

Maine's Learning Results Science and Technology Performance Indicators Content Clarification Crosswalk for Middle Grades 5-8

Standard A: Classifying Life Forms

Maine's Learning Results	Maine's Curriculum Framework	Science for All Americans	Project 2061 Benchmarks for Science Literacy	National Science Education Standards	Project 2061 Atlas of Science Literacy
A1: Compare systems of classifying organisms including systems used by scientists.	Essay pII-64 A(5-8)#1 pII-64	Diversity of Life pp 60-61	5A Essay p101 5A(6-8) Essay p104 5A(6-8)#1,3,4 5A Research pp 340-41	5-8/C5a p158 9-12/C Essay p181 9-12/C3e p185	Biological Evolution Map p 81
A2: Decipher the system for assigning a scientific name to every living thing.	A(5-8)#2 pII-64	Diversity of Life p 60	5A(6-8)#4	9-12/C Essay p181 9-12/C3e p185	No Maps
A3: Describe some structural and behavioral adaptations that allow organisms to survive in a changing environment.	Essay pII-64 A(5-8)#3 pII-64	Diversity of Life pp 60-61	5A(6-8)#2 5F(6-8)#2 6D(6-8)#1 5D Research p342 & 5F p344	5-8/C Essay p156 5-8/C1d p 156 5-8/C3a,3b,3c,3d p157 5-8/C5b p 158	Variation and Advantage Map p 83

Standard B: Ecology

Maine's Learning Results	Maine's Curriculum Framework	Science for All Americans	Project 2061 Benchmarks for Science Literacy	National Science Education Standards	Project 2061 Atlas of Science Literacy
B1: Describe in general terms the chemical processes of photosynthesis and respiration	B(5-8)#1 pII-65 A(5-8)#2 p II-42	Flow of Matter and Energy p 66 Basic Functions p 77	5E(6-8) Essay p120 5E(6-8)#1,3 6C(6-8)#3 5E(9-12) Essay p121 5E Research p342-43	5-8/C Essay p156 5-8/C4c pp 157-58	Flow of Matter in Ecosystems Map p 77 Flow of Energy in Ecosystems Map p 79 Functions of Organs Strand p 75
B2: Analyze how the finite resources in an ecosystem limit the types and populations of organisms within it	B(5-8)#2 pII-65 Snapshot pII-65	Interdependence of Life p 65 Flow of Matter and Energy p 67	5D Essay p 115 5D(6-8) Essay p 117 5D(6-8)#1 5D(9-12)#1 5E(9-12)#2 5D Research p342	5-8/C Essay p 156 5-8/C4d p158 5-8/F Essay p 167 5-8/F2a,b p 168 9-12/C4a, 5e p 186	Natural Selection Map p 83 Systems Map p 133
B3: Describe succession and other ways ecosystems can change over time	B(5-8)#3 pII-65	Interdependence of Life p 65	5D(9-12)#1,2,3 11C(6-8)#1	5-8/C4d p158 9-12/C4c,e p186	No Maps

Standard B: Ecology (Continued)

B4: Generate examples of the variety of ways that organisms interact	B(5-8)#4 pII-65 A(5-8)#2 p II-42	Interdependence of Life pp 64-65	5D Essay p 115 5D(6-8) Essay p117 <u>5D(6-8)#2</u>	5-8/C Essay p155 <u>5-8/C 4b</u> p157 5-8/C 4a p 157	Flow of Matter in Ecosystems Map p 77
B5: Describe various mechanisms found in the natural world for transporting living and nonliving matter and the results of such movements	A(5-8)#2,4,6,8 p II-42	Diversity of Life p 61 Flow of Matter and Energy pp 66-67	4B(6-8)#7 4C(9-12)#1 5E(3-5)#3 <u>5A(6-8)#5</u> 5E(6-8) Essay p120 <u>5E(6-8)#1,2</u> 5E(9-12)#1,3 5E Research p 343	5-8/C4b p157 5-8/D1e,f,g p 160 <u>9-12/C4a, 5f</u> p186	Flow of Matter in Ecosystems Map p 77

