



SCIENCE

An Introduction to the Life, Earth, and Physical Sciences
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STANDARDS

PAGE REFERENCES

Scientific Inquiry (Nature of Science Unifying Concept A)

Scientific inquiry is the process by which humans systematically examine the natural world. Scientific inquiry is a human endeavor and involves observation, reasoning, insight, energy, skill, and creativity. Scientific inquiry is used to formulate and test explanations of nature through observation, experiments, and theoretical or mathematical models. Scientific explanations and evidence are constantly reviewed and examined by others. Questioning, response to criticism and open communication are integral to the process of science.

By the end of grade band, students know and are able to do everything required in earlier grades and:

N.8.A Students understand that scientific knowledge requires critical consideration of verifiable evidence obtained from inquiry and appropriate investigations.

N.8.A.1 Students know how to identify and critically evaluate information in data, tables, and graphs. E/S

Student Edition:

Design Your Own Experiment 126-127, 160-161, 330-331

Problem Solving 163

Section Wrap-up 327 #4

Using Math 229, 365

Teacher Wraparound Edition:

A 16, 127, 153

N.8.A.2 Students know how to critically evaluate information to distinguish between fact and opinion. E/S

Student Edition:

Science & Society 166-167, 488-489

Teacher Wraparound Edition:

TS 395, 489

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N.8.A.3	Students know different explanations can be given for the same evidence. E/S	Student Edition: 516-517	Teacher Wraparound Edition: CB 119
N.8.A.4	Students know how to design and conduct a controlled experiment. E/L	Student Edition: 18-23 <i>Design Your Own Experiment</i> 160-161, 418-419, 472-473 <i>Section Wrap-up</i> 26 #4 <i>Skills Review</i> 115 #18, 343 #17	Teacher Wraparound Edition: A 79, 331; SH 85
N.8.A.5	Students know how to use appropriate technology and laboratory procedures safely for observing, measuring, recording, and analyzing data. E/L	Student Edition: <i>Activity</i> 150, 271 <i>Design Your Own Experiment</i> 94-95, 246-247 <i>Internet Project</i> 522-523 <i>Science Journal</i> 12	Teacher Wraparound Edition: A 104, 125; D 499; R 122
N.8.A.6	Students know scientific inquiry includes evaluating results of scientific investigations, experiments, observations, theoretical and mathematical models, and explanations proposed by other scientists. E/S	Student Edition: 23 <i>Activity</i> 226 <i>Design Your Own Experiment</i> 94-95, 160-161, 302-303, 330-331 <i>Internet Project</i> 522-523 <i>Problem Solving</i> 131 <i>Science Journal</i> 123	Teacher Wraparound Edition: E 192

STANDARDS		PAGE REFERENCES
N.8.A.7	Students know there are multiple methods for organizing items and information. E/S	Student Edition: <i>Activity 48</i> <i>Science & Language Arts 123</i>
Science, Technology, and Society (Nature of Science Unifying Concept B) <p>Technology defines a society or era. It can shape the environment in which people live, and it has increasingly become a larger part of people's lives. While many of technology's effects on society are regarded as desirable, other effects are seen as less desirable. These concepts are shared across subject areas such as science, math, technology, social studies and language arts. The development and use of technology affects society and the environment in which we live, and, at the same time, society influences the development of technology and its impact on culture.</p> <p>By the end of grade band, students know and are able to do everything required in earlier grades and:</p> <p>N.8.B Students understand the interactions of science and society in an ever-changing world.</p>		
N.8.B.1	Students understand that consequences of technologies can cause resource depletion and environmental degradation, but technology can also increase resource availability, mitigate environmental degradation, and make new resources economical.	Student Edition: 177-180, 496-497 <i>Using Technology 181, 413</i> Teacher Wraparound Edition: AC 193; CB 182; CC 191; TC 424; VL 497
N.8.B.2	Students know scientific knowledge is revised through a process of incorporating new evidence gained through on-going investigation and collaborative discussion. E/S	Student Edition: 12, 452-455, 458-459, 516-517 Teacher Wraparound Edition: CU 23; D 109; E 6, 388; SJ 16; VL 52
Matter (Physical Science Unifying Concept A) <p>Matter has various states with unique properties that can be used as a basis for organization. The relationship between the properties of matter and its structure is an essential component of study in the physical sciences. The understanding of matter and its properties leads to practical applications, such as the capability to liberate elements from ore, create new drugs, manipulate the structure of genes and synthesize polymers.</p> <p>By the end of grade band, students know and are able to do everything required in earlier grades and:</p> <p>P.8.A Students understand the properties and changes of properties in matter.</p>		
P.8.A.1	Students know particles are arranged differently in solids, liquids, and gases of the same substance. E/S	Student Edition: 241, 253 Teacher Wraparound Edition: A 241

