

# Biology

## Unit 1: The Scientific Method

2 ½ weeks

Bio 10.1, Bio 10.2, Bio 10.5

### Biblical Worldview Essential Questions How does biology fit into the Creation Mandate?

Objectives	Methods	Resources	Assessments
<ul style="list-style-type: none"><li>• Define truth and recognize the correct source for all truth is the scriptures</li><li>• Identify the steps of the scientific method</li><li>• Identify the attributes that all living organisms share in common</li><li>• Distinguish between a simple compound, stereoscopic, and electron microscope</li><li>• Demonstrate the correct way to use a compound and a stereoscopic microscope</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li><li>• Discussion</li><li>• Brainstorming ideas in groups of 3 or 4 students</li><li>• Video</li><li>• Group lab activity</li><li>• Review game</li></ul>	<ul style="list-style-type: none"><li>• <i>Biology for Christian Schools</i> 4<sup>th</sup> Ed, BJU Press, Ch. 1</li><li>• Video: <i>The Scientific Method</i></li><li>• Lab 1A: The Scientific Method, <i>Biology for Christian Schools Laboratory Manual</i> 4<sup>th</sup> Ed., BJU Press</li><li>• Lab 1B: The Microscope, biology lab manual</li><li>• Posters: The Scientific Method</li></ul>	<ul style="list-style-type: none"><li>• Participation in class discussion</li><li>• Responses to questions found in the textbook</li><li>• Responses to video questions</li><li>• Responses to microscope worksheet</li><li>• Responses to questions in lab manual</li><li>• Responses to review game questions</li><li>• Teacher made test</li></ul>

# Biology

## Unit 2: Cytology

3 ½ weeks

Bio10.4, Bio10.5

### Biblical Worldview Essential Questions

How has God shown Himself within the intricate design of the cell?

Objectives	Methods	Resources	Assessments
<ul style="list-style-type: none"><li>• Trace the history of cytology culminating in the writing of the cell theory</li><li>• List and define the processes carried on by cells</li><li>• Identify cellular organelles and their functions for the cell</li><li>• Distinguish between the three different types of solutions that a cell can live in</li><li>• Identify how a cell compensates for living in a hypotonic and hypertonic solution</li><li>• Describe two forms of passive transport of substances into cells</li><li>• Describe active transport of substances into cells</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li><li>• Discussion</li><li>• Group lab activities</li><li>• Role play</li><li>• Review game</li><li>• Watch video</li></ul>	<ul style="list-style-type: none"><li>• <i>Biology for Christian Schools</i> 4<sup>th</sup> Ed, BJU Press, Ch. 3</li><li>• Lab 3A: Basic Cytology, <i>Biology for Christian Schools Laboratory Manual</i> 4<sup>th</sup> Ed, BJU Press</li><li>• Lab 3B: Cellular Organelles and Processes, biology lab manual</li><li>• Video: <i>The Dissected World of Biology</i>, 1996, Cerebellum Corp.</li><li>• Video: <i>Inside a Cell</i>, Teacher's Video Company</li><li>• Posters: Animal Cell, Plant Cell</li></ul>	<ul style="list-style-type: none"><li>• Participation in class discussion</li><li>• Responses to cellular processes worksheet</li><li>• Responses to questions in lab manual</li><li>• Responses to review game questions</li><li>• Teacher made test</li></ul>

# Biology

## Unit 3: Cell Division

3 weeks

Bio10.1, Bio10.3, Bio10.5

### Biblical Worldview Essential Questions

How has God shown Himself within the intricate process of cell division?

