



**KANSAS**  
**Science Education Standards Eighth Grade**  
*Life's Structure and Function A*  
*From Bacteria to Plants B*  
*Animal Diversity C*  
*Human Body Systems D*  
*Ecology E* © 2005

OBJECTIVES	PAGE REFERENCES
<b>STANDARD 1: SCIENCE AS INQUIRY</b> As a result of activities in grades 5-8, all students will develop the abilities to do scientific inquiry, be able to demonstrate how scientific inquiry is applied, and develop understandings about scientific inquiry.	
<b>Benchmark 1: The students will demonstrate abilities necessary to do the processes of scientific inquiry.</b> <b>Indicators: The students will:</b>	
<b>1.</b> Identify questions that can be answered through scientific investigations.	(A) <i>Lab: Design Your Own Experiment</i> 30-31 (B) <i>Lab: Design Your Own Experiment</i> 114-115 (C) <i>Lab: Design Your Own Experiment</i> 96-97 (D) <i>Lab: Design Your Own Experiment</i> 82-83, 136-137 (E) <i>Lab: Design Your Own Experiment</i> 26-27
<b>2.</b> Design and conduct a scientific investigation.	(A) <i>Lab: Design Your Own Experiment</i> 30-31 (B) <i>Lab: Design Your Own Experiment</i> 114-115 (C) <i>Lab: Design Your Own Experiment</i> 28-29, 96-97 (D) <i>Lab: Design Your Own Experiment</i> 82-83, 136-137 (E) <i>Lab: Design Your Own Experiment</i> 26-27
<b>3.</b> Use appropriate tools, mathematics, technology, and techniques to gather, analyze, and interpret data.	(A) 52 <i>MiniLab</i> 11, 52 <i>Lab</i> 48 <i>Lab: Design Your Own Experiment</i> 58-59, 176-177 (B) <i>Lab: Design Your Own Experiment</i> 114-115 <i>Lab</i> 132 (C) <i>Lab: Design Your Own Experiment</i> 96-97 <i>Lab: Use the Internet</i> 124-125 (D) <i>Lab: Use the Internet</i> 26-27 <i>Lab</i> 189 (E) <i>Lab: Design Your Own Experiment</i> 26-27 <i>Lab</i> 54-55 <i>Lab: Use the Internet</i> 84-85

OBJECTIVES	PAGE REFERENCES
4. Think critically to identify the relationship between evidence and logical conclusions.	(A) <i>Applying Science</i> 13, 159 <i>Lab: Design Your Own Experiment</i> 176-177 (B) <i>Lab: Design Your Own Experiment</i> 114-115 <i>Lab</i> 140-141 (C) <i>Lab: Design Your Own Experiment</i> 96-97 (D) <i>Lab: Design Your Own Experiment</i> 82-83, 196-197 (E) <i>Lab: Design Your Own Experiment</i> 26-27
5. Apply mathematical reasoning to scientific inquiry.	(A) <i>Applying Math</i> 133 <i>Lab</i> 135 <i>Lab: Design Your Own Experiment</i> 176-177 (B) <i>MiniLab</i> 9 <i>Lab: Design Your Own Experiment</i> 114-115 <i>Lab</i> 132 (C) <i>Applying Math</i> 25 <i>Lab: Design Your Own Experiment</i> 96-97 <i>Lab: Use the Internet</i> 124-125 (D) <i>Lab</i> 25, 166-167 <i>MiniLab</i> 96 (E) <i>Lab: Design Your Own Experiment</i> 26-27
6. Communicate scientific procedures and explanations.	(A) <i>Communicating Your Data</i> 31, 89 (B) <i>Communicating Your Data</i> 115, 132 (C) <i>Communicating Your Data</i> 21, 29 (D) <i>Communicating Your Data</i> 25, 127, 167 (E) <i>Communicating Your Data</i> 43 <i>CYD</i> 25, 117
<b>Benchmark 2: The students will apply different kinds of investigations to different kinds of questions.</b> <b>Indicators: The students will:</b>	
1. Differentiate between a qualitative and a quantitative investigation.	*For each investigation, discuss with students whether the data collected are qualitative or quantitative. (A) <i>MiniLab</i> 11 <i>Lab: Design Your Own Experiment</i> 176-177 <i>Science Skill Handbook</i> 190 (B) <i>MiniLab</i> 69, 127 <i>Lab: Design Your Own Experiment</i> 114-115 <i>Lab</i> 140-141 (C) <i>Lab</i> 62-63, 149 <i>Lab: Design Your Own Experiment</i> 96-97 (D) <i>Lab</i> 25, 54-55, 166-167 (E) <i>Lab</i> 25, 54-55 <i>Lab: Design Your Own Experiment</i> 26-27
2. Develop questions and adapt the inquiry process to guide an investigation.	(A) <i>Lab: Design Your Own Experiment</i> 30-31, 176-177 (B) <i>Lab: Design Your Own Experiment</i> 22-23, 114-115 (C) <i>Lab: Design Your Own Experiment</i> 96-97 (D) <i>Lab: Design Your Own Experiment</i> 82-83, 196-197 (E) <i>Lab: Design Your Own Experiment</i> 26-27