Standard C: Cells

Maine's Learning Results	Maine's Curriculum Framework	Science for All Americans	Project 2061 Benchmarks for Science Literacy	National Science Education Standards	Project 2061 Atlas of Science Literacy
C1: Compare and contrast human organ systems with those of other species	C(5-8)#1 pII-66	Human Identity p72	5C(6-8) Essay p112 <u>5C(6-8)#1,3</u> 6A(6-8) Essay p129 6A(6-8)#1	5-8/C5a p 158	Cells and Organs Map p 75
C2: Prepare and examine microscope slides of single-celled and multi-celled organisms	C(5-8)#2,3,4 pII-66 Snapshot pII-67	Cells p62	5C(6-8) Essay p112 <u>5C(6-8)#1</u> 5C Research p342 6C(6-8)#1	5-8/C Essay p155 5-8/C1b p156	Structure Strand p 75
C3: Describe the structure and function of major organs in human systems.	C(5-8)#5 p II-66	Basic Functions pp 76-78	5C(6-8) Essay p 112 <u>5C(6-8)#1,2,3,4</u> 6C(6-8) Essay p137 <u>6C(6-8)#1,2,3,4,5,6</u> 6C Research p344-345	5-8/C Essay p156 <u>5-8/C1a,d</u> p156	Cell Functions Map p 73 Cells and Organs Map p 75 Systems Map p 133
C4: Identify the causes and effects of diseases, explain their transmission, and identify prevention strategies.	C(5-8)#6 p II-66	Physical Health pp 80-82 Health Technology pp 123-126 Discovering Germs p 160	6E(6-8) Essay p145 6E(3-5)#3,4 <u>6E(6-8)#2,3,4,5</u> <u>8F(6-8)#1</u> 8F(6-8) Essay p 206 10I(6-8) Essay p257 10I(6-8)#1,2,3,4 6E Research p345-346	<u>5-8/C1f</u> p 157	Maintaining Good Health Map p 89 Disease Map p 87

Standard C: Cells (Continued)

C5: Describe how body systems work together.	Not in the Framework	Basic Functions p 77 Systems pp 166-168	6C(6-8) Essay p137 6C(6-8)#1,2,3,5,6 6C(9-12)#2 11A(6-8)#1,2,3 11A Essay p 262 11A(6-8) Essay p 265 6C Research p344-345 11A Research pp 355-6	5-8/C Essay p156 5-8/C1e p 156	Cells and Organs Map p 75 Systems Map p 133
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Standard D: Continuity and Change

Maine's Learning Results	Maine's Curriculum Framework	Science for All Americans	Project 2061 Benchmarks for Science Literacy	National Science Education Standards	Project 2061 Atlas of Science Literacy
D1: Describe how fossils can be used by scientists to trace the history of a species	D(5-8)#1 p II-68	Evolution of Life pp 67-68 Human Identity p 72 Evolution pp 177-78	Ch 5 Essay p 99 5F Essay p 122 5F(6-8) Essay p124 4C(6-8)#5 6A(6-8)#3 5F(6-8)#3 4C 6-8 Essay p73	5-8/D Essay p159 5-8/D2b p160 5-8/C5c p158 9-12/C Vignette pp182-183	Rocks and Sediments Strand p 51 Fossil Evidence Strand p 81
D2: Explain how scientists use fossils to prove that life forms, climate, environment, and geologic features in a certain location are not the same now as they were in the past.	D(5-8)#2 p II-68	Evolution of Life pp 67-68 Earth Processes p 46 Evolution pp 177-78	5F(6-8) Essay p124 5F(6-8)#3 4C(6-8) Essay p73 4C(6-8)#5	5-8/D Essay p 159 5-8/D2b p160 5-8/C5c p158	Fossil Evidence Strand p 81
D3: Provide examples of the concept of natural and artificial selection and its role in species change over time	D(5-8)#4,7 p II-68	Evolution of Life pp 67-69 Heredity p 61 Explaining the Diversity of Life pp 157-159 Agriculture pp 108-09	5B(6-8) Essay p108 5B(6-8)#3 5F Essay p122 5F(6-8) Essay p124 5F(9-12) Essay p 124 5F(6-8)#1,2 8A(6-8)#2 5F(9-12)#1,3,4,5,6,7 10H(9-12)#1,2,3,4,5,6 5F Research p343	5-8/C5b p158 9-12/C Essay pp181,184 9-12/C3c p185	Biological Evolution Map p 81 Natural Selection Map p 83

Standard D: Continuity and Change (Continued)

D4: Compare how sexually and asexually reproducing species transfer genetic information to offspring.	D(5-8)#5,6 p II-68	Heredity pp 61-62 Human Development p 73	<u>5B(6-8)#1,2</u> 5B(6-8) Essay p 108 6B(6-8)#1	5-8/C Essay p 156 <u>5-8/C2a,b,c,d</u> p 157	DNA and Inherited Characteristics Map p 69 Variation in Inherited Characteristics Map p 71
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Standard E: Structure of Matter

