



New York Regents Core Curriculum

Correlation of Standards and Key Ideas for Physical Setting/Earth Science	Student Edition Pages
STANDARD 1—Analysis, Inquiry, and Design Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.	
Mathematical Analysis	
(KI 1) Abstraction and symbolic representation are used to communicate mathematically.	14–16, 18, 20–21, 24–26, 28–29, 35–36, 42–43, 46–47, 94, 110, 172, 206, 217–218, 226, 239, 247, 253, 278, 282–283, 302–303, 305–307, 310–311, 319, 326–327, 344, 350, 357, 363, 386, 390–392, 394–396, 399, 464–465, 486, 492, 516–517, 610, 658, 665, 672, 695, 699, 702, 704–705, 748, 768–770, 777–779, 791–792, 798–799, 802–803, 806, 810–812, 815–817, 826–827, 830–831, 833, 842–843, 845–846, 850, 856–857
(KI 2) Deductive and inductive reasoning are used to reach mathematical conclusions.	26, 28, 31, 35–36, 42–44, 46–47, 57, 63, 80, 94, 96–97, 110, 112, 129, 161, 172, 204–206, 217–218, 226, 239, 247, 253, 263, 278–280, 283–284, 310, 318, 327, 329, 344, 348, 350, 353, 357, 360, 363, 365, 385, 388–389, 391–392, 394–396, 399, 464–465, 486, 492, 524, 586, 637, 644, 665, 698–699, 702, 704–705, 770, 777–780, 783, 786, 791–792, 797–799, 802–803, 806, 810, 815–817, 826–827, 830–831, 833, 843, 845–846, 850–851
(KI 3) Critical thinking skills are used in the solution of mathematical problems.	28, 31, 35–36, 42–44, 46–47, 94, 96–97, 129, 141, 172, 204–206, 217, 226, 237, 239, 247, 253, 263, 279–280, 283–284, 318, 344, 348, 350, 357, 360, 363, 365, 391–392, 394–395, 428, 464–465, 486, 492, 516–517, 521, 526, 542, 586, 590, 637, 665, 695, 698–699, 704–705, 770, 777–779, 791–792, 798–799, 810, 816–817, 826–827, 830–831, 833, 843, 845–846, 850
Scientific Inquiry	
(KI 1) The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.	4–5, 11–13, 17–19, 21, 23–25, 48–49, 71, 88, 92–93, 99, 108, 114–115, 121, 132, 138–140, 153, 163, 174–175, 181, 204–205, 211, 229, 232–233, 239, 254, 284, 292–293, 299, 302, 329, 359, 376–379, 385, 406–407, 413, 428, 430, 443, 471, 474, 495, 540, 553, 558, 576, 587, 618–619, 625, 642, 674, 689, 704–705, 711, 734–735, 756, 757, 768, 775–792, 794–797, 800–803, 805–857
(KI 2) Beyond the use of reasoning and consensus, scientific inquiry involves the testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.	5, 71, 92–93, 99, 108, 114–115, 121, 126–127, 140, 153, 163, 174–175, 181, 211, 229, 232–233, 239, 254, 271, 284, 290, 293, 299, 302, 359, 376–379, 385, 406–407, 428, 471, 474, 495, 558, 576, 601, 625, 642, 655, 676–677, 688, 704–705, 711, 768–769, 783, 785, 790, 793, 800, 816–817, 830–831, 833–834, 837, 840–843, 846, 848–853, 855–857
(KI 3) The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.	53, 77, 92–93, 99, 108, 114–115, 121, 123, 126, 140, 142, 153, 163, 174–175, 181, 211, 229, 232–233, 239, 254, 271, 290, 293, 299, 302, 329, 352–354, 359, 376–379, 385, 394, 406–407, 413, 428, 471, 474, 558, 576, 587, 596, 625, 683, 688, 699, 704–705, 768, 776–777, 783, 800, 805–810, 812, 817, 819, 826–828, 835, 837–845, 847–849, 851–857
Engineering Design	
(KI 1) Engineering design is an iterative process involving modeling and optimization (finding the best solution within given constraints); this process is used to develop technological solutions to problems within given constraints.	26, 28–36, 42–43, 45–46, 108, 110, 114–115, 166, 243, 260, 284, 316, 321, 377, 466, 511–512, 520, 671, 676–677, 679–681, 691, 700–705, 708–709, 717, 720, 722–723, 729, 732–735, 749–752, 798–799, 810–811, 817, 833, 837, 842, 847, 850–855



