics.
1807	Thomas Jefferson reads a report from Yale on meteorites, and retorts: “I would find it

	easier to believe that two Yankee professors would lie, than that stones should fall from the sky.”
1820s	All fields of science have a low reputation; workers tend to be instrument makers or curators.
1830	Charles Lyell publishes the first volume of <i>Principles of Geology</i> , moving the observer into the “world of the non sequitur.”
1833	William Whewell invents the term “scientist” in response to a request by the poet Coleridge. Whewell also invented “anode,” “cathode,” and “ion” for Michael Faraday.
1830s	William Whewell coins the term “uniformitarianism” for Lyell, in contrast to his own “catastrophism.”
1851	German chemist Robert Wilhelm Bunsen (of Bunsen burners) suggests that igneous rocks are derived from two primitive melts: acid and basic.
1860	Scots scientist Kirk takes the first step toward producing extreme temperatures in the laboratory by reaching 234K, below the freezing point of mercury.
1890	Lord Kelvin (William Thomson) publishes <i>On the Secular Cooling of the Earth</i> , in which he states that the Earth consolidated no less than 20 Myr and no more than 400 Myr ago. He later revised the estimate to 20 to 40 Myr. His estimate did not include heat from radioactive elements, which had not yet been discovered.
1896	French physicist and subsequent Nobel-prize winner Antoine Henri Becquerel discovers radioactivity by placing potassium uranyl sulfate on photographic plates. Marie Curie subsequently took up the study and coined the term “radioactivity.”
1905	Albert Einstein publishes his seminal paper on special relativity.
1906	French physicist Bernard Brunhes discovers that the Earth’s magnetic field periodically reverses its pole directions when he finds lava flows with reversed fields recorded in their minerals.
1907	American chemist Bertram Borden Boltwood develops a method for calculating the age of a rock based on radiodecay of its elements.
1908	Dutch Nobel-prize winning physicist Heike KamerlinghOnnes reaches 4.2K in a laboratory experiment, and shortly after, 1K.
1910	Canadian geologist Norman L. Bowen begins petrology experiments. Bowen studied at MIT and worked at the Carnegie Institute, and produced the first phase diagrams along with his influential descriptions of the evolution of igneous rocks.
1911	Carnegie Institute scientists A.L. Day and R.D. Sosman calibrate platinum-rhodium thermocouples for high-temperature experiments. Superconductivity of materials near absolute zero is discovered.
1912	German geophysicist Alfred Lothar Wegener proposes the theory of continental drift based on matching fossils across present-day oceans. In 1918 he publishes <i>The origin of the continents and oceans</i> .
1930s	Serbian astrophysicist Miultin Milankovitch develops a theory linking the Earth’s motion with large-scale climate change, and hypothesizes that the planet has experienced periodic ice ages.
1936	Inge Lehmann uses seismic observations to discover the Earth’s solid inner core.
1957	The Soviets launch <i>Sputnik 1</i> , a sphere with a radio in it, and the Earth’s first artificial satellite.
1959	The Soviets launch <i>Luna 2</i> , the first manmade object to reach the Moon.
1962	Murray Gell-Mann proposes the existence of quarks, the fundamental building blocks of atomic matter.
1960s	The theory of plate tectonics is developed from continental drift and seafloor spreading.
1969	The U.S. launches <i>Apollo 11</i> , the first crewed lunar lander and the first lunar sample return.
1970	the Soviets launches <i>Venera 7</i> , the first controlled lander on another planet (Venus), and

	the first to transmit information about the Venusian surface, including composition and temperature.
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