Maine's Learning Results	Maine's Curriculum Framework	Science for All Americans	Project 2061 Benchmarks for Science Literacy	National Science Education Standards	Project 2061 Atlas of Science Literacy
E1: Predict and test whether objects will float or sink based on a qualitative and quantitative understanding of the concepts of density and buoyancy	E(3-4)#2 p II-69 E(5-8)#9 p II-70	Structure of Matter p 46	<u>4D(6-8)#2</u> 4D Research p336-7	5-8/B Essay p149 5-8/B Vignette p150-53 <u>5-8/B1a</u> p154	Conservation of Matter Map p 57
E2: Describe the evidence that all matter consists of particles called atoms that are made up of certain smaller particles	E(5-8)#1 p II-69	Structure of Matter p 47	4D Essay p 75 4D (6-8) Essay p77 <u>4D(6-8)#1</u> 4D(9-12) Essay p79 <u>4D(9-12)#1,2</u> 10F(6-8)#1 10F(6-8) Essay p250 4DResearch p336-7	5-8/B Essay p149 9-12/B Essay p177 <u>9-12/B1a, 1b</u> p178	Atoms and Molecules Map p 55 Conservation of Matter Map p 57 States of Matter Map p 59 Basic Ingredients Strand p 61
E3: Use the Periodic Table to group elements based on their characteristics	E(5-8)#2 p II-69	Structure of Matter p 47	4D(6-8)#5,6 <u>4D(9-12)#6</u>	5-8/B1b p154 <u>9-12/B2b</u> p178	Atoms and Molecules Map p 55 Chemical Reactions Map p 61
E4: Describe how a substance can combine with different substances in different ways, depending on the conditions and the properties of each substance	E(5-8)#3 p II-69	Structure of Matter p 48-49	<u>4D(3-5)#1</u> 4D(3-5) Essay p 76 4D(6-8) Essay p77-78 <u>4D(6-8)#4</u> 10F(6-8)#2,5 10F(6-8)Essay p250 4D Research p337	5-8/B Essay p149 5-8/B1b p154	Reaction Rates Strand p 61
E5: Describe how the motion of the particles of matter determines the state of that matter	E(5-8)#4,5 p II-69	Structure of Matter pp 47-48	4D Essay p 75 4D(6-8) Essay p78 <u>4D(6-8)#3</u> 4D Research p336-337	9-12?B Essay p 178 <u>9-12/B2e</u> p179 <u>9-12/B5c</u> p 180 5-8/B Essay p 149	Heat Energy Strand p 59

Standard E: Structure of Matter (Continued)

E6: Explain how the relatively small number of naturally occurring elements can result in the large variety of substances found in the world	E(5-8)#6 p II-70	Structure of Matter pp 46-47	4D(6-8)#5	5-8/B1c p154	Basic Ingredients Strand pp 55 & 61
E7: Investigate the similarities and differences between elements, compounds, and mixtures	E(5-8)#7,8 p II-70	Structure of Matter pp 46-47	4D(6-8) Essay p77 4D(6-8)#5	5-8/B Essay p 149 5-8/B1a,b,c p154	Atoms and Molecules Map p 55 Chemical Reactions Map p 61
E8: Demonstrate the law of conservation of matter	E(5-8)#10 p II-70 A(5-8)#1 p II-42	Structure of Matter p 47 Flow pp 66-67 Constancy p173 Understanding Fire p 154	4D(6-8)#7 10F(6-8)#3 4D Research pp336-337 11C Research p357	5-8/B1b p154	Conservation of Matter Map p 57 Matter Cycle Strand p 77

Standard F: Earth

Maine's Learning Results	Maine's Curriculum Framework	Science for All Americans	Project 2061 Benchmarks for Science Literacy	National Science Education Standards	Project 2061 Atlas of Science Literacy
F1: Demonstrate how the earth's tilt on its axis results in the seasons	F(5-8)#1 p II-71	The Earth p 43	Essay p66 6-8 Essay p68 4B(6-8)#4 4B Research 335-336	5-8/D Essay p159 5-8/D3d p161	No Maps
F2: Describe how soils are formed and why soils differ from place to place	F(5-8)#2 p II-71 Snapshot p II-71	Processes that Shape the Earth pp 45-46	4C Essay p 73 4C(6-8)#6 4C(3-5)#2	5-8/D1e p160	No Maps
F3: Explain the evidence scientists use when they give the age of the earth	F(5-8)#3 p II-71	Extending Time p 151	4C(6-8) Essay p 73 4C(6-8)#5 4C(9-12) Essay p74 10D Essay p246 10D(9-12) Essay p246 10D(9-12)#1,2	9-12/D3b p189	Changes in the Earth's Surface Map p 51
F4: Describe factors that can cause short term and long term changes to the earth	F(5-8)#4 p II-71 Snapshot p II-71	The Earth p43 Processes that Shape the Earth pp 45-46	4B(6-8)#6 4C Essay p71 4C(3-5) Essay p 72 4C(6-8)#1,2,3,4,7 4C(3-5)#1 4C Research p336	5-8/D Essay pp 158-159 5-8/D1b,c,f,g,i,j,k p160 5-8/D2a p 160	Changes in the Earth's Surface Map p 51 Earthquakes and Volcanoes Strand p 53