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STANDARD 2 Students will access, generate, process, and transfer information, using appropriate technologies.	
Information Systems	
(KI 1) Information technology is used to retrieve, process, and communicate information as a tool to enhance learning.	10, 22, 26, 37–41, 46, 49, 72, 200, 311, 313–316, 319, 324, 352–354, 385–386, 410, 439, 488–490, 542, 706, 775, 800, 805, 828, 852–854, 858
(KI 2) Knowledge of the impacts and limitations of information systems is essential to its effective and ethical use.	200, 314–316, 319, 324, 352–353, 385–386, 706, 800, 828, 852–854
(KI 3) Information technology can have positive and negative impacts on society, depending upon how it is used.	40–41, 46, 200, 206, 221, 236–237, 313–316, 319, 324, 339–340, 346, 349–353, 385–386, 488–490, 706, 775, 800, 828, 854
STANDARD 6—Interconnectedness: Common Themes Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.	
Systems Thinking	
(KI 1) Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.	4–7, 9, 23–24, 76, 81–83, 91, 93, 95–100, 107–113, 117–119, 138–141, 143, 145, 161, 165–175, 177–179, 184–188, 190, 195, 199–201, 203–205, 207–208, 210–231, 235–259, 261–263, 271, 273–275, 285–293, 296–298, 300–302, 304–311, 316, 318, 320–323, 325–346, 348–351, 355–357, 364–374, 381–383, 391, 399–408, 410–411, 470, 472–475, 479–487, 491–493, 681–682, 697, 699–703, 707–709, 712–713, 721, 776–779, 793–800, 814–815, 819–825, 829–831, 838–839, 843, 846–847, 851, 855–857
Models	
(KI 2) Models are simplified representations of objects, structures, or systems used in analysis, explanation, interpretation, or design.	18, 26–27, 32–36, 42–43, 45, 49, 79, 106, 108, 110, 113–115, 126, 149, 161, 166, 172, 179, 190, 194, 203–205, 208–209, 217, 221, 227, 229, 231–233, 237, 243, 248, 253–254, 260, 290–291, 293, 299, 302, 311, 316–318, 322–323, 325–327, 329, 368, 374, 376, 380, 383, 385, 401, 406–407, 411, 423, 430, 458, 464–465, 471, 474, 493, 495–496, 502, 504, 508–509, 516–517, 521, 523, 525–526, 533, 535–538, 541, 544–545, 554, 558, 560, 577–578, 587, 594, 601, 603, 610, 613, 616, 623, 625, 636, 646, 658, 665, 672, 680, 688–689, 704–705, 708–709, 711, 713–714, 718, 727–728, 730, 738, 748, 757, 761, 766–767, 772, 776–780, 782–785, 787–795, 798–799, 801–803, 805, 811, 813, 815–816, 818–825, 829–833, 836–837, 839–843, 847–857
Magnitude and Scale	
(KI 3) The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems.	26–36, 42–43, 45, 174–175, 204–205, 327, 385, 423, 430, 443, 458, 464–465, 501, 503–508, 519, 521, 526, 533, 536, 570–571, 594, 602, 610, 623, 626, 635, 747, 768–769, 786, 790–792, 795, 798–799, 805–806, 810–811, 814–816, 819–821, 824–827, 829–831, 833–834, 836, 839–843, 845, 851–853, 855–857



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Correlation of Standards and Key Ideas for Physical Setting/Earth Science	Student Edition Pages
Equilibrium and Stability	
(KI 4) Equilibrium is a state of stability due either to a lack of change (static equilibrium) or a balance between opposing forces (dynamic equilibrium).	101–106, 152–175, 177, 180–205, 207–209, 222–227, 235–237, 304, 327, 330, 334–335, 337, 340, 355–357, 388, 393–394, 487, 525, 533, 543, 656–657, 659–660, 664–665, 670–674, 679, 685, 703, 707, 716, 718, 764, 783, 787–788, 790–797, 800–803, 807–809, 821–825, 828–829, 831, 834, 836, 838, 842–851, 855–857
Patterns of Change	
(KI 5) Identifying patterns of change is necessary for making predictions about future behavior and conditions.	6, 66, 71, 101–106, 114–115, 117–119, 121–125, 127, 130–131, 133–135, 138–141, 143–145, 277, 285, 293, 297, 304, 318–323, 326, 328, 331, 333, 338, 340, 344, 346–347, 351, 356–357, 359–360, 363, 369, 371–383, 388, 393–394, 396–408, 410–411, 428, 470–471, 473, 475–479, 486–493, 510, 513–517, 519, 521, 630, 632, 657, 665, 682, 685, 687–689, 697, 707, 710, 713–715, 719, 724–725, 730–731, 736–739, 742–743, 773, 797, 800, 808–809, 813, 818, 822–825, 829–831, 843, 846–851, 855–857
Optimization	
(KI 6) In order to arrive at the best solution that meets criteria within constraints, it is often necessary to make trade-offs.	90, 176, 178–179, 197, 204–205, 207–208, 234, 237, 257–259, 659, 673, 675, 682, 685, 687, 690–705, 708–710, 717, 720, 723, 737–739
STANDARD 7—Interdisciplinary Problem Solving Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.	
Connections	
(KI 1) The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems, especially those relating to issues of science/technology/society, consumer decision making, design, and inquiry into phenomena.	32–43, 45–47, 94, 97, 129, 142, 176–179, 189–190, 204–206, 258–259, 281–284, 294, 311, 316, 319, 321, 340, 346, 348, 350–351, 358, 386–387, 398, 407, 464–465, 586, 663, 671–674, 680, 685, 687, 690–705, 707–710, 717, 720, 722–723, 728, 732, 734–735, 748–752
Strategies	
(KI 2) Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results.	69, 234, 257–259, 283, 298, 312–313, 315–316, 321, 324, 350–351, 408, 488–490, 665, 690–705, 707–710, 717, 720, 722, 734–735



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Correlation of Standards and Key Ideas for Physical Setting/Earth Science	Student Edition Pages
STANDARD 4 Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.	
(KI 1) The Earth and celestial phenomena can be described by principles of relative motion and perspective.	
(PI 1.1) Explain complex phenomena, such as tides, variations in day length, solar insolation, apparent motion of the planets, and annual traverse of the constellations.	
(1.1a) Most objects in the solar system are in regular and predictable motion. <ul style="list-style-type: none"> • These motions explain such phenomena as the day, the year, seasons, phases of the moon, eclipses, and tides. • Gravity influences the motions of celestial objects. The force of gravity between two objects in the universe depends on their masses and the distance between them. 	384, 402–403, 405, 409–410, 758–767, 771–785, 787–792, 796–799, 801–803, 815, 818
	384, 402–403, 405, 409–410, 758–767, 771–785, 787–792, 796–799, 801–803, 815, 818
	402–403, 405, 409–410, 764, 771, 774, 778, 803, 813–814
(1.1b) Nine planets move around the Sun in nearly circular orbits. <ul style="list-style-type: none"> • The orbit of each planet is an ellipse with the Sun located at one of the foci. • Earth is orbited by one moon and many artificial satellites. 	753, 771, 775–780, 783, 791, 798–799, 801–803, 813, 832, 859
	775–780, 791, 798–799, 801–803, 832
	753, 771, 775, 783, 798–799, 813, 859
(1.1c) Earth's coordinate system of latitude and longitude, with the equator and prime meridian as reference lines, is based upon Earth's rotation and our observation of the Sun and stars.	27–29, 45, 362, 760–761, 771, 783, 815
(1.1d) Earth rotates on an imaginary axis at a rate of 15 degrees per hour. To people on Earth, this turning of the planet makes it seem as though the Sun, the moon, and the stars are moving around Earth once a day. Rotation provides a basis for our system of local time; meridians of longitude are the basis for time zones.	30–31, 45, 402, 758–759, 772, 774, 776, 783, 794–795, 813, 815, 818, 858
(1.1e) The Foucault pendulum and the Coriolis effect provide evidence of Earth's rotation.	404, 410, 758, 772, 783
(1.1f) Earth's changing position with regard to the Sun and the moon has noticeable effects. <ul style="list-style-type: none"> • Earth revolves around the Sun with its rotational axis tilted at 23.5 degrees to a line perpendicular to the plane of its orbit, with the North Pole aligned with Polaris. • During Earth's one-year period of revolution, the tilt of its axis results in changes in the angle of incidence of the Sun's rays at a given latitude; these changes cause variation in the heating of the surface. This produces seasonal variation in weather. 	362, 373–374, 402–403, 684, 690–692, 746, 759–762, 765–766, 771–773, 776, 809, 813, 815, 858
	362, 373–374, 746, 759–762, 771–773, 813, 858
	362, 373–374, 402–403, 684, 690–692, 746, 759–762, 765–766, 771–773, 776, 809, 813, 815, 858



