

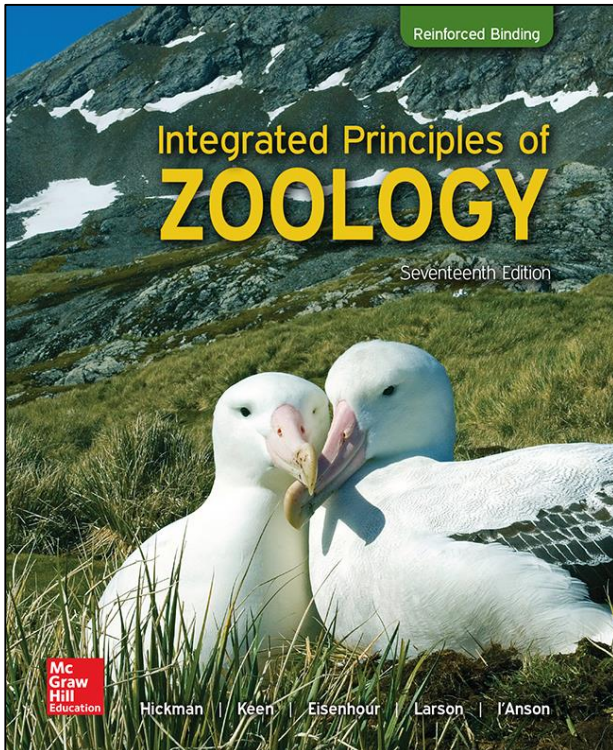


College- and Career Readiness  
Standards for Science  
Zoology II (Vertebrate)



MISSISSIPPI  
DEPARTMENT OF  
EDUCATION

Ensuring a bright future for every child



© 2017

STANDARDS	PAGE REFERENCES
<b>ZOO.1 Evolution</b>	
ZOO.1 Students will develop a model of evolutionary change over time.	
<b>ZOO.1.1</b> Develop and use dichotomous keys to distinguish animals from protists, plants, and fungi.	This standard can be met during teacher/class discussion.
<b>ZOO.1.2</b> Describe how the fossil record documents the history of life on earth.	<b>Student Edition:</b> 103-107, 108, 119, 128
<b>ZOO.1.3</b> Recognize that the classification of living organisms is based on their evolutionary history and/or similarities in fossils and living organisms.	<b>Student Edition:</b> 198-199, 202, 204, 205-210, 213 <i>Phylogenies from DNA Sequences</i> 210-212

STANDARDS	PAGE REFERENCES
<p><b>ZOO.1.4</b> Construct cladograms or phylogenetic trees to show the evolutionary branches of an ancestral species and its descendants.</p>	<p>The following page references can be used to meet this standard.</p> <p><b>Student Edition:</b> 111-112, 205-210, 213 <i>Review Questions</i> 215 (#6-#8), 542 (#9) <i>For Further Thought</i> 215, 496</p>
<p><b>ZOO.1.5</b> 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.</p> <p><b>Student Edition:</b> 119-121, 125, 127-128</p>
<p><b>ZOO.1.6 Enrichment:</b> 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>This standard can be met during teacher/class lab instruction.</p>
<p><b>ZOO.7 Phylum Chordata, Classes Chondrichthyes and Osteichthyes</b></p>	
<p>ZOO.7 Students will understand the structure and function of phylum Chordata, classes Chondrichthyes and Osteichthyes, and how they demonstrate the characteristics of living things.</p>	
<p><b>ZOO.7.1</b> Students will understand why evolutionary changes lead to the diversity of fish and how they have adapted to the different aquatic environments.</p>	<p>Discussion of vertebrate evolutionary change describes evolution of fishes and adaptations prior to dedicated discussion of fish adaptations.</p> <p><b>Student Edition:</b> 506-513, 517, 531-541 <i>Review Questions</i> 542 (#10)</p>
<p><b>ZOO.7.2</b> Compare and contrast the characteristics of class Chondrichthyes and Osteichthyes.</p>	<p><b>Student Edition:</b> 522-530 <i>Review Questions</i> 542 (#7)</p>
<p><b>ZOO.7.3</b> Identify specific fish species and characteristics that differentiate class Chondrichthyes (e.g., sharks, skates, and rays).</p>	<p><b>Student Edition:</b> 522-526</p>
<p><b>ZOO.7.4</b> Describe how the body and jaw design of sharks make them adept predators.</p>	<p><b>Student Edition:</b> 512-513, 522-524, 536 <i>Review Questions</i> 542 (#5)</p>
<p><b>ZOO.7.5</b> Label and describe functions of the anatomical features of the bony fish, including internal organs, lateral line system, operculum, swim bladder, and external fins.</p>	<p><b>Student Edition:</b> 526-530, 533-536 <i>Review Questions</i> 542 (#6, #15, #17)</p>
<p><b>ZOO.7.6</b> Research, analyze, and communicate the effects of urbanization and continued expansion by humans on the biodiversity of fish species (e.g., overfishing and invasive species).</p>	<p>This standard can be met during teacher/class discussion.</p>