Standard F: The Earth (Continued)

F5: Classify and identify rocks and minerals based on their physical and chemical properties, their composition, and the processes which formed them	F(5-8)#5,6 p II-71	Processes that Shape the Earth pp 45-46	4C(6-8)#3,4	5-8/D1d p 160	Rocks and Sediments Strand p 51
F6: Describe the many products used by humans that are derived from materials in the earth's crust	F (5-8)#7	The Earth p 44	4B(6-8)#10,11	K-4/D1a p134	No Maps
F7: Demonstrate factors effecting the flow of groundwater.	N/A	The Earth p 44	4B(6-8)#7,8	5-8/D1f p160	No Maps

Standard G: The Universe

Maine's Learning Results	Maine's Curriculum Framework	Science for All Americans	Project 2061 Benchmarks for Science Literacy	National Science Education Standards	Project 2061 Atlas of Science Literacy
G1: Compare past and present knowledge about characteristics of stars (e.g.: composition, location, life cycles) and explain how people have learned about them	G(5-8)#1 p II-72	The Universe p40 Displacing the Earth from the Center of the Universe pp 147-149	3A(6-8)#2 4A Essay p61 4A(6-8) Essay p63 4A(6-8)#1,2 4A(3-5)#1,2,3,5 4A(9-12)#1,2,3 10A Essay p239 10A(6-8) Essay p 240 10A(6-8)#2 10A(9-12)#5	9-12/D4b,c p190	Stars Map p 47 Galaxies and the Universe Map p 49
G2: Describe the concept of galaxies, including size and number of stars	G(5-8)#2 p II-72	The Universe p40	4A(6-8)#1,2	9-12/D Essay p 188 9-12/D4a p 190	Stars Map p 47 Galaxies and the Universe Map p 49
G3: Compare and contrast distances and the time required to travel those distances on earth, in the solar system, in the galaxy, and between galaxies	G(5-8)#4 p II-72 Snapshot p II-72	The Universe p40 Scale p 179	4A Essay p60-61 4A(6-8) Essay p63 4A(6-8)#2 11D Essay p 278	5-8/D3a p160 9-12/D Essay p 188	Stars Map p 47 Galaxies and the Universe Map p 49

Standard G: The Universe (Continued)

G4: Describe scientists' exploration of space and the objects they have found (e.g.: comets, asteroids, pulsars)	G(5-8)#5 p II-72	The Universe pp 41-42	3A(6-8)#2 4A Essay p61 4A(6-8)#3,4 10A(6-8) Essay p240 10A(6-8)#2	5-8/D3a p160 5-8/D Essay p 159	Solar System Map p 45 Telescopes Strand pp 47 & 49
G5: Describe the motions of moons, planets, stars, solar systems, and galaxies	G(5-8)#6 p II-72	The Universe p41 The Earth p 43 Forces of Nature p 55 Displacing the Earth from the Center of the Universe pp 147-149	4A Essay p61 4B Essay p 66 4A(3-5)#1,3,4 4A(6-8)#3 4B(6-8)#3,5 4G(6-8)#2 10A Essay p239 10A (6-8) Essay p240 10A(6-8)#1 4B Research p335-36	5-8/D Essay p159 5-8/D3b,c p 160-61 9-12/B5a,d p 180	Observations of the Sky Strand pp 43 & 47 Solar System Map p 45

Standard H: Energy

Maine's Learning Results	Maine's Curriculum Framework	Science for All Americans	Project 2061 Benchmarks for Science Literacy	National Science Education Standards	Project 2061 Atlas of Science Literacy
H1: Analyze the benefits and drawbacks of energy conversions	H(5-8)#1 p II-73	Energy Transformations pp 49-51 Energy Use p116	4E Essay pp 81-82 4E(6-8) Essay p84 4E(6-8)#1,2 4E(9-12)#3 8C(6-8) Essay p194 8C(6-8)#1,2,3,4,5 4E Research p338	5-8/B Essay p154 5-8/B3a,b,c,d,e,f p155 9-12/B5 a,d p 180	Energy in Living Things Strand p 79
H2: Demonstrate that energy cannot be created or destroyed but only changed from one form to another	H(5-8)#2 p II-73	Energy Transformations p 50	4E Essay pp 81-82 4E(6-8) Essay p84 4E(6-8)#1,2 4E(9-12)#1 11C Essay p 271 4E Research p338	5-8/B Essay p154 5-8/B3a,d,e,f p155 9-12/B Essay p 178 9-12/B5a p180	Energy in Living Things Strand p 79 Waves Map p 65