OBJECTIVES	PAGE REFERENCES
<b>Benchmark 3: The students will analyze how science advances through new ideas, scientific investigations, skepticism, and examining evidence of varied explanations.</b>	
<b>Indicators: The students will:</b>	
<p>1. After doing an investigation, generate alternative methods of investigation and/or further questions for inquiry.</p>	<p>(A) 11 TFYI 12 AS 147</p> <p>(B) <i>Lab: Design Your Own Experiment</i> 22-23 Lab 140-141</p> <p>(C) <i>Lab</i> 62-63 <i>Lab: Model and Invent</i> 150-151</p> <p>(D) <i>Lab: Design Your Own Experiment</i> 82-83, 196-197</p> <p>(E) <i>Lab</i> 76</p>
<p>2. Determine evidence which supports or contradicts a scientific breakthrough.</p>	<p>(A) 21, 23, 112-113, 156-159 <i>National Geographic</i> 22 DI 21 CC 115 IM 157</p> <p>(B) <i>Lab: Use the Internet</i> 84-85</p> <p>(D) <i>The Nature of Science</i> 2-3 <i>National Geographic</i> 183 DI 3 VKR 183</p> <p>(E) <i>Lab</i> 54-55 PU 54</p>
<p>3. Identify faulty reasoning or conclusions that go beyond evidence and/or are not supported by data.</p>	<p>(A) 9-13 EA 147, 177 <i>Science Skill Handbook</i> 194</p> <p>(B) EA 141</p> <p>(C) EA 63</p> <p>(D) EA 197</p> <p>(E) EA 55</p>
<b>STANDARD 3: LIFE SCIENCE</b>	
<b>As a result of activities in grades 5-8, all students will apply process skills to explore and understand structure and function in living systems, reproduction and heredity, regulation and behavior, populations and ecosystems, and diversity and adaptations of organisms.</b>	
<b>Benchmark 1: The students will model structures of organisms and relate functions to the structures.</b>	
<b>Indicators: The students will:</b>	
<p>1. Relate the structure of cells, organs, tissues, organ systems, and whole organisms to their functions.</p>	<p>(A) 40-47 IM 47</p> <p>(B) 64-65, 74-77 <i>Integrate Health</i> 77 <i>Lab</i> 132 UAA 65</p> <p>(C) 8, 18, 38, 43-45, 48, 58, 85-86</p> <p>(D) 101-103, 119 <i>MiniLab</i> 103 <i>Lab</i> 107</p>

OBJECTIVES	PAGE REFERENCES
2. Compare organisms composed of single cells with organisms that are multi-cellular.	(A) 47, 58 IM 47 (B) 8-9, 32-42, 44-47, 62-63 <i>Lab</i> 43 (C) 14-20, 22-25, 48-49, 85-87
3. Conclude that breakdowns in structure or function of an organism may be caused by disease, damage, heredity or aging.	(D) 23-24, 71-72, 79, 81, 98-100, 105-106, 165 <i>National Geographic</i> 70 <i>Science Online</i> 71
<b>Benchmark 2: The students will understand the role of reproduction and heredity for all living things.</b> <b>Indicators: The students will:</b>	
1. Conclude that reproduction is essential to the continuation of a species.	(A) 19, 106, 156 RC 19 (B) 10, 32, 98-101, 103-113 (C) 8, 19, 79, 117 (D) 151, 157-165 (E) 130-131
2. Differentiate between asexual and sexual reproduction in plants and animals.	(A) 103-104, 106-107 IL 104 (B) 94-97, 98-101, 103-110 <i>MiniLab</i> 95 DIF 95 QD 95 (C) 8, 16, 19, 23, 45, 79, 86, 117 (D) 151, 157
3. Infer that the characteristics of an organism result from heredity and interactions with the environment.	(A) 128-130, 136-138 <i>Science Online</i> 129 <i>MiniLab</i> 138 TTPK 128
4. Understand that hereditary information contained in the genes (part of the chromosomes) of each cell is passed from one generation to the next.	(A) 112, 114-116, 128-130, 132-134, 141-142
<b>Benchmark 3: The students will describe the effects of a changing external environment on the regulation/balance of internal conditions and processes of organisms.</b> <b>Indicators: The students will:</b>	
1. Understand the effects of a change in environmental conditions on behavior of an organism by carrying out a full investigation.	(B) <i>Lab</i> 140-141 (C) <i>MiniLab</i> 138 <i>Lab</i> 149 LD 136 IL 141