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(1.1g) Seasonal changes in the apparent positions of constellations provide evidence of Earth's revolution.	760–761, 770, 813
(1.1h) The Sun's apparent path through the sky varies with latitude and season.	668, 758–762, 771–773, 776, 810, 815
(1.1i) Approximately 70 percent of Earth's surface is covered by a relatively thin layer of water, which responds to the gravitational attraction of the moon and the Sun with a daily cycle of high and low tides.	385, 389–391, 400–403, 405, 409–410, 412, 438–439, 523, 669, 758, 764, 771, 783, 858
(PI 1.2) Describe current theories about the origin of the universe and solar system.	
(1.2a) The universe is vast and estimated to be over ten billion years old. The current theory is that the universe was created from an explosion called the Big Bang. Evidence for this theory includes: <ul style="list-style-type: none"> cosmic background radiation. a red-shift (the Doppler effect) in the light from very distant galaxies. 	774, 793, 801–803, 832, 836–837, 845–851, 854–857, 860–861
	847–851, 854–857, 860–861
	845–846, 848–851, 854–857, 860–861
(1.2b) Stars form when gravity causes clouds of molecules to contract until nuclear fusion of light elements into heavier ones occurs. Fusion releases great amounts of energy over millions of years. <ul style="list-style-type: none"> The stars differ from each other in size, temperature, and age. Our Sun is a medium-sized star within a spiral galaxy of stars known as the Milky Way. Our galaxy contains billions of stars, and the universe contains billions of such galaxies. 	793–795, 804–805, 809, 811–812, 814–827, 829–838, 841–843, 846, 855–857, 859–861
	793–795, 814–827, 829–831, 833–838, 859–861
	804–805, 830–838, 841–843, 846, 855–857, 859–861
(1.2c) Our solar system formed about five billion years ago from a giant cloud of gas and debris. Gravity caused Earth and the other planets to become layered according to density differences in their materials. <ul style="list-style-type: none"> The characteristics of the planets of the solar system are affected by each planet's location in relationship to the Sun. The terrestrial planets are small, rocky, and dense. The Jovian planets are large, gaseous, and of low density. 	387, 409, 597–598, 756, 774, 780, 783–799, 801–803, 812, 832, 836–837, 839, 854–857, 861
	387, 409, 597–598, 756, 774, 780, 783–799, 801–803, 812, 832, 836–837, 839, 854–857, 861
	597–598, 756, 774, 780, 783–799, 801–803, 832, 854–857, 861
(1.2d) Asteroids, comets, and meteors are components of our solar system. <ul style="list-style-type: none"> Impact events have been correlated with mass extinction and global climatic change. Impact craters can be identified in Earth's crust. 	387, 409, 565, 579, 589, 596, 633–634, 754–755, 784, 789, 792–793, 795–799, 801, 803
	634
	633
(1.2e) Earth's early atmosphere formed as a result of the outgassing of water vapor, carbon dioxide, nitrogen, and lesser amounts of other gases from its interior.	388, 409–410, 576, 584, 587–589, 598–599, 651, 664, 740, 783



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(1.2f) Earth's oceans formed as a result of precipitation over millions of years. The presence of an early ocean is indicated by sedimentary rocks of marine origin, dating back about four billion years.	384, 387–388, 391, 409, 432, 438, 576, 588, 597–598
(1.2g) Earth has continuously been recycling water since the outgassing of water early in its history. This constant recirculation of water at and near Earth's surface is described by the hydrologic (water) cycle. <ul style="list-style-type: none"> • Water is returned from the atmosphere to Earth's surface by precipitation. Water returns to the atmosphere by evaporation or transpiration from plants. A portion of the precipitation becomes runoff over the land or infiltrates into the ground to become stored in the soil or groundwater below the water table. Soil capillarity influences these processes. • The amount of precipitation that seeps into the ground or runs off is influenced by climate, slope of the land, soil, rock type, vegetation, land use, and degree of saturation. • Porosity, permeability, and water retention affect runoff and infiltration. 	8, 24, 48, 210–221, 234–259, 261–263, 265–267, 270, 290–291, 388, 395, 420, 436, 588, 669, 679–680, 683, 692–693, 708–709
	8, 24, 210–212, 235, 238–259, 261–263, 266–267, 270, 290–291, 388, 395, 420, 436, 588, 669, 679–680, 683, 692–693, 708–709
	212–221, 235–237, 240–259, 261–263, 265
	212–221, 234–235, 237, 240–259, 261–263
(1.2h) The evolution of life caused dramatic changes in the composition of Earth's atmosphere. Free oxygen did not form in the atmosphere until oxygen-producing organisms evolved.	576, 585–586, 588, 590–591, 597–598, 649–651, 781
(1.2i) The pattern of evolution of life-forms on Earth is at least partially preserved in the rock record. <ul style="list-style-type: none"> • Fossil evidence indicates that a wide variety of life-forms has existed in the past and that most of these forms have become extinct. • Human existence has been very brief compared to the expanse of geologic time. 	22, 126–127, 132, 143, 554–556, 564, 566–569, 572–575, 577, 585–586, 591–593, 596–597, 599, 604, 609–611, 615–618, 620–623, 628–634, 636, 639–641, 645–650
	22, 126–127, 132, 143, 554–556, 564, 566–569, 572–575, 577, 585–586, 592–593, 596–597, 599, 604, 609–611, 615–618, 620–623, 628–634, 636, 639, 645–650
	577, 585, 591, 597, 640–641, 648–650