Standard H: Energy (Continued)

H3: Compare and contrast the ways energy travels (eg: waves, conduction, convection, radiation)	H(5-8)#3,4,7 p II-73	Energy Transformations p 50 Motion pp 53-55	4E(6-8) Essay p85 4E(6-8)#3 4F Essay p 88 4F(6-8) Essay p90 4F(6-8)#1,2 4F(6-8)#4 4F(9-12)#3 4E,4F Research pp337-339	3-5/B3b p127 5-8/B3b,c,f p155 9-12/B5d p180 9-12/B6a,b p180	Waves Map p 65
H4: Describe the characteristics of static and current electricity	H(5-8)#5 p II-73 I (5-8)#3 p II-74	Forces of Nature pp 55-56	4G(3-5) Essay p94 4G(3-5)#3 4G(6-8) Essay p95 4G(6-8)#3 4G(9-12) Essay p96 4G(9-12)#3,4	3-5/B3c p127 5-8/B3d p155	No Maps
H5: Categorize energy sources as renewable or non-renewable and compare how these sources are used by humans	H(5-8)#6 p II-73	Energy Sources pp 114-118	8C(6-8) Essay p194 8C(6-8)#4,5,6 8C(9-12)#2,3,4,5	K-4/F3b,c p 140 9-12/F3b p 198	No Maps
H6: Describe how energy put into or taken out of a system can cause changes in the motion of particles of matter.	E(5-8)#4 p II-69	Structure of Matter pp 47-48	4D(6-8)#3 4E Research p337-38	9-12/B Essay p 178 9-12/B2e p179 9-12/B5c p180	States of Matter Map p 59

Standard I: Motion

Maine's Learning Results	Maine's Curriculum Framework	Science for All Americans	Project 2061 Benchmarks for Science Literacy	National Science Education Standards	Project 2061 Atlas of Science Literacy
I1: Describe the motion of objects using knowledge of Newton's Laws	I(5-8)#1 p II-74	Motion p 53 Uniting the Heavens and Earth pp 149-150	4F Essay pp87-88 4F(6-8) Essay p90 4F(3-5)#1 4F(6-8)#3 4F(9-12)#1,4 10B(9-12)#1,2,3,4,5 4F Research pp339-340	5-8/B Essay p149,154 5-8/B2a,b p 154	Gravity Map p43 Laws of Motion Map p 63

Standard I: Motion (continued)

I2: Use mathematics to describe the motion of objects (e.g.: (speed, distance, time, acceleration)	I(5-8)#2 p II-74 Snapshot p II-74	Mathematics, Science, and Technology pp 17-18 Symbolic Relationships p 133	4F(3-5) Essay 89 4F(3-5)#2 4F(9-12) Essay p 91 9B Essay p 218 9B(6-8)#2,3	5-8/A1c, 2c p 145,148 5B/Essay p 149, 154 5-8/B2a p154 Vignette pp 146-147	Laws of Motion Map p 63
I3: Describe and quantify the way machines can provide mechanical advantage in producing motion.	I(9-12)#6 p II-74	Not in SFAA	No related Benchmarks	No related NSES	No Maps

Standard J: Inquiry and Problem Solving

Maine's Learning Results	Maine's Curriculum Framework	Science for All Americans	Project 2061 Benchmarks for Science Literacy	National Science Education Standards	Project 2061 Atlas of Science Literacy
J1: Make accurate observations using appropriate tools and units of measure	A(All levels) #1,2,3 p II-22	The Scientific World View pp 2-3 Scientific Inquiry pp 3-4 Manipulation and Observation pp 191-92	1B Essay p 9 1B(3-5) Essay p10 1B(3-5)#1 3A(3-5)#3 12A(3-5) Essay p286 12C Essay p292 12C(3-5)#3 12C(6-8)#3 12C Research p360	5-8/A Essay pp 143-145 5-8/A1b,c p 145 5-8?A2a,c,d p 148 5-8?G2a p 171	Observations and Evidence Strand p 17
J2: Design and conduct scientific investigations which include controlled experiments and systematic observations. Collect and analyze data and draw conclusions fairly.	A (All levels)#4 p II-22 A(5-8)#1 p II-22 A(5-8)#1,2 p II-39	Scientific Inquiry pp 3-6 Summarizing Data pp137-139	1B Essay p 9 1B(3-5) Essay p10-11 1B(6-8) Essay p 12 1B(3-5)#1 1B(6-8)#1,2 1C(6-8)#7 Research 1B p 332, 12E p 360	5-8/A Essay pp 143-145 5-8/A1a,b,c ,d,e pp 145, 148 Vignette pp 146-7 5-8/A2a,b,c,d,e,f,g p 148 5-8/G Essay p 170 5-8/G2a p 171	Observation and Evidence Strand p 17 Scientific Investigations Map 19 Making Sense of Evidence Strand p 21 Expectations and Explanations Strand p 23 Control and Conditions Strand p 123,125, 127
J3: Verify and evaluate scientific investigations and use the results in a purposeful way	A(All levels)#3 p II-39	Scientific Inquiry pp 4-6	Essay p 9 1A(6-8)#1,2 1B(3-5)#2,3	5-8/A Essay pp 143-145 5-8/A1c,d,e p 145 5-8/G Essay p 170 5-8/G2c p 171	Scientific Investigations Map 19 Reliability and Results Strand p 23 Theory Modification Strand p 21