Objectives	Methods	Resources	Assessments
<ul style="list-style-type: none"><li>• Explain the importance of mitosis and meiosis for all living organisms</li><li>• Describe and define a gene</li><li>• Describe the features of DNA</li><li>• Describe the process of the cell cycle</li><li>• Identify a cell's phase of cell cycle by sight</li><li>• Describe the process of meiosis</li><li>• Differentiate between mitosis and meiosis</li><li>• Explain how the structure of DNA shows God's hand in our creation</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li><li>• Discussion</li><li>• Group lab activities</li><li>• Role play</li><li>• Review game</li><li>• Watch video</li></ul>	<ul style="list-style-type: none"><li>• <i>Biology for Christian Schools</i> 4<sup>th</sup> Ed, BJU Press, Ch. 5A</li><li>• Lab 5A: Mitosis and Meiosis, <i>Biology for Christian Schools</i> 4<sup>th</sup> Ed, BJU Press</li><li>• <i>The Biology Project</i>, internet</li><li>• Video: <i>The Dissected World of Biology</i>, 1996, Cerebellum Corp.</li><li>• Nobelprize.org (games, animations)</li></ul>	<ul style="list-style-type: none"><li>• Participation in class discussion</li><li>• Responses to worksheet on DNA structure</li><li>• Responses to worksheet on mitosis</li><li>• Responses to questions in lab manual</li><li>• Responses to review game questions</li><li>• Teacher made test</li></ul>

# Biology

## Unit 4: Genetics

3 ½ weeks

Bio10.1, Bio10.6

### Biblical Worldview Essential Questions

What does the study of genetics tell us about the appearance of Adam and Eve?

What does it tell us about how we should handle race relations today?

Objectives	Methods	Resources	Assessments
<ul style="list-style-type: none"><li>• Explain the contributions of Gregor Mendel to the field of genetics</li><li>• List &amp; explain Mendel's basic conclusions regarding inheritance</li><li>• Define common terminology used by genetics</li><li>• Recognize the inheritance of traits in a genetic cross as being monohybrid, dihybrid, incomplete dominance, sex linked or multiple alleles</li><li>• Explain how an offspring will inherit traits from their parents by using genetic crosses</li><li>• Use a Punnet square to determine the probability of an offspring's characteristics when the parents characteristics are known</li><li>• Identify Adam &amp; Eve's appearance</li><li>• Recognize that God created only one race, we only have different cultures now</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li><li>• Discussion</li><li>• Group practice</li><li>• Individual practice</li><li>• Group lab activity</li><li>• Review game</li></ul>	<ul style="list-style-type: none"><li>• <i>Biology for Christian Schools 4<sup>th</sup> Ed</i>, BJU Press, Ch. 5B</li><li>• Lab 5B: Genetics (Parts I-VI), <i>Biology for Christian Schools Laboratory Manual 4<sup>th</sup> Ed</i>, BJU Press</li><li>• Baby Face Lab</li></ul>	<ul style="list-style-type: none"><li>• Participation in class discussion</li><li>• Responses to genetic crosses worksheets</li><li>• Responses to questions in lab manual</li><li>• Responses to review game questions</li><li>• Teacher made test</li></ul>

# Biology

## Unit 5: Taxonomy

1 ½ weeks

Bio10.1, Bio10.7

### Biblical Worldview Essential Questions

What should a Christian's response be to the taxonomic arrangement biologist have given to organisms?

<b>Objectives</b>	<b>Methods</b>	<b>Resources</b>	<b>Assessments</b>
<ul style="list-style-type: none"><li>• Trace the history of taxonomy from Aristotle to the present</li><li>• List the seven main levels in the current biological classification hierarchy</li><li>• Describe the major characteristics for each of the five kingdoms</li><li>• Describe the problems associated with defining a species and identify the various ideas held by modern taxonomists</li><li>• Classify organisms using a field guide and a taxonomic key</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li><li>• Discussion</li><li>• Group lab activities</li><li>• Review game</li></ul>	<ul style="list-style-type: none"><li>• <i>Biology for Christian Schools</i> 4<sup>th</sup> Ed, BJU Press, Ch. 9</li><li>• Lab 9: The Use of Biological Keys, <i>Biology for Christian Schools Laboratory Manual</i> 4<sup>th</sup> Ed, BJU Press</li></ul>	<ul style="list-style-type: none"><li>• Participation in class discussion</li><li>• Responses to questions in lab manual</li><li>• Responses to review game questions</li><li>• Teacher made test</li></ul>

## Biology

### Unit 6: Bacteria and Viruses

2 ½ weeks

Bio10.1, Bio10.7, Bio10.8, Bio10.9

#### Biblical Worldview Essential Questions

How does the design of our bodies in regards to protecting us from pathogens show that we are “fearfully and wonderfully made”?