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<p>(1.2j) Geologic history can be reconstructed by observing sequences of rock types and fossils to correlate bedrock at various locations.</p> <ul style="list-style-type: none"> The characteristics of rocks indicate the processes by which they formed and the environments in which these processes took place. Fossils preserved in rocks provide information about past environmental conditions. Geologists have divided Earth history into time units based upon the fossil record. Age relationships among bodies of rocks can be determined using principles of original horizontality, superposition, inclusions, cross-cutting relationships, contact metamorphism, and unconformities. The presence of volcanic ash layers, index fossils, and meteoritic debris can provide additional information. The regular rate of nuclear decay (half-life time period) of radioactive isotopes allows geologists to determine the absolute age of materials found in some rocks. 	<p>76, 120, 127, 132–134, 145, 369, 444–446, 450, 552–556, 558–563, 565–567, 573–578, 581, 585–586, 592–596, 604–606, 609, 613–615, 617, 620–623, 626, 628–631, 633, 636, 639–640, 646–650, 668, 687</p> <p>76, 120, 127, 132–134, 145, 369, 444–446, 450, 552–556, 573–578, 581, 585–586, 604–606, 613–614, 621–623, 648–650</p> <p>120, 127, 369, 445, 552–556, 566–567, 573–577, 592–593, 596, 609, 615, 617, 620, 621–623, 636, 646, 648–650</p> <p>552–556, 573–577, 604–606, 609, 613–615, 617, 620–621, 623, 626, 628–631, 633, 639–640, 647–650</p> <p>132, 552–556, 558–561, 573–577, 594–595, 648–649</p> <p>562–563, 565, 573, 578, 648–649, 668, 687</p>
<p>(KI 2) Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.</p>	
<p>(PI 2.1) Use the concepts of density and heat energy to explain observations of weather patterns, seasonal changes, and the movements of Earth's plates.</p>	
<p>(2.1a) Earth systems have internal and external sources of energy, both of which create heat.</p>	<p>101, 117, 154, 278, 295, 300, 303, 420, 436, 471–472, 578–580, 597–598, 670, 682, 684–688, 690–691, 693, 697–698, 707–709, 741, 743</p>
<p>(2.1b) The transfer of heat energy within the atmosphere, the hydrosphere, and Earth's interior results in the formation of regions of different densities. These density differences result in motion.</p>	<p>278, 288, 295–298, 300–301, 303–304, 331–332, 473, 476–479, 482–487, 580–581, 598, 690–692, 694, 708–709, 809–810</p>
<p>(2.1c) Weather patterns become evident when weather variables are observed, measured, and recorded. These variables include air temperature, air pressure, moisture (relative humidity and dewpoint), precipitation (rain, snow, hail, sleet, etc.), wind speed and direction, and cloud cover.</p>	<p>278–284, 287–289, 291, 295, 298–300, 304, 306, 312–321, 325–326, 328–346, 352–355, 359–362, 374, 376–379, 381, 412, 436, 439, 694, 809</p>
<p>(2.1d) Weather variables are measured using instruments such as thermometers, barometers, psychrometers, precipitation gauges, anemometers, and wind vanes.</p>	<p>312–316, 325–326, 378–379, 436</p>
<p>(2.1e) Weather variables are interrelated. For example:</p> <ul style="list-style-type: none"> temperature and humidity affect air pressure and probability of precipitation air pressure gradient controls wind velocity 	<p>281–292, 295–297, 307–311, 325–327, 329–340, 348–351, 355–357, 436</p> <p>281–292, 295–297, 311, 326–327, 329–335, 340, 348–349, 351, 355–357, 436</p> <p>281–292, 295–296, 307–311, 325–327, 336–340, 348–351, 355–357, 436</p>

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(2.1f) Air temperature, dewpoint, cloud formation, and precipitation are affected by the expansion and contraction of air due to vertical atmospheric movement.	240, 279–281, 285–286, 288–292, 295–297, 307, 325–326, 332–335, 337, 356–357, 368, 382–383, 436
(2.1g) Weather variables can be represented in a variety of formats including radar and satellite images, weather maps (including station models, isobars, and fronts), atmospheric cross-sections, and computer models.	298, 309–311, 314–319, 322–323, 325–327, 340, 352–353, 436, 439
(2.1h) Atmospheric moisture, temperature and pressure distributions; jet streams, wind; air masses and frontal boundaries; and the movement of cyclonic systems and associated tornadoes, thunderstorms, and hurricanes occur in observable patterns. Loss of property, personal injury, and loss of life can be reduced by effective emergency preparedness.	240, 436, 439
(2.1i) Seasonal changes can be explained using concepts of density and heat energy. These changes include the shifting of global temperature zones, the shifting of planetary wind and ocean current patterns, the occurrence of monsoons, hurricanes, flooding, and severe weather.	220–221, 294, 297, 302–306, 325–328, 334, 341–351, 355–357, 359–360, 365–366, 369–374, 381–383, 400, 405, 408–409, 411, 684, 690–692, 694, 697, 708–709, 810
(2.1j) Properties of Earth's internal structure (crust, mantle, inner core, and outer core) can be inferred from the analysis of the behavior of seismic waves (including velocity and refraction). <ul style="list-style-type: none"> • Analysis of seismic waves allows the determination of the location of earthquake epicenters and the measurement of earthquake magnitude; this analysis leads to the inference that Earth's interior is composed of layers that differ in composition and states of matter. 	462, 487, 498–505, 509, 514–515, 518–521, 525, 543, 547, 597
	462, 487, 498–505, 509, 514–515, 518–521, 525, 543, 547, 597
(2.1k) The outward transfer of Earth's internal heat drives convective circulation in the mantle that moves the lithospheric plates comprising Earth's surface.	420, 427, 460–462, 467, 546–547, 549, 580–581, 597, 708–709
(2.1l) The lithosphere consists of separate plates that ride on the more fluid asthenosphere and move slowly in relationship to one another, creating convergent, divergent, and transform plate boundaries. These motions indicate Earth is a dynamic geologic system. <ul style="list-style-type: none"> • These plate boundaries are the sites of most earthquakes, volcanoes, and young mountain ranges. • Compared to continental crust, ocean crust is thinner and denser. New ocean crust continues to form at mid-ocean ridges. • Earthquakes and volcanoes present geologic hazards to humans. Loss of property, personal injury, and loss of life can be reduced by effective emergency preparedness. 	8, 24–25, 48, 422, 434–435, 442–444, 447–448, 455–456, 459, 461, 463, 467–469, 472, 478–481, 484–485, 487–495, 513, 525, 528–535, 537, 542–549, 581–583, 598–599, 648, 693
	8, 442–444, 455–456, 459, 461, 463, 467–469, 472, 478–481, 485, 487, 491–495, 528–534, 537, 542–549, 582–583, 598–599, 693
	422, 434–435, 447–448, 523, 535, 537, 543–549, 581, 599
484, 487–490, 492, 494–495, 513, 548	