Standard J: Inquiry and Problem Solving (Continued)

J4: Compare and contrast the process of scientific inquiry and the technological method.	A(5-8)#1 p II-22	Technology and Science pp 26-27,	1B Essay p 9 Ch 3 Essay pp 41-42 3A Essay p 43 3A(6-8) Essay p46 <u>3A(6-8)#2,3</u> 3B Essay p 48 3A Research p 334	5-8/A Essay pp 143-145 5-8/E Essay pp 161-165 Vignette pp 162-4 <u>5-8/A2a,b,c,d,e,f,g</u> p 145 <u>5-8/E2a,b,c,d,e,f</u> p 166 5-8/F5a,b,c,g pp 169-170	Scientific Investigations Map p 19 Design Constraints Map p 33
J5: Explain how personal bias can affect observations.	A(5-8)#3 p II-22	Scientific Inquiry pp 6-7	<u>1B(6-8)#3</u> <u>9E(6-8)#3</u> 1B(9-12)#5	5-8/A2e,f p 148	Avoiding Bias in Science Map p 23
J6: Design, construct, and test a device (Invention) that solves a special problem.	A(5-8)#2 p II-39	Design and Systems pp 28-29	3B Essay p 48 <u>3B(6-8)#1,2,3,4</u>	5-8 Essay pp 161-165 <u>5-8/E1a,b,c,d,e</u> pp 165-166	Design Constraints Map p 33 Designed Systems Map p 35

Standard K: Scientific Reasoning

Maine's Learning Results	Maine's Curriculum Framework	Science for All Americans	Project 2061 Benchmarks for Science Literacy	National Science Education Standards	Project 2061 Atlas of Science Literacy
K1: Examine the ways people form generalizations.	B(5-8)#4 p II-35	Reasoning pp 140-141	<u>9E(6-8)#3,4,5</u> 9E Essay p 231	5-8/A1d,e p 145	Expectations and Explanations Strand p 23
K2: Identify exceptions to proposed generalizations.	B(5-8)#1 p II-35	Reasoning pp 140-141	<u>9E(6-8)#5</u> 12A(6-8)#3 12E(6-8)#4	<u>5-8/A1e,f</u> pp 145,148	Expectations and Explanations Strand p 23
K3: Identify basic informal fallacies in arguments.	C(5-8)#1 p II-36	Reasoning pp 140-141 Critical Response Skills pp 193-194	<u>9E(6-8)#3,4,5</u> <u>12E(6-8)#3,5</u> 9E(6-8)Essay p 233 12E Essay p 298	5-8/A1e,f pp 145,148 5-8/A2f p 148 5-8/G Essay p 170 5-8/G1b,2c pp 170-171	Lines of Reasoning Strand p 17 Control and Conditions Strand pp 19, 123,125 Sampling Strand p 127
K4: Analyze means of slanting information.	E(5-8)#1 p II-30 C(5-8)#2 p II-36 E(5-8)#1 p II-30	Critical Response Skills p 194 Sampling pp139-140	<u>12E(6-8)#1,3,4,5</u> 12E(9-12)#1,2,5 12E Essay p 298 12E Research p 361	5-8/A2f p 148	Lines of Reasoning Strand p 17 Control and Conditions Strand pp 123,125 Sampling Strand p 127

Standard K: Scientific Reasoning (Continued)