Objectives	Methods	Resources	Assessments
<ul style="list-style-type: none"><li>• Describe the unique features, which separates the organisms in Kingdom Monera from the other kingdoms</li><li>• Identify the characteristics of organisms in Kingdom Monera</li><li>• Describe the cellular structure of a bacteria</li><li>• Identify the three shapes of bacteria by sight</li><li>• Identify the ways in which bacteria are useful in our lives</li><li>• Describe the conditions bacteria need for growth and explain how microbiologists use this information to impede growth</li><li>• Describe the physical properties of a virus</li><li>• Describe the lytic cycle of a virus</li><li>• Distinguish between a latent virus, a persistent virus and a transforming virus</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li><li>• Class discussion</li><li>• Watch video</li><li>• Review game</li></ul>	<ul style="list-style-type: none"><li>• <i>Biology for Christian Schools</i> 4<sup>th</sup> Ed, BJU Press, Ch. 10</li><li>• Video: <i>The Odyssey of Life – The Unknown World</i>, 1996, NOVA Adventures in Science</li></ul>	<ul style="list-style-type: none"><li>• Participation in class discussion</li><li>• Responses to bacteria review worksheet</li><li>• Responses to review game questions</li><li>• Teacher made test</li></ul>

<ul style="list-style-type: none"><li>• Explain how bacterial and viral diseases are spread and the means used to prevent that spread</li><li>• Identify and recommend treatment for several complications resulting from bacterial and viral diseases</li><li>• Refute evolution based on the characteristics of Kingdom Monera</li></ul>			
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# Biology

## Unit 7: Kingdom Protista

3 weeks

Bio10.5, Bio10.7, Bio10.8, Bio10.9

### Biblical Worldview Essential Questions

How does the complexity of Kingdom Protista punch holes in the theory of evolution?

Objectives	Methods	Resources	Assessments
<ul style="list-style-type: none"><li>• Describe the unique features, which separates Kingdom Protista from the other kingdoms</li><li>• Classify organisms of Kingdom Protista into the correct subkingdom and the correct phyla</li><li>• Recognize common protozoans by sight</li><li>• Identify and give the functions of the basic structures of the protozoan</li><li>• Describe the various methods of locomotion, reproduction, and food acquisition in the protozoan</li><li>• Explain algae's economic and ecological significance</li><li>• Identify and recommend treatment for several complications resulting from protozoans</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li><li>• Discussion</li><li>• Group lab activities</li><li>• Individual project</li><li>• Review game</li></ul>	<ul style="list-style-type: none"><li>• <i>Biology for Christian Schools</i> 4<sup>th</sup> Ed, BJU Press, Ch. 11</li><li>• Lab 11: Protista, <i>Biology for Christian Schools Laboratory Manual</i> 4<sup>th</sup> Ed, BJU Press</li></ul>	<ul style="list-style-type: none"><li>• Participation in class discussion</li><li>• Responses to protozoan review worksheet</li><li>• Responses to questions in lab manual</li><li>• Construction of a museum exhibit of protozoans and fungi</li><li>• Responses to review game questions</li><li>• Teacher made test</li></ul>

# Biology

## Unit 8: Kingdom Fungi

2 weeks

Bio10.5, Bio10.7, Bio10.8, Bio10.9

### Biblical Worldview Essential Questions

How does the design of fungi display God's handiwork and provision for all of His creation?

Objectives	Methods	Resources	Assessments
<ul style="list-style-type: none"><li>• Describe the unique features which distinguish Kingdom Fungi from the other kingdoms</li><li>• Identify the characteristics of organisms in Kingdom Fungi</li><li>• Classify fungi into the correct phyla of Kingdom Fungi</li><li>• Describe the methods of reproduction and food acquisition in the fungi</li><li>• Describe the gross anatomy and symbiotic relationship of lichen</li><li>• Identify the benefits and problems that fungi are for mankind</li><li>• Identify and recommend treatment for several complications resulting from fungus</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li><li>• Slide show presentation</li><li>• Discussion</li><li>• Group lab activities</li><li>• Individual project</li><li>• Review game</li></ul>	<ul style="list-style-type: none"><li>• <i>Biology for Christian Schools</i> 4<sup>th</sup> Ed, BJU Press, Ch. 12</li><li>• Lab 12: Fungi and Lichens, <i>Biology for Christian Schools Laboratory Manual</i> 4<sup>th</sup> Ed, BJU Press</li><li>• Slides</li><li>• TomVolkFungi.net</li></ul>	<ul style="list-style-type: none"><li>• Participation in class discussion</li><li>• Responses to fungi review worksheet</li><li>• Responses to questions in lab manual</li><li>• Construction of a museum exhibit for protozoans and fungi</li><li>• Responses to review game questions</li><li>• Teacher made test</li></ul>