STANDARDS	PAGE REFERENCES
<b>ZOO.7.7</b> <i>Dissect representative taxa and compare their internal and external anatomy and complexity.</i>	This standard can be met during teacher/class lab instruction.
<b>ZOO.7.8 Enrichment:</b> <i>Use an engineering design process to design a “balloon fish” that has neutral buoyancy (i.e., does not sink or float). Report which materials were used to create the “fish,” and predict which materials should be added to make the “fish” sink and which materials would make the “fish” float.*</i>	The following page reference can be incorporated into discussion of buoyancy. <b>Student Edition:</b> 533
<b>ZOO.8 Phylum Chordata, Classes Amphibia and Reptilia</b>	
<b>ZOO.8</b> Students will understand the structure and function of phylum Chordata, classes Amphibia and Reptilia, and how they demonstrate the characteristics of living things.	
<b>ZOO.8.1</b> <i>Understand the evolution of tetrapods and the development of the structure and function of body systems and life cycles.</i>	<b>Student Edition:</b> 544-546, 547 <i>Review Questions</i> 560 (#1, #3, #4)
<b>ZOO.8.2</b> <i>Describe the constraints that require amphibians to spend part of their lives in water and part on land, including the morphological and physiological changes as they pass from one stage of their life cycle to the next.</i>	<b>Student Edition:</b> 543, 544, 546, 548, 550-551, 557-559
<b>ZOO.8.3</b> <i>Describe adaptations that have led to reptiles living on land successfully.</i>	<b>Student Edition:</b> 563, 566-567, 569-582 <i>Review Questions</i> 582 (#5)
<b>ZOO.8.4</b> <i>Define what it means to be ectothermic, and identify ways in which reptiles regulate their body temperature.</i>	<b>Student Edition:</b> 571, 573, 673, 674 <i>For Further Thought</i> 678
<b>ZOO.8.5</b> <i>Describe how snakes use chemosensory to locate and track prey.</i>	<b>Student Edition:</b> 575, 736 <i>Review Questions</i> 582 (#12)
<b>ZOO.8.6 Enrichment:</b> <i>Use an engineering design process to model biomimicry of ectothermic temperature regulation or chemosensory detection to meet a societal need.*</i>	The following page references discuss ectothermy and chemosensory detection. <b>Student Edition:</b> 571, 573, 575, 673, 674, 736 <i>Review Questions</i> 582 (#12) <i>For Further Thought</i> 678
<b>ZOO.8.7</b> <i>Compare and contrast living and extinct reptiles.</i>	<b>Student Edition:</b> 568-582 <i>The Mesozoic World of Dinosaurs</i> 578 <i>Taxonomy of Early Amniotes and Living Nonavian Reptiles</i> 580 <i>Review Questions</i> 583 (#19)

STANDARDS	PAGE REFERENCES
<b>ZOO.8.8</b> Explain the importance of tetrapod evolution.	<b>Student Edition:</b> 544-546 <i>Review Questions</i> 560 (#1, #3)
<b>ZOO.8.9</b> Identify the amniotic egg as the major derived characteristic of reptiles.	<b>Student Edition:</b> 563, 566 <i>Review Questions</i> 582 (#1)
<b>ZOO.8.10</b> Dissect representative taxa and compare their internal and external anatomy and complexity.	This standard can be met during teacher/class lab instruction.
<b>ZOO.9 Phylum Chordata, Class Aves</b>	
<b>ZOO.9 Students will understand the structure and function of phylum Chordata, class Aves, and how they demonstrate the characteristics of living things.</b>	
<b>ZOO. 9.1</b> Trace the evolutionary history of modern birds beginning with the theropods. Relate how today's birds have adapted to changing environments.	<b>Student Edition:</b> 585-604 <i>Taxonomy of Early Amniotes and Living Nonavian Reptiles</i> 580 <i>Review Questions</i> 609 (#1, #3, #8, #10)
<b>ZOO. 9.2</b> Describe the fossil evidence that indicates that birds evolved from two-legged dinosaurs called theropods.	<b>Student Edition:</b> 585, 588 <i>Review Questions</i> 609 (#1)
<b>ZOO. 9.3</b> Define the term endothermic, and describe how birds regulate body temperature in extreme environments.	<b>Student Edition:</b> 673-677 <i>Review Questions</i> 678 (#15, #17)
<b>ZOO. 9.4 Enrichment:</b> Use an engineering design process to model biomimicry of endothermic temperature regulation to meet a sustainable need.*	The following page references can be used for a discussion of endothermy. <b>Student Edition:</b> 673-677 <i>Review Questions</i> 678 (#15, #17)
<b>ZOO. 9.5</b> Explain how birds of prey use their keen sense of sight to locate and attack prey.	<b>Student Edition:</b> 595-596
<b>ZOO. 9.6</b> Describe how corvids use their intellect for problem solving and locating food storage.	This standard can be met during teacher/class discussion.
<b>ZOO. 9.7</b> Explain the importance of the evolution of flight and feathers, including the morphological and physiological adaptations needed to sustain flight.	<b>Student Edition:</b> 585, 588-594, 595, 596-599 <i>Review Questions</i> 609 (#2, #4, #5, #6)
<b>ZOO. 9.8 Enrichment:</b> Use an engineering design process to utilize a bird's flight adaptations in the development of a flying aircraft (e.g., glider, plane).*	The following page references can be used with discussion of dynamics of flight in birds. <b>Student Edition:</b> 596-599 <i>Review Questions</i> 609 (#5, #6)