K5: Identify stereotypes.	C(5-8)#3 p II-36	Critical Response Skills p 194	9E(3-5)#2	5-8/A2f p 148	Avoiding Bias in Science Map p 23
K6: Support reasoning by using a variety of evidence.	A(All levels) #2,3,4 p II-34 C(5-8)#4 p II-36 E(5-8)#3 p II-31	Critical Response Skills p 194	1B Essay p 9 <u>1B(6-8)#1</u> 12E Essay p 298 12E(3-5)#1,3 <u>12E(6-8)#4</u> 9E Essay p 231 9E(6-8) Essay p 233	Unifying Concepts and Processes K-12 p 117 5-8/A1d,e p 145 5-8/A2e p 148	Evidence and Reasoning in Inquiry Map p 17 Scientific Investigations Map p 19 Expectations and Explanations Strand p 23
K7: Show that proving a hypothesis false is easier than proving it true and explain why.	A(5-8)#1 p II-34	Reasoning p 142	1B(6-8)#1 12A(6-8) Essay p 286 <u>9E(6-8)#5</u> 9E(9-12)#3 12A(6-8)#2 12E Research p 361	5-8/A1d,e p 145	Kinds of Investigations Strand p 19 Making Sense of Evidence Strand p 21
K8: Construct logical arguments	B(5-8)#2 p II-35	Reasoning pp 140-143	<u>1B(6-8)#1</u> 9E Essay p231 12E Essay p 298 12E Research p 361 9E Essay p 233 <u>9E(6-8)#1,2,3,4,5</u> 12E(6-8)#3,4,5	K-12 p 117 5-8?A Essay pp 143-144 <u>5-8/A1d,e,h</u> p 145 <u>5-8/A2e</u> p 148	Lines of Reasoning Strand p 17 Making Sense of Evidence Strand p 21 Expectations and Explanations Strand p 23
K9: Apply analogous reasoning.	B(5-8)#3 p II-35	Reasoning p 143 Conceptual Models p 170	12E(6-8)#5 11B Essay p 267 <u>9E(6-8)#6</u>	8/A1d,e p 145	Evidence and Reasoning in Inquiry Map p 17

Standard L: Communication

Maine's Learning Results	Maine's Curriculum Framework	Science for All Americans	Project 2061 Benchmarks for Science Literacy	National Science Education Standards	Project 2061 Atlas of Science Literacy
L1: Discuss scientific and technological ideas and make conjectures and convincing arguments.	A(All levels) #4,7 p II-27 C(5-8)#2 p II-29	Communication pp 192-193	1B(6-8)#1 9E Essay p 231 12A(6-8) Essay p 286 12A(6-8)#3 12D Essay p 295 12D(6-8)#1,2	5-8/A Essay pp 143-44 <u>5-8/A1g</u> p 148 <u>5-8/E1e</u> p 166	Evidence and Reasoning in Inquiry Map p 17

Standard L: Communication (Continued)

L2: Defend problem-solving strategies and solutions.	B(All levels)#3 p II-28 B(5-8)#1 p II-28	Communication pp 192-193	2A(6-8)Essay p 28 2A(6-8)#1 2C(6-8)#2 12B Essay pp 288-289	5-8/A1g p 148 5-8/E1e p 166	Choices in Mathematics Strand p 29
L3: Evaluate individual and group communication for clarity, and work to improve communication.	B(5-8)#2 p II-28	Communication pp 192-93	12D(9-12)#6	5-8/A1g p 148	No Maps
L4: Make and use scale drawings, maps, and three-dimensional models to represent real objects, find locations, and describe relationships.	C(5-8)#2,4 p II-24 A(All levels) #1 p II-27 C(5-8)#3,4 p II-29	Communication 192-193 Models pp 168-172 Estimation p 190	4D(3-5) Essay p 76 9C(6-8)#3,5,6 11B(6-8)#1,3 12B(6-8)#5 12D(6-8)#5 9C Essay p 224 11B(6-8) Essay p 269 11B Research p 357	Unifying Concepts and Processes p 117- Evidence, Models , and Explanation 5-8?A1d p 145	Alternative Explanations Strand p 21 Representation and Modeling Strand p 29
L5: Access information at remote sites using telecommunications.	D(5-8)#2 p II-30	Not in SFAA	1C(6-8) Essay 12D(6-8)#3	5-8/A1c p 145 5-8/A2d p 148	Computers Map p 111
L6: Identify and perform roles necessary to accomplish group tasks.	F(5-8)#1 p II-31	Not in SFAA	No related Benchmarks	5-8/G1a p 170	No Maps

