Twelfth Grade
Science STAR Standards

Nebraska

Biology

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STANDARDS	PAGE REFERENCES
Science As Inquiry requires students to combine processes and scientific knowledge with scientific reasoning and critical thinking to develop their understanding of science.	
12.2.1 By the end of twelfth grade, students will develop the abilities needed to do scientific inquiry.	
• Formulate questions and identify concepts that guide scientific investigations.	**Student Edition:** 11-14, 16, 18-20 *BioLab: Design Your Own* 23, 173, 533, 567, 593 *National Geographic* 17 *Section Assessment* 21 (#1) **Teacher Wraparound Edition:** CT 18; DC 16; SP 17; WS 20
• Design and conduct scientific investigations.	**Student Edition:** 16, 18-20 *BioLab: Design Your Own* 23, 83, 173, 533, 567, 593, 653, 1035 *Section Assessment* 21 (#5) **Teacher Wraparound Edition:** CT 18

Codes used for Teacher Wraparound Edition pages are the initial caps of headings on that page.

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• Use technology and mathematics to improve investigations and communications.	**Student Edition:** *BioLab* 623, 783, 809, 1011, 1067 *BioLab: Design Your Own* 235 *Investigation and Experimentation* xxxvi, xxxix-xliii **Teacher Wraparound Edition:** CB 20
• Formulate and revise scientific explanations and models using logic and evidence.	**Student Edition:** *BioDiscoveries* 842 *BioLab: Design Your Own* 23, 83, 173, 287, 653 *In the Field* 408 **Teacher Wraparound Edition:** AC 842; DIB 408; WS 435
• Recognize and analyze alternative explanations and models.	**Student Edition:** 402-406, 440-441 *BioDiscoveries* 842 *BioLab: Design Your Own* 23, 83, 173, 287, 653 *In the Field* 408 **Teacher Wraparound Edition:** CB 404; DC 440; DIB 408
• Communicate and defend a scientific argument.	**Student Edition:** *BioLab: Design Your Own* 23, 83, 173, 235, 287, 653, 925 *MiniLab* 77 *Section Assessment* 407 (#6) **Teacher Wraparound Edition:** AC 257; DC 407
Life Science focuses on science facts, concepts, principles, theories, and models that are important for all students to know, understand, and use.	
12.4.1 By the end of twelfth grade, students will develop an understanding of the cell.	
• Investigate and describe the form and function of subcellular structures that regulate cell activities.	**Student Edition:** 186, 193-200 *Data Analysis Lab* 194 *National Geographic* 192 **Teacher Wraparound Edition:** CB 195; CT 194, 196; FA 200; RS 195; WS 193

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• Investigate and describe cell functions (e.g., photosynthesis, respiration, cell division).	**Student Edition:** 201-207, 220, 222-224, 226, 228-233, 246-247, 248, 250-252 *Launch Lab* 243 *MiniLab* 220 *National Geographic* 225, 249 **Teacher Wraparound Edition:** DC 250; RE 233; WS 205
• Investigate and understand that complex multicellular organisms are formed as highly organized arrangements of differentiated cells.	**Student Edition:** 8, 694, 697, 699 **Teacher Wraparound Edition:** DC 698; DE 694; WS 694
12.4.2 By the end of twelfth grade, students will develop an understanding of the molecular basis of heredity.	
• Investigate and describe how DNA carries the genetic code.	**Student Edition:** 171, 330-331, 336-338, 340-341 *MiniLab* 331 *National Geographic* 339 *Section Assessment* 341 (#1) **Teacher Wraparound Edition:** DC 171; DE 330, 339; WS 336
• Investigate and understand that genetic variation occurs when genetic information is transmitted during sexual reproduction.	**Student Edition:** 270-271, 275-276, 283 *Section Assessment* 276 (#5) **Teacher Wraparound Edition:** DC 276; SP 271
• Investigate and explain how some mutations could help, harm or have no effect on individual organisms.	**Student Edition:** 254-255, 345-349, 434 **Teacher Wraparound Edition:** CT 349; DC 347; WS 346
• Investigate and explain how mutations in sex cells, but not in body cells, could be passed on to offspring.	**Student Edition:** 349, 434 **Teacher Wraparound Edition:** CT 349

