

**Mc
Graw
Hill
Education**

**College- and Career Readiness
Standards for Science
Zoology I (Invertebrate)**

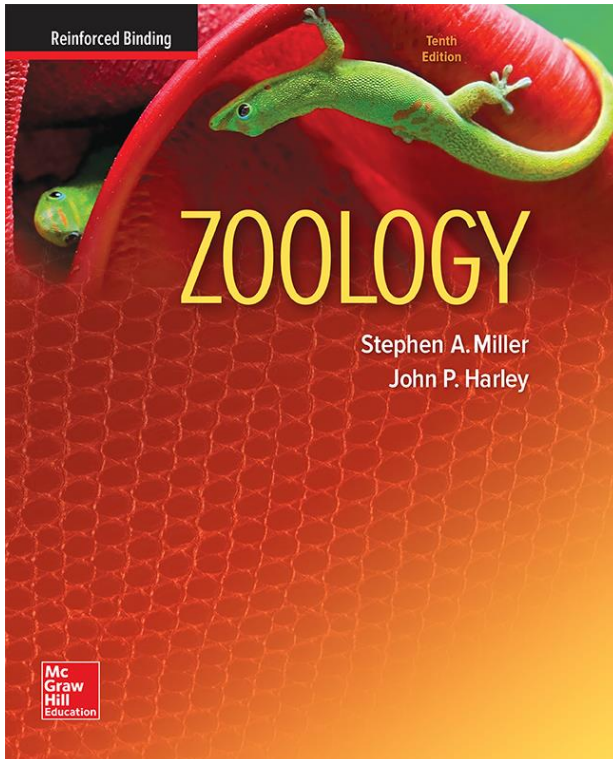


MISSISSIPPI
DEPARTMENT OF
EDUCATION

Ensuring a bright future for every child



Mississippi



ZOOLOGY

© 2016

STANDARDS	PAGE REFERENCES
ZOO.1 Evolution	
ZOO.1 Students will develop a model of evolutionary change over time.	
ZOO.1.1 <i>Develop and use dichotomous keys to distinguish animals from protists, plants, and fungi.</i>	This standard falls outside the scope of <i>Zoology</i> © 2016.
ZOO.1.2 <i>Describe how the fossil record documents the history of life on earth.</i>	Student Edition: 62, 68-69, 70, 90 <i>Evolutionary Insights</i> 125
ZOO.1.3 <i>Recognize that the classification of living organisms is based on their evolutionary history and/or similarities in fossils and living organisms.</i>	Student Edition: 112-113, 114-120 <i>Evolutionary Insights</i> 75-76

STANDARDS	PAGE REFERENCES
<p>ZOO.1.4 Construct cladograms or phylogenetic trees to show the evolutionary branches of an ancestral species and its descendants.</p>	<p>Student Edition: 114-120 <i>Analysis and Application Questions</i> 128 (#4) <i>Evolutionary Insights</i> 75-76 <i>How Do We Know Tree Diagrams Are Accurate?</i> 120</p>
<p>ZOO.1.5 Design models to illustrate the interaction between changing environments and genetic variation in natural selection leading to adaptations in populations and differential success of populations.</p>	<p>The following page references can be used to meet this standard. Student Edition: 64-67, 83-85 <i>Analysis and Application Questions</i> 92 (#5)</p>
<p>ZOO.1.6 Enrichment: Use an engineering design process to develop an artificial habitat to meet the requirements of a population that has been impacted by human activity.*</p>	<p>The following page references can be used to meet this standard. Student Edition: 5-7, 9 <i>Wildlife Alert</i> 8, 55-56, 109, 166-167, 378-379</p>
<p>ZOO.2 Phyla Porifera and Cnidaria</p>	
<p>ZOO.2 Students will understand the structure and function of phylum Porifera and phylum Cnidaria and how each adapts to their environments.</p>	
<p>ZOO.2.1 Differentiate among asymmetry, radial symmetry, and bilateral symmetry in an animal's body plan.</p>	<p>Student Edition: 120-122</p>
<p>ZOO.2.2 Identify the anatomy and physiology of a sponge, including how specialized cells within sponges work cooperatively without forming tissues to capture and digest food.</p>	<p>Student Edition: 151-155 <i>Analysis and Application Questions</i> 171 (#2)</p>
<p>ZOO.2.3 Describe the importance of phylum Porifera in aquatic habitats.</p>	<p>This standard falls outside the scope of <i>Zoology</i> © 2016.</p>
<p>ZOO.2.4 Create a model, either physical or digital, illustrating the anatomy of a sponge, tracing the flow of water.</p>	<p>The following page references can be used to meet this standard. Student Edition: 152-153</p>
<p>ZOO.2.5 Enrichment: Use an engineering design process to determine the quantity of water that may be absorbed per unit in a natural sponge versus a synthetic sponge.*</p>	<p>The following page references can be used to meet this standard. Student Edition: 152-153</p>
<p>ZOO.2.6 Contrast the polyp lifestyle of most Cnidarians with the medusa lifestyle of jellyfish, including how both utilize a single body opening.</p>	<p>Student Edition: 156-165 <i>Analysis and Application Questions</i> 171 (#4)</p>