STANDARDS		PAGE REFERENCES
P.8.A.2	Students know elements can be arranged in the periodic table which shows repeating patterns that group elements with similar properties. E/S	<p>Student Edition: 224 <i>Using Math</i> 229</p> <p>Teacher Wraparound Edition: A 229; TS 233</p>
P.8.A.3	Students know methods for separating mixtures based on the properties of the components. E/S	<p>Student Edition: <i>MiniLAB</i> 228 <i>Problem Solving</i> 216 <i>Section Wrap-up</i> 229 #3 <i>Skills Review</i> 235 #2</p> <p>Teacher Wraparound Edition: A 228</p>
P.8.A.4	Students know atoms often combine to form molecules, and that compounds form when two or more different kinds of atoms chemically bond. E/S	<p>Student Edition: 225, 227 <i>Reviewing Main Ideas</i> 233 <i>Skills Review</i> 235 #1 & #15</p> <p>Teacher Wraparound Edition: CU 227; IQ 227; TPK 407</p>
P.8.A.5	Students know mass is conserved in physical and chemical changes. E/S	<p>Student Edition: 213-214</p> <p>Teacher Wraparound Edition: CB 213, 254; D 214</p>
P.8.A.6	Students know matter is made up of tiny particles called atoms. E/S	<p>Student Edition: 212-214, 222 <i>Reviewing Main Ideas</i> 233</p>
P.8.A.7	Students know the characteristics of electrons, protons, and neutrons. E/S	<p>Student Edition: 218-219 <i>Reviewing Main Ideas</i> 233</p> <p>Teacher Wraparound Edition: CB 218; E 219; VL 219</p>

STANDARDS	PAGE REFERENCES
P.8.A.8 Students know substances containing only one kind of atom are elements which cannot be broken into smaller pieces by normal laboratory processes. E/S	Student Edition: 223 <i>Science & Society</i> 230 Teacher Wraparound Edition: CU 227
Forces and Motion (Physical Science Unifying Concept B)	
The laws of motion are used to describe the effects of forces on the movement of objects.	
By the end of grade band, students know and are able to do everything required in earlier grades and:	
P.8.B Students understand that position and motion of an object result from the net effect of the different forces acting on it.	
P.8.B.1 Student know the effects of balanced and unbalanced forces on an object's motion. E/S	Student Edition: 277, 279, 282 <i>Section Wrap-up</i> 283 #3 <i>Skills Review</i> 289 #19 Teacher Wraparound Edition: CU 282
P.8.B.2 Students know electric currents can produce magnetic forces and magnets can cause electric currents. E/S	Student Edition: 362, 364 <i>Activity</i> 361 Teacher Wraparound Edition: A 362; CB 366; CU 365
P.8.B.3 Students know every object exerts gravitational force on every other object, and the magnitude of this force depends on the mass of the objects and their distance from one another. I/S	Student Edition: 264-266 <i>Section Wrap-up</i> 268 #2 & #3 Teacher Wraparound Edition: CB 265; SB 264

