

Equinox Program

Course Title: Biology Honors

Course Description

Biology comes alive in this fast-paced high school honors course, emphasizing the principles that apply to plants and animals. As a supplement to class discussion, text readings, and demonstrations, students spend class time in a laboratory performing experiments and learning methods of scientific investigation. Biology Honors is designed for students who have the ability to accelerate in science. Students must be willing to commit to the intense demands of mastering one year of biology in three weeks. This course prepares students for Human Biology Honors and Advanced Placement Biology.

Honors Biology is a complete high school honors biology course, emphasizing the fundamental principles that apply to the life and development of plants and animals. As a supplement to class discussion, text readings, and demonstrations, students spend about one-third of class time in a university laboratory performing experiments and learning the biologist's method of scientific investigation. The course highlights biotechnology and modern research; topics covered include: genetics, ecology, evolution, and reproduction. Biology Honors is designed for students who have the opportunity to accelerate in science, and have made advance arrangements with their school to replace an academic year course with an equivalent course.

Essential Questions

- How do structural levels from molecules to complex organisms ensure the successful function in all living organisms and systems?
- How does the process of evolution account for the biological change of organisms and the biological diversity of life on earth?
- How does scientific research lead to technological advances that can have both positive and negative impacts on society as a whole?

Outcomes

Upon successful completion of this course, students will:

- Describe the process that controls life cycles on a chemical level.
- Use the scientific method to answer questions and solve problems.
- Think critically and independently.
- Work cooperatively as part of a team.

Instructional Strategies

For the Honors Biology student to be successful in understanding and retaining course information, multiple instructional strategies will be used. The most comprehensive instructional strategy used is that of lab work. Lab work illustrates and reinforces lecture concepts and encourages inquiry based thinking. Other instructional strategies utilized include concept modeling, group discussions, statistical analysis, and small group work.

Along with varying instruction strategies, flexible grouping, tiered assignments, and independent study techniques will be utilized to differentiate instruction to help meet the varied level of student abilities.

Resources and Materials

- **Books**
 - a. Miller & Levine, *Prentice Hall Biology* 2010. ISBN-10: 0133669513
 - b. Course Pack – Lecture Notes
 - c. Course Pack – Labs and Activities
- **Materials**
 - a. Calculator
 - b. Colored Pencils

Student Assessment

- **Pre-Assessment**
Multiple choice exam covering all content areas.
- **CTD Grading Scale**

A+	100-97%	A	96-93%	A-	92-90%
B+	89-87%	B	86-83%	B-	82-80%
C+	79-77%	C	76-73%	C-	72-70%
D+	69-67%	D	66-63%	D-	62-60%
F	below 60%				
- **Breakdown of Final Grade**
Grades are based on a total number of points earned out of a maximum amount possible. Homework, laboratory reports, quizzes, tests and projects all contribute to the total amount of points that a student can earn. The percentage of points earned corresponds to a letter grade as shown above.
- **Post-Assessment**
Multiple choice exam covering all content areas.

Schedule

Date	Topics	In-Class Activities	Assignments and/or Assessment
Monday <u>Tools of Science</u>	<u>Tools of Science</u> <ul style="list-style-type: none"> • Microscope use • Measurement • Graphing • Scientific method • Annotated notes 	Course Pre-Test <u>Labs:</u> Microscopy <u>Activities:</u> <ul style="list-style-type: none"> • How to Form a Hypothesis • Presenting Data • Measurements and Calculations • Lab Techniques • Science and Technology 	Complete Microscopy Lab <u>Complete Activities</u> ALL Tools of Science Activities
Tuesday <u>Basis of Life</u> <i>Chapters 1 & 2</i>	<u>Basis of Life</u> <ul style="list-style-type: none"> • Characteristics of life • Basic chemistry • Macromolecule structure and function 	<u>Labs</u> <ul style="list-style-type: none"> • Temperature and Enzymes • Macromolecule Test <u>Activities</u> <ul style="list-style-type: none"> • Toothpick Enzyme 	<u>Complete Labs</u> <ul style="list-style-type: none"> • Enzyme Lab • Macromolecule Lab <u>Complete Chart</u> <ul style="list-style-type: none"> • Macromolecules <u>Review</u> <ul style="list-style-type: none"> • Test – Chapters 1-2