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12.4.3 By the end of twelfth grade, students will develop an understanding of the theory of biological evolution.	
• Understand that the concept of biological evolution is a theory which explains the consequence of the interactions of: (1) the potential for a species to increase its numbers; (2) the genetic variability of offspring due to mutation and recombination of genes; (3) a finite supply of the resources of life; and (4) the ensuing selection by the environment of those offspring better able to survive and leave offspring.	**Student Edition:** 420, 422, 431-436, 439-441 *BioLab* 443 *Data Analysis Lab* 435 *National Geographic* 421 *Launch Lab* 417 **Teacher Wraparound Edition:** DC 421
• Investigate and use the theory of biological evolution to explain diversity of life.	**Student Edition:** 405-407, 438-440, 495-496, 498 *National Geographic* 497 *Section Assessment* 441 (#3) **Teacher Wraparound Edition:** DC 405; SP 495, 497
• Investigate whether natural selection provides a scientific explanation of the fossil record and the molecular similarities among the diverse species of living organisms.	**Student Edition:** 423-428 *BioLab* 443 *Section Assessment* 430 (#1-#4) **Teacher Wraparound Edition:** MI 423
• Investigate and use biological classifications based on similarities.	**Student Edition:** 484-489, 490-496, 498 *BioLab* 505, 623 *Data Analysis Lab* 494 *Launch Lab* 483 *MiniLab* 488, 500 *National Geographic* 497 **Teacher Wraparound Edition:** DC 493; SP 492
12.4.4 By the end of twelfth grade, students will develop an understanding of the interdependence of organisms.	
• Investigate and understand that atoms and molecules cycle among living and nonliving components of the biosphere.	**Student Edition:** 45-49 **Teacher Wraparound Edition:** DC 46; RS 49; SP 47

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• Investigate and describe the flow of energy through ecosystems, in one direction, from producers to herbivores to carnivores and decomposers.	**Student Edition:** 41-44 *MiniLab* 42 *Section Assessment* 44 (#2) **Teacher Wraparound Edition:** FA 44
• Investigate and cite examples of organisms cooperating and competing in ecosystems.	**Student Edition:** 38-40, 95-96 *BioLab* 107 **Teacher Wraparound Edition:** DC 40; FA 40, 99
• Investigate and understand that interactions among organisms are affected by the conflict between an organism's capacity to produce infinite populations and the finite amount of resources.	**Student Edition:** 94-98 *BioLab* 107 *Data Analysis Lab* 98 *Section Assessment* 99 (#2) **Teacher Wraparound Edition:** DC 94; WS 95, 96
• Investigate and describe how humans modify the ecosystem as a result of population growth, technology, and consumption.	**Student Edition:** 100-105, 123-128 *Biology & Society* 50, 1010 *Section Assessment* 128 (#1) **Teacher Wraparound Edition:** CB 124; SP 127
12.4.5 By the end of twelfth grade, students will develop an understanding of matter, energy, and organization in living systems.	
• Investigate and understand that living systems require a constant input of energy to maintain their chemical and physical organization.	**Student Edition:** 10, 218-221 **Teacher Wraparound Edition:** DC 219
• Investigate and understand that producers use solar energy to combine molecules of carbon dioxide and water into organic compounds.	**Student Edition:** 10, 41, 43, 47, 219, 220, 222-224, 226 *National Geographic* 225 *Section Assessment* 227 (#1) **Teacher Wraparound Edition:** DC 222; FA 227

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• Investigate and explain how distribution and abundance of different organisms in ecosystems are limited by the availability of matter and energy and the ability of the ecosystem to recycle materials.	**Student Edition:** 68-73, 94-95 *Section Assessment* 73 (#6) **Teacher Wraparound Edition:** CT 65; DC 94; RS 72
12.4.6 By the end of twelfth grade, students will develop an understanding of the behavior of organisms.	
• Investigate and describe how nervous systems function in multicellular animals.	**Student Edition:** 711, 728, 739, 747, 768, 796, 826, 837, 855, 865, 886, 962-965, 967, 968-972 *MiniLab* 965 *National Geographic* 966 *Section Assessment* 967 (#1) **Teacher Wraparound Edition:** DC 962, 969; DE 886, 963
• Investigate and describe how organisms respond to internal changes and external stimuli.	**Student Edition:** 9, 908, 910, 912-915, 916-923, 962-965, 967, 968-972, 973-976 *BioLab: Design Your Own* 567, 925, 983 *MiniLab* 975 *Section Assessment* 915 (#2) **Teacher Wraparound Edition:** CB 913; SP 910
• Investigate and explain how the behavioral patterns of organisms have evolved through natural selection.	**Student Edition:** 908-910, 912-915, 916-923 *MiniLab* 912 *National Geographic* 911 *Section Assessment* 915 (#1), 923 (#1) **Teacher Wraparound Edition:** CT 914; DC 909; WS 911
• Investigate and understand that behavioral biology relates to humans since it provides links to psychology, sociology, and anthropology.	The following page references can be incorporated to meet this standard. **Student Edition:** 908-909, 915, 977-981 *Biology & Society* 898 *Careers in Biology* 910, 922 *Section Assessment* 981 (#5) **Teacher Wraparound Edition:** CT 910; WS 910