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Correlation of Standards and Key Ideas for Physical Setting/Earth Science	Student Edition Pages
(2.1m) Many processes of the rock cycle are consequences of plate dynamics. These include the production of magma (and subsequent igneous rock formation and contact metamorphism) at both subduction and rifting regions, regional metamorphism within subduction zones, and the creation of major depositional basins through down-warping of the crust.	98, 101, 422, 427, 451, 460–461, 467, 470–475, 491–493, 522, 530–531, 535–536, 546–547, 549, 580, 582, 597, 607, 647, 687
(2.1n) Many of Earth's surface features such as mid-ocean ridges/rifts, trenches/subduction zones/island arcs, mountain ranges (folded, faulted, and volcanic), hot spots, and the magnetic and age patterns in surface bedrock are a consequence of forces associated with plate motion and interaction.	422–423, 425–428, 433–435, 444, 449–454, 456–459, 461, 463, 467–470, 476–481, 486–487, 491–493, 495–497, 499, 509–510, 512, 518–521, 523, 527–539, 542–549, 557, 582–583, 598–599, 602, 607, 609, 614–615, 621–623, 625–627, 635–638, 645–647
(2.1o) Plate motions have resulted in global changes in geography, climate, and the patterns of organic evolution.	422–426, 433–435, 442, 455, 459, 463, 467–469, 487, 490, 528, 532–534, 542–548, 557, 581–583, 600–601, 611, 621, 624–626, 635, 638, 647, 687
(2.1p) Landforms are the result of the interaction of tectonic forces and the processes of weathering, erosion, and deposition.	267, 281, 413–414, 418, 421, 423, 425, 433–435, 523, 525, 527–528, 580, 582, 597–599, 608, 612, 626, 636–637, 645, 651
(2.1q) Topographic maps represent landforms through the use of contour lines that are isolines connecting points of equal elevation. Gradients and profiles can be determined from changes in elevation over a given distance.	523–524
(2.1r) Climate variations, structure, and characteristics of bedrock influence the development of landscape features including mountains, plateaus, plains, valleys, ridges, escarpments, and stream drainage patterns.	158–160, 170–171, 173, 178, 192, 197, 214–215, 220, 222–225, 227–229, 235–237, 543–545, 635
(2.1s) Weathering is the physical and chemical breakdown of rocks at or near Earth's surface. Soils are the result of weathering and biological activity over long periods of time.	152–159, 161, 167–168, 173–175, 177–178, 264, 267
(2.1t) Natural agents of erosion, generally driven by gravity, remove, transport, and deposit weathered rock particles. Each agent of erosion produces distinctive changes in the material that it transports and creates characteristic surface features and landscapes. In certain erosional situations, loss of property, personal injury, and loss of life can be reduced by effective emergency preparedness.	152–153, 162–163, 168, 176–179, 181–182, 185–193, 196, 200–205, 207–208, 221, 264–265, 267, 414, 416–419, 424, 428, 433–435, 526, 602, 647, 660, 662, 679



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Correlation of Standards and Key Ideas for Physical Setting/Earth Science	Student Edition Pages
<p>(2.1u) The natural agents of erosion include:</p> <ul style="list-style-type: none"> • <i>Streams (running water)</i>: Gradient, discharge, and channel shape influence a stream’s velocity and the erosion and deposition of sediments. Sediments transported by streams tend to become rounded as a result of abrasion. Stream features include V-shaped valleys, deltas, flood plains, and meanders. A watershed is the area drained by a stream and its tributaries. • <i>Glaciers (moving ice)</i>: Glacial erosional processes include the formation of U-shaped valleys, parallel scratches, and grooves in bedrock. Glacial features include moraines, drumlins, kettle lakes, finger lakes, and outwash plains. • <i>Wave Action</i>: Erosion and deposition cause changes in shoreline features, including beaches, sandbars, and barrier islands. Wave action rounds sediments as a result of abrasion. Waves approaching a shoreline move sand parallel to the shore within the zone of breaking waves. • <i>Wind</i>: Erosion of sediments by wind is most common in arid climates and along shorelines. Wind-generated features include dunes and sand-blasted bedrock. • <i>Mass Movement</i>: Earth materials move down-slope under the influence of gravity. 	<p>124, 164–166, 168, 176–189, 191–208, 215, 217–219, 222–225, 227, 232–233, 235–237, 264–265, 267, 414–419, 428, 433–435, 636, 647</p> <p>124, 164, 168, 177–179, 215, 217–219, 222–225, 227, 232–233, 235–237, 264, 267, 647</p> <p>124, 165, 168, 177–180, 198–203, 206–208, 264–265, 267, 636</p> <p>124, 164, 176, 178–179, 264, 267, 414–419, 428, 433–435</p> <p>124, 164–166, 168, 176–180, 191–197, 207–208, 264–265, 267</p> <p>124, 177–189, 204–205, 207–208, 264, 267</p>
<p>(2.1v) Patterns of deposition result from a loss of energy within the transporting system and are influenced by the size, shape, and density of the transported particles. Sediment deposits may be sorted or unsorted.</p>	<p>163, 202, 216, 226, 235–237, 264, 415–417, 428, 603, 636</p>
<p>(2.1w) Sediments of inorganic and organic origin often accumulate in depositional environments. Sedimentary rocks form when sediments are compacted and/or cemented after burial or as the result of chemical precipitation from seawater.</p>	<p>231, 428, 602, 604, 606, 613, 621–623, 627, 636, 686–687, 689, 696–697, 707–709</p>