Date	Topics	In-Class Activities	Assignments and/or Assessment
Wednesday <u>Ecology, Part 1</u> <i>Chapters 3 & 4</i>	<u>Ecology</u> <ul style="list-style-type: none"> • Biomes • Cycles of materials • Food chains 	<u>TEST #1</u> <ul style="list-style-type: none"> • Tools of Science and • Basis of Life <u>Labs</u> <ul style="list-style-type: none"> • Effect of Fertilizer on Algae <u>Activities</u> <ul style="list-style-type: none"> • Local Ecology • Food Chains • Ecological Succession • Biome ID 	<u>Complete Labs</u> <ul style="list-style-type: none"> • Effect of Fertilizer on Algae <u>Complete Activities</u> <ul style="list-style-type: none"> • Local Ecology • Ecological Succession <u>Complete DBQ</u> <ul style="list-style-type: none"> • Eutrophication
Thursday <u>Ecology, Part 2</u> <i>Chapters 5 & 6</i>	<u>Ecology</u> <ul style="list-style-type: none"> • Populations • Environmental concerns 	<u>Labs</u> <ul style="list-style-type: none"> • Growth Cycle of Yeasts • Acid Rain & Seeds <u>Activities</u> <ul style="list-style-type: none"> • Limiting Factors • Zebra Mussels Ecology Article Review 	<u>Complete Labs</u> <ul style="list-style-type: none"> • Yeast Growth • Acid Rain <u>Complete Activities</u> <ul style="list-style-type: none"> • Ecology Review Article
Friday <u>Cells</u> <i>Chapters 7 & 10</i>	<u>Cells</u> <ul style="list-style-type: none"> • Prokaryotic cells • Cell organelles • Membrane structure and function • Mitosis 	<u>Labs</u> <ul style="list-style-type: none"> • Detecting Diffusion • Independent Assortment <u>Activities</u> <ul style="list-style-type: none"> • Class Cell Model • Yarn Mitosis Booklet • Cell Comparisons 	<u>Complete Labs</u> <ul style="list-style-type: none"> • Detecting Diffusion • Independent Assortment <u>Complete DBQ</u> <ul style="list-style-type: none"> • Antibiotics
Monday <u>Photosynthesis & Respiration</u> <i>Chapters 8 & 9</i>	<u>Cellular Processes</u> <ul style="list-style-type: none"> • Photosynthesis • Cellular Respiration 	<u>Labs</u> <ul style="list-style-type: none"> • Photosynthetic Pigments • Fermentation Rates of Sugar 	<u>Complete Labs</u> <ul style="list-style-type: none"> • Pigments • Fermentation <u>Review</u> <ul style="list-style-type: none"> • Test – Chapters 3 - 9
Tuesday <u>Heredity</u> <i>Chapters 11 & 14, Part 1</i>	<u>Genetics</u> <ul style="list-style-type: none"> • Probability • Mendelian inheritance • Meiosis • Genetic Disorders 	<u>TEST #2</u> <ul style="list-style-type: none"> • Ecology, Cells and Photosynthesis and Respiration <u>Activities</u> <ul style="list-style-type: none"> • Genetic Disorder Project Research 	<u>Complete Activities</u> <ul style="list-style-type: none"> • Genetic Disorder • Research Project
Wednesday <u>Heredity</u> <i>Chapters 11 & 14, Part 2</i>	<u>Genetics</u> <ul style="list-style-type: none"> • Probability • Mendelian inheritance • Meiosis • Genetic Disorders 	<u>Labs</u> <ul style="list-style-type: none"> • Modeling Meiosis • DNA Identification <u>Activities</u> <ul style="list-style-type: none"> • Genetic Project Presentations • Genetics/Probability Practice Problems • Karyotypes 	<u>Complete Labs</u> <ul style="list-style-type: none"> • Meiosis • DNA Identification <u>Complete Activities</u> <ul style="list-style-type: none"> • Genetics Problems