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<p>Energy (Physical Science Unifying Concept C)</p> <p>The total energy of the universe is constant. All events involve the transfer of energy in one form or another. In all energy transfers, the overall effect is that the energy is spread out uniformly.</p> <p>By the end of grade band, students know and are able to do everything required in earlier grades and:</p> <p>P.8.C Students understand transfer of energy.</p>		
P.8.C.1	Students know visible light is a narrow band within the electromagnetic spectrum. I/S	<p>The electromagnetic spectrum can be covered in class discussion of the following material on light as a form of energy:</p> <p>Student Edition: 320-322</p> <p>Teacher Wraparound Edition: B 322</p>
P.8.C.2	Students know vibrations (e.g., sounds, earthquakes) move at different speeds in different materials, have different wavelengths, and set up wave-like disturbances that spread away from the source uniformly. E/S	<p>Student Edition: 438, 448-449</p> <p><i>Design Your Own Experiment</i> 450-451</p> <p><i>Explore Activity</i> 437</p> <p><i>Problem Solving</i> 441</p> <p>Teacher Wraparound Edition: IS 484; R 443; TC 446</p>
P.8.C.3	Students know physical, chemical, and nuclear reactions involve a transfer of energy. E/S	<p>Student Edition: 320-325</p> <p><i>Activity</i> 326</p> <p><i>Explore Activity</i> 319</p> <p><i>Science Journal</i> 327</p> <p>Teacher Wraparound Edition: B 322; CB 322; CU 325</p>
P.8.C.4	Students know energy cannot be created or destroyed, in a chemical or physical reaction, but only changed from one form to another. E/S	<p>Student Edition: 321</p> <p>Teacher Wraparound Edition: SB 320</p>

STANDARDS		PAGE REFERENCES	
P.8.C.5	Students know heat energy flows from warmer materials or regions to cooler ones through conduction, convection, and radiation. E/S	Student Edition: 328, 334-337 <i>Reviewing Main Ideas</i> 341 <i>Section Wrap-up</i> 337 #1 <i>Skills Review</i> 343 #20	Teacher Wraparound Edition: MM 336; SB 328
P.8.C.6	Students know electrical circuits provide a means of transferring electrical energy to produce heat, light, sound, and chemical changes. I/S	Student Edition: 351-355 <i>Design Your Own Experiment</i> 356-357 <i>MiniLAB</i> 352	Teacher Wraparound Edition: A 358; CB 353
Heredity (Life Science Unifying Concept A)			
Heredity is the genetic passing of a set of instructions from generation to generation. These instructions are encoded as DNA and may manifest themselves as characteristics. Some characteristics are inherited, and some result from interactions with the environment.			
By the end of grade band, students know and are able to do everything required in earlier grades and:			
L.8.A Students understand the role of genetic information in the continuation of a species.			
L.8.A.1	Students know heredity is the passage of genetic instructions from one generation to the next generation. E/S	Student Edition: 102, 108-109 <i>Section Wrap-up</i> 111 #1	Teacher Wraparound Edition: SB 102; SH 113
L.8.A.2	Students know changes in genes of eggs and sperm can cause changes in inherited characteristics. E/S	Student Edition: 110-111 <i>Reviewing Main Ideas</i> 113 <i>Skills Review</i> 115 #19	Teacher Wraparound Edition: CB 110

STANDARDS		PAGE REFERENCES
L.8.A.3	Students know organisms can be bred for specific characteristics. I/L	Student Edition: <i>Science & History</i> 112 Teacher Wraparound Edition: B 108, 112
L.8.A.4	Students know some characteristics of an organism are the result of a combination of interaction with the environment and genetic information. E/S	Student Edition: 110-111 <i>Design Your Own Experiment</i> 94-95 Teacher Wraparound Edition: TC 78; VL 125
Structure of Life (Life Science Unifying Concept B)		
All living things are composed of cells. Cells range from very simple to very complex and have structures which perform functions for the organism. Cells and structures can be damaged or fail because of intrinsic failures or disease.		
By the end of grade band, students know and are able to do everything required in earlier grades and:		
L.8.B Students understand that living things are composed of cells, which are specialized in multicellular organisms to perform a variety of life functions.		
L.8.B.1	Students know all organisms are composed of cells, which are the fundamental units of life. E/S	Student Edition: 62-63 <i>Activity</i> 71 <i>Explore Activity</i> 61 <i>Reviewing Main Ideas</i> 85 Teacher Wraparound Edition: CB 63; TC 60
L.8.B.2	Students know cells grow, divide, and take in nutrients which they use to provide energy for cell functions. E/S	Student Edition: 67-70, 72-73 <i>Section Wrap-up</i> 73 #5 Teacher Wraparound Edition: UA 65; VL 65
L.8.B.3	Students know some organisms are made of just one cell and that multicellular organisms can consist of thousands to millions of cells working together. E/S	Student Edition: 63, 74-77 <i>Reviewing Main Ideas</i> 85 Teacher Wraparound Edition: VL 80