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Correlation of Standards and Key Ideas for Physical Setting/Earth Science	Student Edition Pages
(PI 2.2) Explain how incoming solar radiation, ocean currents, and land masses affect weather and climate.	
(2.2a) Insolation (solar radiation) heats Earth's surface and atmosphere unequally due to variations in: <ul style="list-style-type: none"> the intensity caused by differences in atmospheric transparency and angle of incidence, which vary with time of day, latitude, and season characteristics of the materials absorbing the energy such as color, texture, transparency, state of matter, and specific heat duration, which varies with seasons and latitude. 	270–271, 275–277, 295–296, 300, 303–305, 327, 341, 355, 357–358, 362–363, 367–375, 381–383, 436–437, 683–684, 690–694, 697, 707–708, 807, 809–810
	270–271, 275–277, 295–296, 300, 304, 341, 355, 357–358, 362–363, 369–375, 381–383, 436–437, 683–684, 690–694, 697, 707–708, 807, 809–810
	271, 276, 296, 304, 367–368, 375, 381–383, 436–437, 690–694, 697, 707, 809–810
	303–305, 327, 362–363, 370, 375, 381–383, 436–437, 690–694, 697, 707
(2.2b) The transfer of heat energy within the atmosphere, the hydrosphere, and Earth's surface occurs as the result of radiation, convection, and conduction. <ul style="list-style-type: none"> Heating of Earth's surface and atmosphere by the Sun drives convection within the atmosphere and oceans, producing winds and ocean currents. 	9, 272, 275–277, 295–297, 301, 303–305, 327, 329–330, 333, 341–346, 356–357, 362, 366–377, 381–384, 403–405, 408–411, 436, 460, 467, 587, 684, 690, 693–694, 697, 707–709, 807, 810, 812
	9, 272, 275–277, 295–297, 301, 303–305, 327, 329–330, 333, 341–346, 356–357, 384, 403–405, 408–411, 436, 460, 467, 587
(2.2c) A location's climate is influenced by latitude, proximity to large bodies of water, ocean currents, prevailing winds, vegetative cover, elevation, and mountain ranges.	271, 275–277, 295, 297, 300–301, 304–305, 311, 325–327, 341–346, 356–358, 361–374, 378–379, 381–384, 403–405, 408–411, 437, 439, 684, 690–691, 694, 697, 708–709
(2.2d) Temperature and precipitation patterns are altered by: <ul style="list-style-type: none"> natural events such as El Niño and volcanic eruptions human influences including deforestation, urbanization, and the production of greenhouse gases such as carbon dioxide and methane. 	320–321, 341, 358, 369–377, 380–383, 411, 437, 664, 666–667, 724–728, 737
	320–321, 341, 358, 369–377, 381–383, 411, 437
	358, 375–377, 380–383, 664, 666–667, 724–728, 737
(KI 3) Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.	
(PI 3.1) Explain the properties of materials in terms of the arrangement and properties of the atoms that compose them.	
(3.1a) Minerals have physical properties determined by their chemical composition and crystal structure. <ul style="list-style-type: none"> Minerals can be identified by well-defined physical and chemical properties, such as cleavage, fracture, color, density, hardness, streak, luster, crystal shape, and reaction with acid. Chemical composition and physical properties determine how minerals are used by humans. 	52–56, 59, 67, 76–79, 82–97, 99–113, 117–119, 122, 132, 135–149, 156–160, 174–175, 177, 393–394, 451–452, 621–622, 661
	52–56, 59, 67, 76–79, 82–89, 91–97, 99–113, 117–119, 122, 135–147, 149, 156–160, 174–175, 177, 393–394, 621, 661
	53, 76–79, 89–95, 132, 136–137, 145–145, 147–148, 177, 451–452, 622, 661



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Correlation of Standards and Key Ideas for Physical Setting/Earth Science	Student Edition Pages
<p>(3.1b) Minerals are formed inorganically by the process of crystallization as a result of specific environmental conditions. These include:</p> <ul style="list-style-type: none"> • cooling and solidification of magma • precipitation from water caused by such processes as evaporation, chemical reactions, and temperature changes • rearrangement of atoms in existing minerals subjected to conditions of high temperature and pressure 	52, 58, 65, 67, 70, 76–80, 83, 95–96, 100–106, 114–115, 117–119, 124–125, 128, 130, 132–140, 143–149, 429, 476, 567, 661, 681
	52, 76–80, 83, 95–96, 100–106, 114–115, 117–119, 133–140, 143–147, 476, 661, 681
	52, 58, 65, 70, 76–80, 83, 95–96, 101–106, 117–119, 124–125, 128, 130, 132–140, 143–145, 148–149, 429, 661, 681
	52, 58, 67, 76–80, 83, 95–96, 101–106, 117–119, 124–125, 133–140, 143–145, 148–149, 567, 661, 681
<p>(3.1c) Rocks are usually composed of one or more minerals.</p> <ul style="list-style-type: none"> • Rocks are classified by their mineral composition and texture. • Conditions that existed when a rock formed can be inferred from the rock's mineral composition and texture. • The properties of rocks determine how they are used and also influence land usage by humans. 	52, 58–59, 68, 70, 76, 80–81, 95–96, 98–100, 102–113, 116–120, 122, 128–129, 131–132, 134–141, 143–149, 155, 686–689, 695–697, 707–709
	68, 70, 76, 80–81, 95–96, 98–100, 102–113, 116–120, 128–129, 132, 134–141, 143–149
	52, 58–59, 70, 95–96, 98–100, 102–113, 117–120, 128–129, 131–132, 136–141, 143–145, 148
	70, 98, 116–120, 122, 128–129, 131–132, 136–137, 139, 145, 147–149, 155, 686–689, 695–697, 707–709