Date	Topics	In-Class Activities	Assignments and/or Assessment
Thursday <u>DNA & RNA</u> <i>Chapters 12 & 13</i>	<u>Nucleic Acids</u> <ul style="list-style-type: none"> DNA structure DNA replication RNA structure Transcription RNA processing Translation Gene expression Genetic mutations 	<u>Labs</u> <ul style="list-style-type: none"> Extracting DNA Protein Synthesis <u>Activities</u> <ul style="list-style-type: none"> DNA Cheese Crime Insulin Mutations 	<u>Complete Labs</u> <ul style="list-style-type: none"> DNA Extraction Protein Synthesis <u>Scientific Reading</u> <ul style="list-style-type: none"> “DNA is Not Destiny”
Friday <u>Evolution</u> <i>Chapters 16, 17, 19</i>	<u>Evolution</u> <ul style="list-style-type: none"> Origin of life Natural selection Fossil evidence Hardy-Weinberg 	<u>Labs</u> <ul style="list-style-type: none"> AA Sequencing Index Fossils Investigating Human Fossils <u>Activities</u> <ul style="list-style-type: none"> Who Ate the Beans <u>Video</u> <ul style="list-style-type: none"> Becoming Human 	<u>Complete Labs</u> <ul style="list-style-type: none"> AA Sequencing Index Fossils Human Fossils <u>Review</u> <ul style="list-style-type: none"> Test Chapters 10-19
Monday <u>Classification, Part 1</u> <i>Chapters 18, 25-28</i>	<u>Classification & Diversity</u> <ul style="list-style-type: none"> Classification Invertebrates Vertebrates 	<u>TEST #3</u> <ul style="list-style-type: none"> Heredity, DNA, RNA, Evolution <u>Labs</u> <ul style="list-style-type: none"> Dichotomous Keys <u>Activities</u> <ul style="list-style-type: none"> Cladograms Alien Taxonomy <u>Project</u> <ul style="list-style-type: none"> Zoo Proposal Diversity Project 	<u>Complete Labs</u> <ul style="list-style-type: none"> Dichotomous Keys <u>Complete Project</u> <ul style="list-style-type: none"> Zoo Proposal
Tuesday <u>Classification, Part 2</u> <i>Chapters 18, 25 – 28</i>	<u>Classification and Diversity</u> <ul style="list-style-type: none"> Invertebrates Vertebrates 	<u>Project</u> <ul style="list-style-type: none"> Zoo Proposal Projects and Presentations <u>Labs</u> <ul style="list-style-type: none"> Comparing Invertebrate Body Plans 	<u>Complete Labs</u> <ul style="list-style-type: none"> Body Plans <u>Review</u> <ul style="list-style-type: none"> Test: Chapters 18, 20-28
Wednesday <u>Human Biology, Part 1</u> <i>Chapters 30-35</i>	<u>The Human Body</u> <ul style="list-style-type: none"> Digestive System Respiratory System Circulatory System Excretory System 	<u>TEST #4</u> <ul style="list-style-type: none"> Animal Classification <u>Labs</u> <ul style="list-style-type: none"> Digestion of Dairy Products ABO Blood Typing Cardiac Fitness Test 	<u>Complete Labs</u> <ul style="list-style-type: none"> Digestion Sensory Receptors <u>Complete Activity</u> <ul style="list-style-type: none"> “Brain Caps”
Thursday <u>Human Biology, Part 2</u> <i>Chapters 30-35</i>	<u>The Human Body</u> Skeletal System Muscular System Nervous System Reproductive System	-Course Pre-Test <u>Labs</u> -Comparing Limbs -Sensory Receptors <u>Activities</u> -“Brain Caps”	<u>Review</u> Final Exam Cumulative Focus on Human Body

Date	Topics	In-Class Activities	Assignments and/or Assessment
Friday Final Exam	<i>GOOD</i>	<i>LUCK</i>	<i>!!!</i>

CTD Statement on Third-Party Web Sites

Instructors are required to thoroughly review any third-party web sites they intend to use in their courses for inappropriate content. However, because web content continuously changes, CTD disclaims any responsibility for any of the content contained on third-party web sites used in course materials. If you become aware of anything that may be inappropriate, please notify CTD staff immediately.

SAMPLE