OBJECTIVES	PAGE REFERENCES
<p>2. Identify behaviors of an organism that are responses made to internal or environmental stimuli.</p>	<p>(A) 17            (B) <i>Lab</i> 140-141            (C) 134-139, 140-144, 146-148  <i>MiniLab</i> 138  <i>Science Online</i> 146  <i>Lab</i> 149            QD 136            TFYI 139            (D) <i>Explore Activity</i> 117  <i>National Geographic</i> 120  <i>Lab</i> 127</p>
<p>3. Explain that all organisms must be able to maintain and regulate stable internal conditions to survive in a constantly changing external environment.</p>	<p>(A) 17  <i>Science Online</i> 17            UAA 17            (C) <i>MiniLab</i> 81, 116            (D) 22, 69, 101-102, 119, 146  <i>MiniLab</i> 22            QD 149</p>
<p><b>Benchmark 4: The students will identify and relate interactions of populations of organisms within an ecosystem.</b>  <b>Indicators: The students will:</b></p>	
<p>1. Recognize that all populations living together and the physical factors with which they interact compose an ecosystem.</p>	<p>(E) 9-11, 36-42  <i>Lab</i> 76            TFYI 9            DIV 11</p>
<p>2. Classify organisms in a system by the function they serve (producers, consumers, decomposers).</p>	<p>(E) 20-21, 50-51            DIF 51</p>
<p>3. Trace the energy flow from the sun (source) to producers (chemical energy) to other organisms in food webs.</p>	<p>(E) 20-21, 51-53            AC 51            VL 52            DIV 53</p>
<p>4. Relate the limiting factors of biotic and abiotic resources with a species' population growth, decline, and survival.</p>	<p>(E) 12-16  <i>MiniLab</i> 13  <i>National Geographic</i> 18  <i>Lab: Design Your Own Experiment</i> 26-27            AC 15</p>
<p><b>Benchmark 5: The students will observe the diversity of living things and relate their adaptations to their survival or extinction.</b>  <b>Indicators: The students will:</b></p>	
<p>1. Conclude that millions of species of animals, plants, and microorganisms may look dissimilar on the outside but have similarities in internal structures, developmental characteristics, and chemical processes.</p>	<p>(A) 16-20, 53, 72-73, 85, 112, 171            TTPK 16            AC 19            (B) <i>Lab</i> 43, 83  <i>Lab: Model and Invent</i> 52-53            (C) 8-13  <i>Lab: Design Your Own Experiment</i> 28-29            TTPK 8</p>

