

Science in the Industrial Age

Table of Contents

Lessons 1-15: Science in the Early 19th Century



Lesson 1: Georges Cuvier (1769 – 1832)	1
Lesson 2: Georges Cuvier and the Structure of Animals	4
Lesson 3: Friedrich Wilhelm Adam Sertürner (1783 – 1841)	7
Lesson 4: Alexander von Humboldt (1769 – 1859)	10
Lesson 5: Jöns Jakob Berzelius (1779 – 1848).....	13
Lesson 6: Jöns Jakob Berzelius and Proteins	16
Lesson 7: Jöns Jakob Berzelius and Catalysts	19
Lesson 8: Jean-Baptiste Lamarck (1744 – 1829).....	22
Lesson 9: Amedeo Avogadro (1776 – 1856).....	25
Lesson 10: William Charles Wells (1757 – 1817).....	28
Lesson 11: William Prout (1785 – 1850)	31
Lesson 12: William Prout and Food	34
Lesson 13: Hans Christian Ørsted (1777 – 1851).....	37
Lesson 14: Michael Faraday (1791 – 1867).....	40
Lesson 15: Michael Faraday and Motors	43

Lessons 16-30: Science in the Early-to-Mid 19th Century I



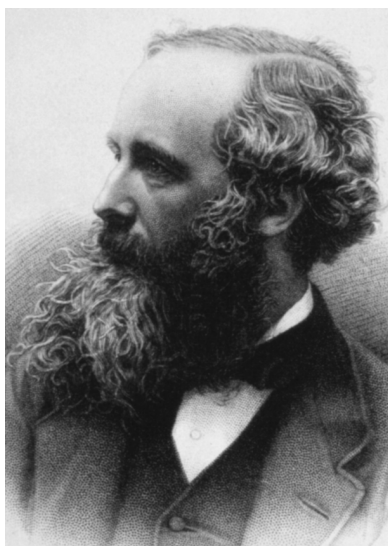
Lesson 16: Michael Faraday and Magnetic Fields.....	47
Lesson 17: Michael Faraday and Electrical Power	50
Lesson 18: Michael Faraday and His Cage.....	53
Lesson 19: André-Marie Ampère (1775 – 1836).....	56
Lesson 20: John Herapath (1790 – 1868)	59
Lesson 21: Marie Jean Pierre Flourens (1794 – 1867)	62
Lesson 22: Nicolas Léonard Sadi Carnot (1796 – 1832).....	65
Lesson 23: Georg Simon Ohm (1789 – 1854)	68
Lesson 24: Sir Charles Wheatstone (1802 – 1875).....	71
Lesson 25: Sir Charles Wheatstone and The Speed of Electricity.....	74
Lesson 26: Sir Charles Wheatstone and Binocular Vision	77
Lesson 27: Sir Charles Wheatstone and the Telegraph	80
Lesson 28: Sir Charles Lyell (1797 – 1875)	83
Lesson 29: Thomas Graham (1805 – 1869).....	86
Lesson 30: Thomas Graham and Colloids.....	89

Lessons 31-45: Science in the Early-to-Mid 19th Century II



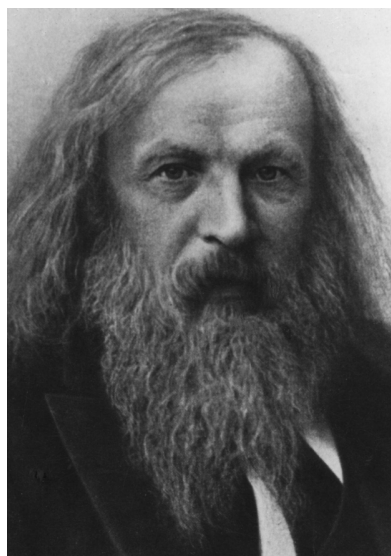
Lesson 31: Mary Somerville (1780 – 1872)	93
Lesson 32: Theodor Schwann (1810 – 1882)	96
Lesson 33: Theodor Schwann and Matthias Jakob Schleiden	99
Lesson 34: Some of the Organelles in a Cell	102
Lesson 35: Heinrich Gustav Magnus (1802 – 1870)	105
Lesson 36: Louis Daguerre (1787 – 1851)	108
Lesson 37: Julius Robert von Mayer (1814 – 1878)	111
Lesson 38: Christian Doppler (1803 – 1853)	114
Lesson 39: James Prescott Joule (1818 – 1889)	117
Lesson 40: Urbain Jean Joseph Le Verrier (1811 – 1877)	120
Lesson 41: Hermann von Helmholtz (1821 – 1894)	123
Lesson 42: Hermann von Helmholtz and the Opthamoloscope	126
Lesson 43: Lord William Thomson, Baron Kelvin (1824 – 1907)	129
Lesson 44: Louis Pasteur (1822 – 1895)	132
Lesson 45: Louis Pasteur and Fermentation	135