## Biology

### Unit 9: Invertebrates Part I

2 ½ weeks

Bio10.5, Bio10.7, Bio10.8

#### Biblical Worldview Essential Questions

How does the design of invertebrates show God’s handiwork and provision for all of His creation?

Objectives	Methods	Resources	Assessments
<ul style="list-style-type: none"><li>• Describe the unique features of organisms in Kingdom Animalia which separate them from the other kingdoms</li><li>• Distinguish between the four basic types of behaviors and relate how humans are not animals</li><li>• Explain why humans are not considered a part of the animal kingdom</li><li>• Define common anatomical and symmetry terms</li><li>• Distinguish between invertebrates and vertebrates</li><li>• Classify organisms into Phyla Porifera and Cnidaria using their unique characteristics</li><li>• Classify organisms into the correct classes of Phylum Cnidaria based upon their unique characteristics</li><li>• Describe how the organisms successfully fulfill each of the necessary life processes</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li><li>• Discussion</li><li>• Group lab activities</li><li>• Video</li><li>• Review game</li></ul>	<ul style="list-style-type: none"><li>• <i>Biology for Christian Schools</i> 4<sup>th</sup> Ed, BJU Press, Ch. 15 A &amp; B</li><li>• Lab 15A: Porifera, <i>Biology for Christian Schools Laboratory Manual</i> 4<sup>th</sup> Ed, BJU Press</li><li>• Lab 15B: Cnidaria, biology lab manual</li><li>• Video: NOVA – “City of Coral” 60 minutes</li></ul>	<ul style="list-style-type: none"><li>• Participation in class discussion</li><li>• Responses to sponge and hydra review worksheet</li><li>• Completion of life process chart for the hydra</li><li>• Responses to questions in lab manual</li><li>• Responses to review game questions</li><li>• Teacher made test</li></ul>

# Biology

## Unit 10: Invertebrates Part II

3 weeks

Bio10.5, Bio10.8, Bio10.9

### Biblical Worldview Essential Questions

How does the design of invertebrates show God's handiwork and provision for all of His creation?

<b>Objectives</b>	<b>Methods</b>	<b>Resources</b>	<b>Assessments</b>
<ul style="list-style-type: none"><li>• Classify worms into the correct phyla based upon their unique characteristics</li><li>• Classify organisms of Phylum Mollusca into the correct classes based upon their unique characteristics</li><li>• Classify organisms into Phylum Echinodermata using their unique characteristics</li><li>• Describe how each organism successfully fulfills each of the necessary life processes</li><li>• Identify and recommend treatment for several complications resulting from invertebrates</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li><li>• Discussion</li><li>• Group lab activities</li><li>• Watch video</li><li>• Review game</li></ul>	<ul style="list-style-type: none"><li>• <i>Biology for Christian Schools</i> 4<sup>th</sup> Ed, BJU Press, Ch. 15 C &amp; D</li><li>• Lab 15C: Worms 1: Platyhelminthes and Nematoda, <i>Biology for Christian Schools Laboratory Manual</i> 4<sup>th</sup> Ed, BJU Press</li><li>• Lab 15D: Worms 2: Annelida, biology lab manual</li><li>• Video: <i>The Odyssey of Life – The Unknown World</i>, 1996, NOVA Adventures in Science</li></ul>	<ul style="list-style-type: none"><li>• Participation in class discussion</li><li>• Responses to worm review worksheet</li><li>• Responses to mollusk review worksheet</li><li>• Responses to questions in lab manual</li><li>• Responses to review game questions</li><li>• Teacher made test</li></ul>

# Biology

## Unit 11: Phylum Arthropoda

3 weeks

Bio10.5, Bio10.8, Bio10.9

### Biblical Worldview Essential Questions

How does the design of arthropods show God's handiwork and provision for all of His creation?