STANDARDS	PAGE REFERENCES
<b>ZOO. 9.9</b> Demonstrate how different adaptations of the bird beak and feet allow them to feed and survive in different environments.	<b>Student Edition:</b> 592, 593, 594
<b>ZOO. 9.10 Enrichment:</b> Based on an understanding of biomimicry, use an engineering design process to develop a tool based on a bird's beak/feet to meet a human need.*	The following page references can be used with a discussion of bird beak/feet. <b>Student Edition:</b> 592, 593, 594
<b>ZOO. 9.11</b> Describe the parenting behavior of different birds in order to incubate their eggs and care for hatchlings.	<b>Student Edition:</b> 603-604 <i>Review Questions</i> 609 (#14)
<b>ZOO. 9.12 Enrichment:</b> Use an engineering design process to design and construct an incubator for hatching abandoned eggs.*	The following page references can be used with a discussion of nesting. <b>Student Edition:</b> 603
<b>ZOO. 9.13</b> Explain the reasons for bird migration and the innate behavior of migratory birds.	<b>Student Edition:</b> 599-601 <i>Review Questions</i> 609 (#8, #9)
<b>ZOO. 9.14</b> Dissect representative taxa and compare their internal and external anatomy and complexity.	This standard can be met during teacher/class lab instruction.
<b>ZOO.10 Phylum Chordata, Class Mammalia</b>	
<b>ZOO.10</b> Students will understand the structure and function of phylum Chordata, class Mammalia, and how they demonstrate the characteristics of living things.	
<b>ZOO 10.1</b> Understand the characteristics and behaviors that distinguish mammals from other phyla, and use characteristics and behaviors to distinguish the major orders, including primates. Explain how human impact has changed the environments of other organisms.	<b>Student Edition:</b> 610-611, 614-621, 624-625, 628 <i>Characteristics of Mammalia</i> 614 <i>Taxonomy of Living Mammalian Orders</i> 633-636 <i>Review Questions</i> 609 (#13, #17, #18)
<b>ZOO 10.2</b> Describe the characteristics of the first true mammal.	<b>Student Edition:</b> 611 <i>Review Questions</i> 637 (#1, #2)
<b>ZOO 10.3</b> Distinguish among monotremes, marsupials, and eutherians, and describe the importance and differences in the placenta in marsupials and eutherians.	<b>Student Edition:</b> 611, 612, 624-625 <i>Review Questions</i> 637 (#13, #17)
<b>ZOO 10.4</b> Describe characteristics that make primates unique, including investigating how the center of gravity relates to the evolution of bipedalism.	<b>Student Edition:</b> 628-630 <i>Taxonomy of Living Mammalian Orders</i> 634 <i>Review Questions</i> 637 (#18)

STANDARDS	PAGE REFERENCES
<b>ZOO 10.5</b> <i>Dissect representative taxa and compare their internal and external anatomy and complexity.</i>	This standard can be met during teacher/class lab instruction.
<b>ZOO 10.6</b> <i>Explain how human impacts have changed the environment of aquatic and terrestrial organisms (e.g., habitat destruction, urbanization, and climate change).</i>	<b>Student Edition:</b> 604-605, 832 <i>For Further Thought</i> 833
<b>ZOO 10.7 Enrichment:</b> <i>Use an engineering design process to develop a possible solution to an environmental issue that currently exists in an ecosystem.*</i>	This standard can be met during teacher/class lab instruction.