OBJECTIVES	PAGE REFERENCES
<p>2. Understand that adaptations of organisms – changes in structure, function, or behavior – contribute to biological diversity.</p>	<p>(A) 156, 160-161            (B) <i>Lab</i> 14, 102                  <i>MiniLab</i> 40            (C) 9-13                  <i>Lab</i> 21, 57                  <i>MiniLab</i> 88, 108, 116            (E) 126-129</p>
<p>3. Associate extinction of a species with environmental changes and insufficient adaptive characteristics.</p>	<p>(E) 130-131, 133-136                  <i>National Geographic</i> 132                  <i>MiniLab</i> 133, 135                  SJ 131                  DIV 136</p>
<p><b>STANDARD 5: SCIENCE AND TECHNOLOGY</b>  <b>As a result of activities in grades 5-8, all students will demonstrate abilities of technological design and understandings about science and technology.</b></p>	
<p><b>Benchmark 1: The students will demonstrate abilities of technological design.</b>  <b>Indicators: The students will:</b></p>	
<p>1. Identify appropriate problems for technological design.</p>	<p>(B) <i>Oops! Accidents in Science</i> 86                  LI 86            (C) <i>Lab: Model and Invent</i> 150-151            (D) <i>Oops! Accidents in Science</i> 28                  INV 28            (E) <i>Lab: Model and Invent</i> 116-117</p>
<p>2. Design a solution or product, implement the proposed design, evaluate the product.</p>	<p>(B) <i>Oops! Accidents in Science</i> 86                  LI 86            (C) <i>Lab: Model and Invent</i> 150-151            (D) <i>Oops! Accidents in Science</i> 28                  INV 28            (E) <i>Lab: Model and Invent</i> 116-117</p>
<p>3. Communicate the process of technological design.</p>	<p>(B) <i>Oops! Accidents in Science</i> 86                  DI 86            (D) <i>Oops! Accidents in Science</i> 28                  INV 28            (E) <i>Lab: Model and Invent</i> 116-117                  <i>Communicating Your Data</i> 117                  CYD 117</p>
<p><b>Benchmark 2: The students will develop understandings of the similarities, differences, and relationships in science and technology.</b>  <b>Indicators: The students will:</b></p>	
<p>1. Compare the work of scientists with that of applied scientists and technologists.</p>	<p>(A) 143-145                  <i>The Nature of Science</i> 2-4                  CB 3                  AC 4                  CDIV 144            (B) <i>Oops! Accidents in Science</i> 86                  <i>Time: Science and Society</i> 116                  DI 86            (D) <i>The Nature of Science</i> 2-4                  <i>Oops! Accidents in Science</i> 28                  CB 28</p>

OBJECTIVES	PAGE REFERENCES
2. Evaluate limitations and trade-offs of technological solutions.	(A) 143-145 <i>Integrate Environment</i> 144 CDIV 144 (B) <i>Time: Science and Society</i> 116 DI 116 ITI 116 (D) <i>The Nature of Science</i> 4
3. Identify contributions to science and technology by many people and many cultures.	(A) 23, 24-25, 113, 129, 156-157 <i>Time: Science and History</i> 60 TFYI 11 CDIV 12 (B) <i>Integrate History</i> 64 <i>Oops! Accidents in Science</i> 86 (D) 182 <i>Time: Science and History</i> 84 <i>Integrate Social Studies</i> 182 (E) <i>The Nature of Science</i> 2-5
<b>STANDARD 6: SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES</b> <b>As a result of activities in grades 5-8, all students will apply process skills to explore and develop an understanding of issues of personal health, population, resources and environment, and natural hazards.</b>	
<b>Benchmark 1: The students will make decisions based on scientific understanding of personal health.</b> <b>Indicators: The students will:</b>	
1. Identify individual nutrition, exercise, and rest needs based on science.	(D) 18-19, 36-39 <i>MiniLab</i> 39 <i>Applying Science</i> 40 <i>National Geographic</i> 41 <i>Lab</i> 46 <i>Time: Science and Society</i> 56 SJ 40 AC 45 ITI 56
2. Use a systemic approach to thinking critically about personal health risks and benefits.	(D) 72, 99-100 <i>Problem-Solving Activity</i> 40 <i>National Geographic</i> 41 SJ 42 MAM 44 IL 44 DI 72 LD 98

OBJECTIVES	PAGE REFERENCES
<b>Benchmark 2: The students will understand the impact of human activity on resources and environment.</b>	
<b>Indicators: The students will:</b>	
1. Investigate the effects of human activities on the environment.	(A) 145 <i>Integrate Environment</i> 144 (E) 96, 97, 102-110, 130-131, 133-136 <i>MiniLab</i> 96, 135 <i>National Geographic</i> 132 <i>Time: Science and Society</i> 146 DI 97
2. Base decisions on perceptions of benefits and risks.	(D) 99-100 <i>MiniLab</i> 39 <i>Applying Science</i> 40 SJ 40 IL 44 (E) 96-100, 112-115 DI 97 DIF 99 AS 100
<b>Benchmark 3: The students will understand that natural hazards are dynamic examples of earth processes which cause us to evaluate risks.</b>	
<b>Indicators: The students will:</b>	
1. Evaluate risks and define appropriate actions associated with natural hazards.	See Glencoe's <i>Earth Materials and Processes (F)</i> , <i>The Changing Surface of Earth (G)</i> , and <i>The Air Around You (I)</i> © 2005 (F) <i>Nature of Science</i> 2-5 <i>Integrate Career</i> 113 CD 158 VL 158 AC 160 (G) <i>Section Review</i> 68 #4,5 AC 67 (I) <i>Section Review</i> 51 #4
2. Recognize patterns of internal and external earth processes that may result in natural hazards.	See Glencoe's <i>Earth Materials and Processes (F)</i> , and <i>The Changing Surface of Earth (G)</i> © 2005 (F) <i>Science Online</i> 108 <i>Use the Internet</i> 116-117 CD 111 DI 112 AIL 116 (G) 64-68, 92-95, 100-101
3. Communicate human activities that can cause/contribute to natural hazards.	See Glencoe's <i>The Changing Surface of Earth (G)</i> © 2005 (G) 51 <i>Science Online</i> 51 <i>Section Review</i> 68 #5 <i>Integrate History</i> 77 TF 100