STANDARDS		PAGE REFERENCES
L.8.B.4	Students know cells combine to form tissues that combine to form organs and organ systems that are specialized to perform life functions. E/S	Student Edition: 80-81 <i>Reviewing Main Ideas</i> 85 <i>Section Wrap-up</i> 81 #4 Teacher Wraparound Edition: A 81; CB 76; R 80; RP 80; USW 77
L.8.B.5	Students know disease can result from defects in body systems or from damage caused by infection. E/S	Student Edition: <i>Science & Society</i> 54-55 Teacher Wraparound Edition: A 111, 498; CC 92
Organisms and Their Environment (Life Science Unifying Concept C) A variety of ecosystems and communities exist on Earth. Ecosystems are dynamic interactions of organisms and their environment. Ecosystems have distinct characteristics and components that allow certain organisms to thrive. Change in one or more components can affect the entire ecosystem.		
By the end of grade band, students know and are able to do everything required in earlier grades and:		
L.8.C Students understand how living and nonliving components of ecosystems interact.		
L.8.C.1	Students know how matter and energy are transferred through food webs in an ecosystem. E/S	Student Edition: 168-170 <i>Skills Review</i> 173 #2 Teacher Wraparound Edition: CU 169; SB 168
L.8.C.2	Students know how to characterize organisms in any ecosystem by their functions. E/S	Student Edition: 168 <i>Skills Review</i> 173 #16 Teacher Wraparound Edition: R 169; VL 169
E.8.C.3	Students will evaluate how changes in environments can be beneficial or harmful. E/S	Student Edition: 185-187, 190-194, 517 <i>Design Your Own Experiment</i> 188-189 <i>Science Journal</i> 156 <i>Section Wrap-up</i> 194 #4 Teacher Wraparound Edition: A 517; CD 190; GF 189; SJ 152

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L.8.C.4 Students know inter-related factors affect the number and type of organisms an ecosystem can support. E/S	<p>Student Edition: 159, 162-164 <i>Design Your Own Experiment</i> 160-161</p> <p>Teacher Wraparound Edition: GF 161; SJ 159, 163</p>
<p>Diversity of Life (Life Science Unifying Concept D)</p> <p>Evidence suggests that living things change over periods of time. These changes can be attributed to genetic and/or environmental influences. This process of change over time is called biological evolution. The diversity of life on Earth is classified using objective characteristics. Scientific classification uses a hierarchy of groups and subgroups based on similarities that reflect evolutionary relationships.</p> <p>By the end of grade band, students know and are able to do everything required in earlier grades and:</p> <p>L.8.D Students understand that life forms change over time, contributing to the variety of organisms found on the Earth.</p>	
L.8.D.1 Students know species can be identified and classified based upon their characteristics. (8.8.6) E/S	<p>Student Edition: 45-47, 49-53 <i>Activity</i> 48 <i>Appendix F</i> 530-533 <i>MiniLAB</i> 46 <i>Problem Solving</i> 47 <i>Section Wrap-up</i> 53 #4</p> <p>Teacher Wraparound Edition: A 53; CU 52</p>
L.8.D.2 Students know fossils provide evidence of how life and environmental conditions have changed throughout geologic time. E/S	<p>Student Edition: 130, 136-138 <i>Science & Society</i> 424</p> <p>Teacher Wraparound Edition: CC 130</p>
L.8.D.3 Students know an organism's behavior is based on both experience and on the species' evolutionary history. E/S	<p>The influence of experience can be covered in class discussion of the following material on physical and behavioral adaptations:</p> <p>Student Edition: 120-122, 124-125</p> <p>Teacher Wraparound Edition: CD 140</p>