Lessons 46-60: Science in the Middle of the 19th Century



Lesson 46: Louis Pasteur and Spontaneous Generation	139
Lesson 47: Louis Pasteur and Disease	142
Lesson 48: Louis Pasteur and Vaccines	145
Lesson 49: Rudolf Clausius (1822 – 1888)	148
Lesson 50: George Gabriel Stokes (1819 – 1903)	151
Lesson 51: Alfred Russel Wallace (1823 – 1913)	154
Lesson 52: James Clerk Maxwell (1831 – 1879)	157
Lesson 53: More on James Clerk Maxwell and Color	160
Lesson 54: James Clerk Maxwell and Saturn	163
Lesson 55: James Clerk Maxwell and Light Waves	166
Lesson 56: Charles Robert Darwin (1809 – 1882)	169
Lesson 57: The Proper Use of Darwin's Theory	173
Lesson 58: Henry Walter Bates (1825 – 1892)	176
Lesson 59: Joseph Lister (1827 – 1912)	179
Lesson 60: Gregor Mendel (1822 – 1884)	182

Lessons 61-75: Science in the Latter Part of the 19th Century



Lesson 61: Alfred Bernhard Nobel (1833 – 1896)	187
Lesson 62: Dmitri Ivanovich Mendeleev (1834 – 1907)	190
Lesson 63: Mendeleev and the Periodic Table of the Elements	193
Lesson 64: Giovanni Virginio Schiaparelli (1835 – 1910)	196
Lesson 65: Giovanni Schiaparelli and Percival Lowell	199
Lesson 66: Ludvig Valentin Lorenz (1829 – 1891)	202
Lesson 67: Camillo Golgi (1843 – 1926)	205
Lesson 68: Johannes Friedrich Miescher (1844 – 1895)	208
Lesson 69: Ludwig Eduard Boltzmann (1844 – 1906)	211
Lesson 70: Ernst Mach (1838 – 1916)	214
Lesson 71: Ernst Mach and Supersonic Speed	217
Lesson 72: Alexander Graham Bell (1847 – 1922)	220
Lesson 73: Robert Koch (1843 – 1910)	223
Lesson 74: Walther Flemming (1843 – 1905)	226
Lesson 75: Albert Abraham Michelson (1852 – 1931)	229

Lessons 76-90: Science in the Late 19th Century



Lesson 76: Thomas Alva Edison (1847 – 1931)	233
Lesson 77: Sydney Ringer (1835 – 1910)	236
Lesson 78: John Venn (1834 – 1923)	239
Lesson 79: Max Rubner (1854 – 1932)	242
Lesson 80: Pierre Curie (1859 – 1906)	245
Lesson 81: Jacobus Henricus van 't Hoff (1852 – 1911)	248
Lesson 82: Jacobus Henricus van 't Hoff and Osmotic Pressure	251
Lesson 83: Svante August Arrhenius (1859 – 1927)	254
Lesson 84: Svante August Arrhenius and Activation Energy	257
Lesson 85: Nikola Tesla (1856 – 1943)	260
Lesson 86: Heinrich Rudolf Hertz (1857 – 1894)	263
Lesson 87: Wilhelm Conrad Röntgen (1845 – 1923)	266
Lesson 88: Antoine-Henri Becquerel (1852 – 1908)	269
Lesson 89: Marie Curie (1867 – 1934)	272
Lesson 90: More About Marie Curie and Radiation	275

<i>Some Final Thoughts</i>	278
----------------------------------	-----

<i>Glossary</i>	279
-----------------------	-----

<i>Image Credits</i>	291
----------------------------	-----

<i>Index</i>	293
--------------------	-----