OBJECTIVES	PAGE REFERENCES
<b>STANDARD 7: HISTORY AND NATURE OF SCIENCE</b>	
As a result of activities in grades 5-8, all students will examine and develop an understanding of science as a historical human endeavor.	
<b>Benchmark 1: The students will develop scientific habits of mind.</b>	
<b>Indicators: The students will:</b>	
1. Practice intellectual honesty.	The Labs listed below* can be used to emphasize and develop intellectual honesty when designing and analyzing the results of an experiment. (A) 10-12 *Lab: <i>Design Your Own Experiment</i> 30-31, 176-177 <i>Science Skill Handbook</i> 186, 194 (B) *Lab: <i>Design Your Own Experiment</i> 22-23, 114-115 (C) *Lab: <i>Design Your Own Experiment</i> 96-97 (D) *Lab: <i>Design Your Own Experiment</i> 196-197 (E) *Lab: <i>Design Your Own Experiment</i> 26-27
2. Demonstrate skepticism appropriately.	(A) 9-12 <i>Science Skill Handbook</i> 186, 194 (B) <i>Lab: Use the Internet</i> 84-85
3. Display open-mindedness to new ideas.	(A) 9-12, 143-145 TFYI 12 (B) <i>Time: Science and Society</i> 116 (E) 112-115, 138-143 <i>Time: Science and Society</i> 86
4. Base decisions on evidence.	(A) 9-12 <i>Science Skill Handbook</i> 194 SJ 9 (B) <i>Time: Science and Society</i> 116 DE 116 (D) <i>Applying Science</i> 40
<b>Benchmark 2: The students will research contributions to science throughout history.</b>	
<b>Indicators: The students will:</b>	
1. Recognize that new knowledge leads to new questions and new discoveries.	(A) 9-12, 21, 23, 112-113 <i>National Geographic</i> 22 <i>Science Skill Handbook</i> 194 TFYI 12 (D) <i>Time: Science and History</i> 84
2. Replicate historic experiments to understand principles of science.	(D) <i>National Geographic</i> 183 MAM 182 AC 183 (E) <i>Lab</i> 54-55 PU 54 AS 55

OBJECTIVES	PAGE REFERENCES
3. Relate contributions of men and women to the fields of science.	(A) 23, 24-25, 113, 129, 156-157 <i>Time: Science and History</i> 60 TFYI 11 CDIV 12 (B) <i>Integrate History</i> 64 <i>Oops! Accidents in Science</i> 86 (D) 182 <i>Time: Science and History</i> 84 <i>Integrate Social Studies</i> 182 (E) <i>The Nature of Science</i> 2-5

### Codes Used for TWE Pages

AC	Activity
AS	Assessment
CB	Content Background
CC	Curriculum Connection
CDIV	Cultural Diversity
CYD	Communicating Your Data
DE	Debate
DI	Discussion
DIF	Differentiated Instruction
DIV	Daily Intervention
EA	Error Analysis
IL	Inquiry Lab
IM	Identifying Misconceptions
INV	Invent
ITI	Investigate the Issue
LD	Lab Demonstration
LI	List
MAM	Make a Model
PU	Purpose
QD	Quick Demo
RC	Reading Check
SJ	Science Journal
TFYI	Teacher FYI
TTPK	Tying to Prior Knowledge
UAA	Using an Analogy
VKR	Visualizing Koch's Rules
VL	Visual Learning