Standard M: Implications of Science and Technology

Maine's Learning Results	Maine's Curriculum Framework	Science for All Americans	Project 2061 Benchmarks for Science Literacy	National Science Education Standards	Project 2061 Atlas of Science Literacy
M1: Research and evaluate the social and environmental impacts of scientific and technological developments.	A(6-8)#1 p II-47	Technologies Side Effects p 30 The Human Presence pp 32-34 Agriculture pp 108-110 Technology Use Decisions pp 35-37 Harnessing Power pp 161-163	3C(6-8)#4,5,6,7 6E(6-8)#5 7A(6-8)#4 7C(6-8)#2 8A(6-8)#3 8B(6-8)#3,4 3C Essay p 53 8A(6-8) Essay p 185	5-8/F4c,d p 169 5-8/F5a,b,c,d p 169 5-8/F Essay pp 167-168	Design Constraints Map p 33 Interaction of Technology and Society Map p 37 Decisions about Using Technology Map p 39 Harmful Substances Strand p 89 Influences on Social Change Map p101 Agricultural Technology Map p 107

Standard M: Implications of Science and Technology (Continued)

M2: Describe the historical and cultural conditions at the time of an invention or discovery, and analyze the societal impacts of that invention.	A(6-8)#1 p II-47 D(6-8)#1 p II-50	Historical Perspectives pp 145-163	1C(9-12) Essay pp 18-19 Ch 10 Essay p 237-238 10A Essay p 239 1C(9-12)#1,2,3 <u>3C(6-8)#3,4</u> 7A(6-8)#4 <u>10J(6-8)#1,2</u> 10J Essay p 258	<u>5-8/F5d</u> p 169 5-8/G Essay p 170 <u>5-8/G3a,b,c</u> p 171	Culture Affects Behavior Strand p 99 Historical Episodes Map Narrative p 129
M3: Discuss the ethical issues surrounding a specific scientific or technological development.	N/A	Ethical Principles and Conduct pp 10-11 Health Technology pp 125-126	<u>1C(6-8)#5</u> 1C(9-12)#5 <u>3A(6-8)#3</u> <u>3C(6-8)#6</u>	<u>5-8/F5f</u> p 169	Social Constraints Strand p 33 Valuing Technology Strand pp 37,39
M4: Describe an individual's biological and other impacts on an environmental system.	C(6-8)#2 p II-44	The Human Presence pp 32-34 Systems pp 166-168	3C(9-12)#4,5 5D(9-12)#3 11A Essay pp 263-64 11A(6-8)Essay p 265 11A(6-8)#1,2,3	5-8/F Essay p 167 5-8/F3b p 168	Systems Map p 133
M5: Identify factors that have caused some countries to become leaders in science and technology.	E(9-12)#1 p II-51	Global Interdependence p 103	3C(9-12)#1 <u>7G(6-8)#1,2</u> 7G(9-12)#1	5-8/F5c p 169	No Maps
M6: Give examples of actions that may have expected or unexpected consequences that may be positive, negative, or both.	B(6-8)#1,4 p II-43 D(6-8)#1 p II-50	Design and Systems pp 28-32 The Human Presence pp 32-33	<u>3B(6-8)#2</u> 3C Essay p 53 <u>3C(6-8)#5,6,7</u> <u>6A(6-8)#5,6</u> <u>8A(6-8)#3</u> <u>8B(6-8)#3,4</u>	<u>5-8/E2f</u> p 166 <u>5-8/F4a,b,c,d</u> p 169	Interaction of Science and Technology Map p 37 Decisions about Using Technology Map p 39 Agricultural Technology Map p 107 Social Decisions Map p 103
M7: Explain the connections between industry, natural resources, population, and economic development.	B(6-8)#3 p II-43 E(3-5)#1 p II-51	The Earth p44 Global Interdependence pp 102-104 Energy Sources p 115	7G Essay p 177 8B Essay p 189 <u>7G(6-8)#1,2,5</u> <u>8A(6-8)#4</u> <u>8B(6-8)#3</u>	<u>5-8/F2a,b</u> p 168	Influences on Social Change Map p 101 Technology Affects Society Strand p 37

Standard M: Implications of Science and Technology (Continued)

M8: Recognize scientific and technological contributions of diverse people including women, different ethnic groups, races, and physically disabled.	N/A	Science Is a Complex Social Activity p 8	1C Essay p 17 <u>1C(6-8)#1.2</u>	5-8/G Essay p 170 <u>5-8/G1a</u> p 170 <u>5-8/G3a</u> p 171	No Maps
<p><i>Benchmarks for Science Literacy</i>- Chapter 10 - Selected Episodes in the History of Science for Middle School:</p> <ul style="list-style-type: none"> • Lavoisier and conservation of matter • Madame and Pierre Curie’s discovery of radioactivity • Invention of the steam engine and how it led to the Industrial Revolution • Louis Pasteur and germ theory 					

* For an explanation of the codes used in this document, please refer to the coding guide.