STANDARDS	PAGE REFERENCES
<p>Atmospheric Processes and the Water Cycle (Earth and Space Science Unifying Concept A)</p> <p>Earth systems have internal and external sources of energy, both of which create heat. Driven by sunlight and Earth's internal heat, a variety of cycles connect and continually circulate energy and material through the components of the earth systems.</p>	
<p>By the end of grade band, students know and are able to do everything required in earlier grades and:</p>	
<p>E.8.A Students understand the relationship between the Earth's atmosphere, topography, weather and climate.</p>	
<p>E.8.A.1 Students know seasons are caused by variations in the amounts of the Sun's energy reaching Earth's surface due to the planet's axial tilt. E/S</p>	<p>Student Edition: 379 <i>Reviewing Main Ideas</i> 401 <i>Section Wrap-up</i> 383 #3 Teacher Wraparound Edition: A 380; CU 382; RP 379</p>
<p>E.8.A.2 Students know how the processes involved in the water cycle affect climatic patterns. E/S</p>	<p>Student Edition: 468-469, 503, 514-515 Teacher Wraparound Edition: R 516; VL 469</p>
<p>E.8.A.3 Students know the properties that make water an essential component of the earth system. E/S</p>	<p>Student Edition: 468-471, 474-477, 479-487 <i>Activity</i> 478 <i>Science Journal</i> 480 <i>Skills Review</i> 493 #2 <i>Using Computers</i> 474 Teacher Wraparound Edition: D 482; MM 483; SH 491</p>
<p>E.8.A.4 Students understand the composition of Earth's atmosphere, emphasizing the role of the atmosphere in Earth's weather and climate. I/S</p>	<p>Student Edition: 496-499, 503-506, 514-517 <i>Design Your Own Experiment</i> 508-509 <i>Reviewing Main Ideas</i> 519 <i>Skills Review</i> 521 #16 Teacher Wraparound Edition: CB 504; R 510</p>

STANDARDS		PAGE REFERENCES	
E.8.A.5	Students know the difference between local weather and regional climate. I/S	Student Edition: 503, 514 <i>Reviewing Main Ideas</i> 519	Teacher Wraparound Edition: A 510; R 516; TC 515
E.8.A.6	Students know topography and patterns of global and local atmospheric movement influence local weather which occurs primarily in the lower atmosphere. E/S	Student Edition: 503-507, 510-511 <i>Design Your Own Experiment</i> 508-509 <i>Skills Review</i> 521 #19	Teacher Wraparound Edition: CB 504; D 506; R 510; TC 336, 472
<p>Solar System and Universe (Earth and Space Science Unifying Concept B)</p> <p>The universe is a dynamic system of matter and energy. The universe is extremely large and massive with its components separated by vast distances. Tools of technology will continue to aid in the investigation of the components, origins, processes and age of the universe. Earth is one part in our solar system, which is within the Milky Way Galaxy. The Sun is the energy-producing star for our solar system. Most objects in our solar system are in predictable motion, resulting in phenomena such as day/night, year, phases of the moon, tides, and eclipses.</p> <p>By the end of grade band, students know and are able to do everything required in earlier grades and:</p> <p>E.8.B Students understand characteristics of our solar system that is part of the Milky Way Galaxy.</p>			
E.8.B.1	Students know the universe contains many billions of galaxies, and each galaxy contains many billions of stars. W/L	Student Edition: 399-400	Teacher Wraparound Edition: A 400; CB 399
E.8.B.2	Students know the solar system includes a great variety of planetary moons, asteroids, and comets. I/S	Student Edition: 386-389, 392 <i>Section Wrap-up</i> 392 #4	Teacher Wraparound Edition: CU 389; SB 384