STANDARDS	PAGE REFERENCES
ZOO.2.7 Describe how nematocysts (stinging cells) of Cnidarians are used for capturing food and for defense.	Student Edition: 156-157
ZOO.2.8 Enrichment: Utilize an engineering design process to create a simulated nematocyst, including possible biomimicry use.*	The following page references can be used to meet this standard. Student Edition: 156-157
ZOO.2.9 Describe the ecological importance of and human impacts on coral reefs.	Student Edition: 163-165 <i>Wildlife Alert</i> 167-168
ZOO.2.10 Create a digital or physical model illustrating the anatomy of a cnidarian, citing similarities and differences between polyps and medusas.	The following page references can be used to meet this standard. Student Edition: 156-165
ZOO.3 Phylum Mollusca	
ZOO.3 Students will understand the structure and function of phylum Mollusca, and how they adapt to their environments.	
ZOO.3.1 Considering the diversity of mollusks, explain how they all share a common body plan (i.e., mantle, visceral mass, and foot).	Student Edition: 198-200
ZOO.3.2 Describe why mollusks are classified as eucoelomates.	The term <i>eucoelomate</i> is not used in this text, but the concept is presented. Student Edition: 197, 198 <i>Analysis and Application Questions</i> 219 (#2)
ZOO.3.3 Explain how the mantle is used in forming the shell.	Student Edition: 199, 200, 204-205
ZOO.3.4 Describe how the radula is used in feeding.	Student Edition: 198, 199-200, 202, 210, 214
ZOO.3.5 Develop a dichotomous key to contrast characteristics of gastropods, bivalves, and cephalopods.	The following page references can be used to meet this standard. Student Edition: 200-213
ZOO.3.6 Examine how the unique characteristics of cephalopods lead to survival.	The following page references can be used to meet this standard. Student Edition: 210, 211-213

STANDARDS	PAGE REFERENCES
ZOO.3.7 Create a model comparing the anatomy of gastropods, bivalves, and cephalopods.	The following page references can be used to meet this standard. Student Edition: 200-213
ZOO.3.8 Enrichment: Use an engineering design process to model the jet propulsion utilized by cephalopods in mechanical design of fluid systems (e.g., improving hydraulic systems).*	The following page references can be used to meet this standard. Student Edition: 210
ZOO.4 Phyla Platyhelminthes, Nematoda, and Annelida	
ZOO.4 Students will describe the evolution of structure and function of phylum Platyhelminthes, phylum Nematoda, and phylum Annelida.	
ZOO.4.1 Define and describe the closed circulatory system of an annelid.	Student Edition: 225-226, 507
ZOO.4.2 Differentiate between parasitic and free living.	Student Edition: 174-185
ZOO.4.3 Compare and contrast the characteristics and lifestyles of flatworms, roundworms, and segmented worms.	Student Edition: 174-185, 222-225, 242-248 <i>Evolutionary Insights</i> 250
ZOO.4.4 Create a model comparing acoelomate, pseudocoelomate, and eucoelomate body plans of Platyhelminthes, Nematoda, and Annelida.	The following page references can be used to meet this standard. Student Edition: 172-176, 223-225, 242-244
ZOO.4.5 Describe the evolutionary importance of the segmented body plans of annelids.	Student Edition: 222-223
ZOO.4.6 Dissect representative taxa, and compare their internal and external anatomy and complexity.	The following page references can be used to meet this standard. Student Edition: 174-185, 222-225, 242-248 <i>Evolutionary Insights</i> 250
ZOO.4.7 Enrichment: Design, conduct, and communicate results of an experiment demonstrating the importance of flatworms, roundworms, and annelids for human use (e.g., the earthworm in agriculture and the leech in medicine).	The following page references can be used to meet this standard. Student Edition: 174-185, 222-225, 242-248
ZOO.4.8 Enrichment: Use an engineering design process to design and construct a system to utilize flatworms, roundworms, or annelids to meet a human need.*	The following page references can be used to meet this standard. Student Edition: 174-185, 222-225, 242-248