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Chapter 1 The Nature of Science		
1.1 Earth Science	4–10	St 1 Science KI 1 & 2, St 2 KI 1, St 4 KI 1.2 g, 2.1l, & 2.2b, St 6 KI 1 & 5
1.2 Methods of Scientists	11–16	St 1 Math KI 1 & Science KI 1
1.3 Communicating in Science	17–25	St 1 Math KI 1 & Science KI 1, St 4 KI 1.2g, 1.2l, and 2.1l, St 6 KI 1 & 2
Chapter 2 Mapping Our World		
2.1 Latitude and Longitude	26–31	St 1 Math KI 1, 2, 3, & Engin KI 1, St 2 KI 1, St 4 KI 1.1c & 1.1d, St 6 KI 2 & 3
2.2 Types of Maps	32–36	St 1 Math KI 1, 2, 3, & Engin KI 1, St 6 KI 2 & 3, St 7 KI 1
2.3 Remote Sensing	37–47	St 1 Math KI 1, 2, 3, & Engin KI 1, St 2 KI 1 & 3, St 4 KI 1.1c & 1.1d, St 6 KI 2 & 3, St 7 KI 1
Chapter 3 Matter and Atomic Structure		
3.1 What are elements?	52–59	St 1 Math KI 2, & Science KI 3, St 4 KI 3.1a, 3.1b, & 3.1c
3.2 How Atoms Combine	60–66	St 1 Math KI 2, St 4 KI 3.1b, St 6 KI 5
3.3 States of Matter	67–75	St 1 Math KI 1, 2, 3, Science KI 1 & 2, St 2 KI 1, St 4 KI 3.1a, 3.1b, & 3.1c, St 6 KI 5, St 7 KI 2
Chapter 4 Minerals		
4.1 What is a mineral?	76–83	St 1 Math KI 2 & Science KI 3, St 4 KI 1.2j, 3.1a, 3.1b, & 3.1c, St 6 KI 1 & 2
4.2 Identifying Minerals	84–97	St 1 Math KI 1, 2, 3, Science KI 1, 2, & 3, St 4 KI 3.1a, 3.1b, & 3.1c, St 6 KI 1 & 6, St 7 KI 1
Chapter 5 Igneous Rocks		
5.1 What are igneous rocks?	98–106	St 1 Science KI 1, 2, & 3, St 4 KI 2.1a, 2.1m, 3.1a, 3.1b, & 3.1c, St 6 KI 1, 2, 4, & 5
5.2 Classifying Igneous Rocks	107–119	St 1 Math KI 1, 2, 3, Science KI 1, 2, 3, & Engin KI 1, St 4 KI 2.1a, 3.1a, 3.1b, & 3.1c, St 6 KI 1, 2, & 5
Chapter 6 Sedimentary and Metamorphic Rocks		
6.1 Formation of Sedimentary Rocks	120–127	St 1 Science KI 1, 2, & 3, St 4 KI 1.2i, 1.2j, 3.1a, 3.1b, & 3.1c, St 6 KI 2 & 5
6.2 Types of Sedimentary Rocks	128–132	St 1 Math KI 2, 3, & Science KI 1, St 4 KI 1.2i, 1.2j, 3.1a, 3.1b, & 3.1c, St 6 KI 5, St 7 KI 1
6.3 Metamorphic Rocks	133–145	St 1 Math KI 3, Science KI 1, 2, & 3, St 4 KI 1.2i, 1.2j, 3.1a, 3.1b, & 3.1c, St 6 KI 1 & 5, St 7 KI 1
Chapter 7 Weathering, Erosion, and Soil		
7.1 Weathering	152–161	St 1 Math KI 2, Science KI 1, 2, & 3, St 4 KI 2.1a, 2.1r, 2.1s, 2.1t, 3.1a, & 3.1c, St 6 KI 1, 2, 4, & 5
7.2 Erosion and Deposition	162–166	St 1 Science KI 1, 2, 3, & Engin KI 1, St 4 KI 2.1t & 2.1v, St 6 KI 1, 2, 4, & 5
7.3 Formation of Soil	167–179	St 1 Math KI 1, 2, 3, Science KI 1, 2, & 3, St 4 KI 2.1r, 2.1s, 2.1t, 2.1u, & 3.1a, St 6 KI 1, 2, 3, 4, 5, & 6, St 7 KI 1



