

Curriculum Guide

High School

Biology

Philosophy Statement: Science for the Christian is the study of God's creation. The exploration of the creation should yield a direct appreciation for the creative work of God. All that can be known of God we know through the creation and science is the study of that work. Students will continually be called on to see the divine order of creation and its implications for other subjects and be stirred to think about the work of an infinitely loving, good God who has prepared a place for us to live temporally and eternally.

Course Objectives: This course includes laboratory work, study of specimens, projects, and a thorough understanding of scientific inquiry. Course content encompasses interrelationships of living things, levels of biological organization, cellular biology, biochemistry, genetics, and evolution. Students should be prepared to conduct projects and write a formal lab report. Instruction centers around inquiry based learning that is incorporated into class activities. Learning activities include teacher-lead instruction, group work, student seatwork, project-based learning, and lab exercises with both student-choice and teacher-choice grouping. Students can expect to start each day with a bell ringer assignment followed by learning activities and/or lecture. At times students will work independently from the teacher in order to achieve student autonomy expected of upper school students. Classes are structured to utilize every minute for learning and assessing understanding. Real world application is a daily objective. Higher-level thinking will be incorporated into each lesson as well as use of technology when applicable to increase student achievement. Students are expected to participate in all activities and actively engage and ask questions during teacher-led lectures. Students are also expected to review and study the content covered in class outside of school daily.

Course Materials: It's Not Rocket Science Unit packets, computer to access online assignments and slideshows, experiments

Time Allotment: 45 minutes per day, 1 and ½ hour on block schedule days

Biblical Integration -

"In the beginning, God created the heavens and the earth." - Genesis 1:1

"Since what may be known about God is plain to them, because God has made it plain to them. For since the creation of the world God's invisible qualities—his eternal power and divine nature—have been clearly seen, being understood from what has been made, so that people are without excuse." -Romans 1: 19-20

"And God blessed them. And God said to them, "Be fruitful and multiply and fill the earth and subdue it, and have dominion over the fish of the sea and over the birds of the heavens and over every living thing that moves on the earth." - Genesis 1:28

Course Content:

1st Semester

Week 1: Getting Started

- I can use a Biblical View of science to prove a Creator of the universe.

Week 2: Getting Started

- I can use a Biblical View of science to prove a Creator of the universe.

Week 3: Unit 1 - Biology Basics

- I can review lab safety basics.
- I can apply lab safety and the scientific method.
- I can practice the scientific method.

Week 4: Unit 1 - Biology Basics

- I can prepare for and complete a lab.
- I can analyze lab results
- I can write a lab report.

Week 5: Unit 1 - Biology Basics

- I can research careers in science.
- I can understand the concepts of chemistry through the lens of biology.

Week 6: Unit 1 - Biology Basics

- I can understand the concepts of chemistry through the lens of biology.
- I can observe & predict properties of water.
- I can describe the processes and categories of macromolecules.

Week 7: Unit 1 - Biology Basics

- I can identify and describe the 4 categories of macromolecules
- I can understand the effects macromolecules have on the human body.
- I can comprehend the basics of biology.

Week 8: Unit 1 - Biology Basics

- I can investigate using macromolecules!
- I can recall.

Week 9: Unit 2 - Cells

- I can explain cell theory and identify cell organelles.

Week 10: Unit 2 - Cells

- I can identify cell organelles and their functions.

Week 11: Unit 2 - Cells

- I can identify cell organelles and their functions.
- I can plan an investigation based on homeostasis.

Week 12: Unit 2 - Cells

- I can investigate the response to stimulus and how it supports or intercedes homeostasis.
- I can explore osmosis!

Week 13: Unit 2 - Cells

- I can investigate the properties of osmosis.

Week 14: Unit 2 - Cells

- I can differentiate and explain cell cycles.
- I can make a homeostasis investigation apply to real life through a formal lab report.

Week 15: Unit 2 - Cells

- I can complete a lab report.
- I can identify and describe how the cell cycle works with cancer cells.
- I can explore cell growth in cancer cells and identify how to regulate the cell cycle.

Week 16: Unit 2 - Cells

- I can understand how cancer cells grow.

Week 17: Unit 3 - Energy Flow

- I can simulate an enzyme reaction.

Week 18: Unit 3 - Energy Flow

- I can simulate an enzyme's behavior.
- I can simulate lab reactions and compare them to real enzyme reactions.

Week 19: Cumulative

- I can review for a midterm.

2nd Semester

Week 20: Unit 3 - Energy Flow

- I can explain the function of ATP.

Week 21: Unit 3 - Energy Flow

- I can understand how energy flows through ecosystems

Week 22: Unit 3 - Energy Flow

- I can understand how energy flows through ecosystems

Week 23: Unit 3 - Energy Flow

- I can explain the process of photosynthesis in depth
- I can explain and demonstrate cellular respiration.

Week 24: Unit 3 - Energy Flow

- I can describe the journey of a photon.

Week 25: Unit 3 - Energy Flow

- I can describe the journey of a photon.
- I can recall.

Week 26: Unit 4 - Genetics

- I can explore my understanding of the human genome.

Week 27: Unit 4 - Genetics

- I can understand the structure of DNA.
- I can explain how DNA replicates.

Week 28: Unit 4 - Genetics

- I can describe transcription and translation of genes.
- I can deepen my understanding of the relevance of transcription and translation of genes.

Week 29: Unit 4 - Genetics

- I can decode DNA.
- I can differentiate haploid and diploid cells.
- I can describe meiosis processes.

Week 30: Unit 4 - Genetics

- I can review and recall genetics concepts.

Week 31: Unit 5 - Heredity

- I can understand and apply Mendelian Genetics.

Week 32: Unit 5 - Heredity

- I can practice and apply mendelian genetics.

Week 33: Unit 5 - Heredity

- I can understand complex inheritance.

Week 34: Unit 5 - Heredity

- I can create Punnett squares demonstrating complex inheritance patterns.
- I can understand and describe mutations and pedigrees.
- I can explore information about genetic disorders.

Week 35: Unit 5 - Heredity

- I can explore information about genetic disorders.
- I can research genetic disorders.
- I can create pedigrees.

Week 36: Unit 5 - Heredity

- I can use data to create a pedigree.
- I can identify and explain genetic engineering.

Week 37:Unit 5 - Heredity

- I can reflect on the ethics of biotechnology.
- I can present detailed information on a genetic disorder.

Week 38:Unit 5 - Heredity

- I can review concepts about heredity

Week 39: Cumulative

- I can take a final exam

Areas to Be Evaluated:

*Class work assignments

*Homework assignments

*Quizzes

*Tests

*Projects

*Participation in experiments

*Dissecting