STANDARDS	PAGE REFERENCES
ZOO.5 Phylum Arthropoda	
ZOO.5 Students will understand the basic structure and function of phylum Arthropoda, and how they demonstrate the characteristics of living things.	
ZOO.5.1 Describe the evolutionary advantages of segmented bodies, hard exoskeletons, and jointed appendages to arthropods and how they contribute to arthropods being the largest phyla in species diversity and the most geographically diverse.	Student Edition: 255-256, 257-259, 273-274, 440-441, 448 <i>Analysis and Application Questions</i> 272 (#1, #3)
ZOO.5.2 Explain how the exoskeleton is used in locomotion, protection, and development.	Student Edition: 257-259, 440-441 <i>Analysis and Application Questions</i> 272 (#2, #3), 454 (#3)
ZOO.5.3 Enrichment: Use an engineering design process to develop a biomimicry of an arthropod's exoskeleton to meet a human need.*	Student Edition: 257-259, 440-441 <i>Analysis and Application Questions</i> 454 (#4)
ZOO.5.4 Identify organisms and characteristics of chelicerates, crustaceans, and insects.	Student Edition: 261-269, 274-299
ZOO.5.5 Describe the importance of toxins for arachnids, such as spiders and scorpions.	Student Edition: 264, 266, 267
ZOO.5.6 Describe the importance of chela for decapods, such as lobsters and crabs.	Student Edition: 277
ZOO.5.7 Differentiate between complete and incomplete metamorphosis in insects' life cycles.	Student Edition: 260, 291-292 <i>Analysis and Application Questions</i> 300 (#3, #4)
ZOO.5.8 Explain the importance of eusociality in insects, such as ants, bees, and termites.	Student Edition: 292-293, 296 <i>Analysis and Application Questions</i> 300 (#2)
ZOO.5.9 Dissect representative taxa, and compare their internal and external anatomy and complexity.	The following page references can be used to meet this standard. Student Edition: 260-271, 274-299
ZOO.6 Phylum Echinodermata	
ZOO.6 Students will understand the structure and function of phylum Echinodermata, and how they demonstrate the characteristics of living things.	
ZOO.6.1 Recognize that the echinoderms have spines on their skin that are extensions of plates that form from the endoskeleton.	Student Edition: 302, 303, 304
ZOO.6.2 Explain how the starfish inverts its stomach for external digestion of food.	Student Edition: 305

STANDARDS	PAGE REFERENCES
ZOO.6.2 Describe sea urchins' and sea cucumbers' defense structures and behaviors.	Student Edition: 309, 311
ZOO.6.3 Describe the sexual and asexual reproduction of starfish.	Student Edition: 306 <i>How Do We Know About Echinoderm Regeneration?</i> 307
ZOO.6.4 Describe how the water vascular system is used for locomotion, feeding, and gas exchange.	Student Edition: 302, 303-304, 307, 309, 448 <i>Analysis and Application Questions</i> 319 (#2, #3)
ZOO.6.5 Research, analyze, and communicate implications of applying the regeneration of starfish to human medicine.	Student Edition: <i>How Do We Know About Echinoderm Regeneration?</i> 307
ZOO.6.6 Dissect representative taxa and compare their internal and external anatomy and complexity.	The following page references can be used to meet this standard. Student Edition: 302-312 <i>Analysis and Application Questions</i> 319 (#2, #4)
ZOO.6.7 Enrichment: Use an engineering design process to model the water vascular system in hydraulic systems to meet a societal need.*	The following page references can be used to meet this standard. Student Edition: 302, 303-304, 448