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8.1 Mass Movements at Earth's Surface	180–190	St 1 Science KI 1, 2, & 3, St 4 KI 2.1t & 2.1u, St 6 KI 1, 2, 4, & 5, St 7 KI 1
8.2 Wind	191–197	St 4 KI 2.1r, 2.1t, & 2.1u, St 6 KI 1, 2, 4, 5, & 6
8.3 Glaciers	198–209	St 1 Math KI 1, 2, 3, Science KI 1, 2, & 3, St 2 KI 1, 2, & 3, St 4 KI 2.1t, 2.1u, & 2.1v, St 6 KI 1, 2, 3, 4, 5, & 6, St 7 KI 1
Chapter 9 Surface Water		
9.1 Surface Water Movement	210–221	St 1 Math KI 1, 2, 3, Science KI 1, 2, & 3, St 2 KI 3, St 4 KI 1.2g, 2.1i, 2.1r, 2.1u, & 2.1v, St 6 KI 1, 2, & 5
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9.3 Lakes and Freshwater Wetlands	228–237	St 1 Math KI 2, Science KI 1, 2, & 3, St 2 KI 3, St 4 KI 1.2g, 2.1r, 2.1u, 2.1v, & 2.1w, St 6 KI 1, 2, 4, 5, & 6, St 7 KI 2
Chapter 10 Groundwater		
10.1 Movement and Storage of Groundwater	238–243	St 1 Math KI 1, 2, 3, Science KI 1, 2, 3, & Engin KI 1, St 4 KI 1.2g, 2.1f, & 2.1h, St 6 KI 1, 2, & 5
10.2 Groundwater Erosion and Deposition	244–248	St 1 Math KI 1, 2, & 3, St 4 KI 1.2g, St 6 KI 1, 2, & 5
10.3 Groundwater Systems	249–263	St 1 Math KI 1, 2, 3, Science KI 1, 2, 3, & Engin KI 1, St 4 KI 1.2g, St 6 KI 1, 2, 5, & 6, St 7 KI 1 & 2
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11.1 Atmospheric Basics	270–277	St 1 Science KI 2 & 3, St 4 KI 1.2g, 2.2a, 2.2b, & 2.2c, St 6 KI 1
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11.3 Moisture in the Atmosphere	285–297	St 1 Science KI 1, 2, & 3, St 4 KI 1.2g, 2.1a, 2.1b, 2.1c, 2.1e, 2.1f, 2.1i, 2.2a, 2.2b, & 2.2c, St 6 KI 1, 2, & 5, St 7 KI 1
Chapter 12 Meteorology		
12.1 The Causes of Weather	298–304	St 1 Math KI 1, Science KI 1, 2, & 3, St 4 KI 2.1a, 2.1b, 2.1c, 2.1g, 2.1i, 2.2a, 2.2b, & 2.2c, St 6 KI 1, 2, 4, & 5, St 7 KI 2
12.2 Weather Systems	305–311	St 1 Math KI 1 & 2, St 2 KI 1, St 4 KI 2.1c, 2.1e, 2.1f, 2.1g, & 2.2c, St 6 KI 1 & 2, St 7 KI 1
12.3 Gathering Weather Data	312–316	St 1 Engin KI 1, St 2 KI 1, 2, & 3, St 4 KI 2.1c, 2.1d, & 2.1g, St 6 KI 1 & 2, St 7 KI 1 & 2
12.4 Weather Analysis	317–327	St 1 Math KI 1, 2, 3, & Engin KI 1, St 2 KI 1, 2, & 3, St 4 KI 2.1c, 2.1d, 2.1e, 2.1f, 2.1g, 2.1i, 2.2b, 2.2c, & 2.2d, St 6 KI 1, 2, 3, 4, & 5, St 7 KI 1 & 2



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13.1 Thunderstorms	328–333	St 1 Math KI 2, Science KI 1, & 3, St 4 KI 2.1b, 2.1c, 2.1e, 2.1f, 2.1i, & 2.2b, St 6 KI 1, 2, 4, & 5
13.2 Severe Weather	334–340	St 2 KI 3, St 4 KI 2.1c, 2.1e, 2.1f, 2.1i, & 2.2b, St 6 KI 1, 4, & 5, St 7 KI 1
13.3 Tropical Storms	341–346	St 1 Math KI 1, 2, & 3, St 2 KI 3, St 4 KI 2.1b, 2.1c, 2.1i, 2.2a, 2.2b, 2.2c, & 2.2d, St 6 KI 1 & 5, St 7 KI 1
13.4 Recurring Weather	347–357	St 1 Math KI 1, 2, 3, Science KI 1, 2, & 3, St 2 KI 1, 2, & 3, St 4 KI 2.1c, 2.1e, 2.1f, 2.1g, 2.1i, 2.2a, 2.2b, 2.2c, & 2.2d, St 6 KI 1, 4, & 5, St 7 KI 1 & 2
Chapter 14 Climate		
14.1 What is climate?	358–363	St 1 Math KI 1, 2, 3, Science KI 1, 2, & 3, St 4 KI 1.1c, 1.1f, 2.1c, 2.1i, 2.2a, 2.2b, 2.2c, & 2.2d, St 6 KI 5, St 7 KI 1
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15.1 The Oceans	384–391	St 1 Math KI 1, 2, 3, Science KI 1, 2, & 3, St 2 KI 1, 2, & 3, St 4 KI 1.1a, 1.1i, 1.2c, 1.2d, 1.2e, 1.2f, 1.2g, 2.2b, & 2.2c, St 6 KI 1, 2, 3, 4, & 5, St 7 KI 1
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15.3 Ocean Movements	399–411	St 1 Math KI 1, 2, Science KI 1, 2, & 3, St 2 KI 1, St 4 KI 1.1a, 1.1d, 1.1e, 1.1f, 1.1i, 1.2a, 1.2d, 1.2e, 1.2f, 2.1i, 2.2b, 2.2c, & 2.2d, St 6 KI 1, 2, & 5, St 7 KI 1 & 2
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16.2 The Seafloor	422–435	St 1 Math KI 3, Science KI 1, 2, & 3, St 4 KI 1.2f, 2.1k, 2.1l, 2.1m, 2.1n, 2.1o, 2.1p, 2.1t, 2.1u, 2.1v, 2.1w, & 3.1b, St 6 KI 2, 3, & 5
Chapter 17 Plate Tectonics		
17.1 Drifting Continents	442–447	St 1 Science KI 1, St 4 KI 1.2j, 2.1l, 2.1n, & 2.1o, St 6 KI 3
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17.4 Causes of Plate Motion	460–469	St 1 Math KI 1, 2, & 3, St 2 KI 1, St 4 KI 2.1j, 2.1k, 2.1l, 2.1m, 2.1n, 2.1o, & 2.2b, St 6 KI 2 & 3, St 7 KI 1



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18.2 Intrusive Activity	476–479	St 4 KI 2.1b, 2.1l, 2.1n, & 3.1b, St 6 KI 1 & 5
18.3 Volcanoes	480–493	St 1 Math KI 1, 2, 3, & Science KI 1, St 2 KI 1 & 3, St 4 KI 2.1b, 2.1j, 2.1l, 2.1m, 2.1n, 2.1o, & 2.1p, St 6 KI 1, 2, 4, & 5, St 7 KI 2
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19.1 Forces Within the Earth	494–499	St 1 Science KI 1 & 2, St 4 KI 2.1j, 2.1l, & 2.1n, St 6 KI 2
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