STANDARDS	PAGE REFERENCES
E.8.B.3 Students know characteristics of the planets in our solar system. I/S	Student Edition: 384-389, 392 <i>Design Your Own Experiment</i> 390-391 <i>Skills Review</i> 403 #16, #17, & #20 Teacher Wraparound Edition: A 385; CU 389; VL 388
E.8.B.4 Students know Earth is part of a solar system located within the Milky Way Galaxy. E/S	Student Edition: 384-389, 399 Teacher Wraparound Edition: A 385; CB 399
E.8.B.5 Students know the Sun is many thousands of times closer to Earth than any other star, and billions of times closer than the far end of the Milky Way Galaxy. W/L	Student Edition: 396, 399-400
E.8.B.6 Students know the Sun is a medium-sized star located in the Milky Way Galaxy, part of which can be seen as a glowing band of light spanning the clear night sky. W/L	Student Edition: 397, 399-400 Teacher Wraparound Edition: CB 399
E.8.B.7 Students know regular and predictable motions of Earth around the Sun and the Moon around the Earth explain such phenomena as the day, the year, phases of the Moon, and eclipses. E/S	Student Edition: 378-380, 382-383 <i>Activity</i> 381 <i>Section Wrap-up</i> 383 #1 & #4 <i>Skills Review</i> 403 #18 Teacher Wraparound Edition: A 378; SB 378

STANDARDS	PAGE REFERENCES
<p>Earth's Composition and Structure (Earth and Space Science Unifying Concept C)</p> <p>Earth is composed of materials that move through the biogeochemical cycles. Earth's features are shaped by ongoing and dynamic processes. These processes can be constructive or destructive and occur over geologic time scales.</p>	
<p>By the end of grade band, students know and are able to do everything required in earlier grades and:</p>	
<p>E.8.C Students understand that landforms result from a combination of constructive and destructive processes.</p>	
<p>E.8.C.1 Students know sedimentary rocks and fossils provide evidence for changing environments and the constancy of geologic processes. E/S</p>	<p>Student Edition: 136-138, 420-423, 452-455 <i>Science & Society</i> 424</p> <p>Teacher Wraparound Edition: SJ 131, 138; TC 422</p>
<p>E.8.C.2 Students know rocks at Earth's surface weather, forming sediments that are buried, then compacted, heated and often recrystallized into new rock. E/S</p>	<p>Student Edition: 420-421, 426-428, 430-431 <i>Activity</i> 429 <i>Skills Review</i> 435 #1</p> <p>Teacher Wraparound Edition: A 429; CU 421; D 427</p>
<p>E.8.C.3 Students know Earth is composed of a crust (both continental and oceanic); hot convecting mantle; and a dense, metallic core. E/S</p>	<p>Student Edition: 448-449 <i>Science Journal</i> 455</p> <p>Teacher Wraparound Edition: MM 449; UA 449</p>
<p>E.8.C.4 Students know the very slow movement of large crustal plates result in geological events. E/S</p>	<p>Student Edition: 438-439, 456-461 <i>Section Wrap-up</i> 461 #4</p> <p>Teacher Wraparound Edition: AC 459; CU 460; TS 463</p>
<p>E.8.C.5 Students know how geologic processes account for state and regional topography. E/S</p>	<p>Student Edition: 375, 420-421, 459-460, 480 <i>Science & Society</i> 424-425</p> <p>Teacher Wraparound Edition: AC 254, 421; CU 479</p>

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<p>E.8.C.6 Students know minerals have different properties and different distributions according to how they form. E/S</p>	<p>Student Edition: 406-414 <i>MiniLAB</i> 411 <i>Problem Solving</i> 412 <i>Science Journal</i> 414</p> <p>Teacher Wraparound Edition: A 407; R 413; SJ 410</p>
<p>E.8.C.7 Students know the characteristics, abundances, and location of renewable and nonrenewable resources found in Nevada. E/S</p>	<p>Teacher Wraparound Edition: AC 469; CC 186; CU 182, 471; R 471</p>
<p>E.8.C.8 Students know soils have properties, such as color, texture, and water retention, and provide nutrients for life according to how they form. E/S</p>	<p>Student Edition: 153-154 <i>Design Your Own Experiment</i> 472-473 <i>MiniLAB</i> 154</p> <p>Teacher Wraparound Edition: A 153, 154, 473</p>