Objectives	Methods	Resources	Assessments
<ul style="list-style-type: none"><li>• Classify organisms into Phylum Arthropoda based upon their unique characteristics</li><li>• Classify arthropods into their correct classes based upon their unique characteristics</li><li>• Classify insects into their correct orders based upon their unique characteristics</li><li>• Describe how the organisms successfully fulfill each of the necessary life processes</li><li>• List and describe the advantages and disadvantages of an exoskeleton</li><li>• Discuss the economic importance of insects</li><li>• Describe several methods humans use to control insects</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li><li>• Discussion</li><li>• Group lab activities</li><li>• Individual project</li><li>• Watch video</li><li>• Review game</li></ul>	<ul style="list-style-type: none"><li>• <i>Biology for Christian Schools</i> 4<sup>th</sup> Ed, BJU Press, Ch. 16</li><li>• Lab 16A: Crustaceans, <i>Biology for Christian Schools Laboratory Manual</i> 4<sup>th</sup> Ed, BJU Press</li><li>• Lab 16B: The Grasshopper, biology lab manual</li><li>• Video: <i>Eyewitness – Insect</i>, 1994, Dorling Kindersley, Ltd.</li><li>• Video: <i>The Odyssey of Life – The Unknown World</i>, 1996, NOVA Adventures in Science</li></ul>	<ul style="list-style-type: none"><li>• Participation in class discussion</li><li>• Responses to questions in lab manual</li><li>• Construction of insect poster</li><li>• Responses to review game questions</li><li>• Teacher made test</li></ul>

# Biology

## Unit 12: Phylum Vertebrata

4 weeks

Bio10.5, Bio10.8

### Biblical Worldview Essential Questions

How does the design of vertebrates show God's handiwork and provision for all of His creation?

<b>Objectives</b>	<b>Methods</b>	<b>Resources</b>	<b>Assessments</b>
<ul style="list-style-type: none"><li>• Identify the unique characteristics of animals classified in Phylum Chordata and Subphylum Vertebrata</li><li>• Classify the vertebrates into the correct classes based upon the organism's unique characteristics</li><li>• Classify mammals into their correct orders based upon their unique characteristics</li><li>• Describe how the vertebrates successfully fulfill each of the necessary life processes</li><li>• List and describe the advantages and disadvantages of an endoskeleton</li><li>• List and describe the basic parts of a vertebrate skeleton</li><li>• Distinguish between an ectothermic and an endothermic organism and explain behaviors they will have because of this label</li><li>• Locate organs inside a fetal pig and identify its function for completing one of the pig's life process</li></ul>	<ul style="list-style-type: none"><li>• Lecture</li><li>• Discussion</li><li>• Group lab activities</li><li>• Watch video</li><li>• Individual project</li><li>• Review game</li></ul>	<ul style="list-style-type: none"><li>• Biology for Christian Schools 4<sup>th</sup> Ed, BJU Press, Ch. 17 &amp; 18</li><li>• Pig dissection lab: Photo Manual and Dissection Guide of the Fetal Pig, Avery Publishing Group Inc.</li><li>• Video: Eyewitness – Reptile, 1994, Dorling Kindersley, Ltd.</li><li>• Video: Reptiles and Amphibians, 1989, National Geographic Society</li><li>• Video: Eyewitness – Amphibian, 1994, Dorling Kindersley, Ltd.</li><li>• Video: The Sharks, 1982, National Geographic Society</li></ul>	<ul style="list-style-type: none"><li>• Participation in class discussion</li><li>• Responses to amphibian and reptile worksheet</li><li>• Responses to questions in lab manual</li><li>• Responses to questions on the pig lab worksheet</li><li>• Identification of pig structures during lab quiz</li><li>• Construction of a museum exhibit for the vertebrates</li><li>• Responses to review game questions</li><li>• Teacher made test</li></ul>

