

Biology A Syllabus

Course Description

This course is designed to acquaint students with topics in biology, chemistry of life, cell structure, cells and their environments, photosynthesis and cellular respiration, chromosomes and cell reproduction, meiosis and sexual reproduction, Mendel and heredity, DNA, how proteins are made, gene technology, history of life on earth, Evolution, classification of organisms, populations, ecosystems, biological communities, environments, kingdoms of life, viruses and bacteria, protists, fungi, plants, plant reproduction, plant structure and function, plant growth and development, animals, simple invertebrates, mollusks and annelids, arthropods, echinoderms and invertebrate chordates, vertebrates, fishes and amphibians, reptiles and birds, mammals, animal behavior, human body structure, circulatory and respiratory systems, digestive and excretory systems, body defenses, nervous system, hormones and the endocrine system, reproduction and development. Class activities will include discussion, on-site labs, online lab simulations and other interactive activities, lab reports, and an exploration project. **Prerequisites: Algebra**

Supplementary Textbook

Holt *Biology* (2004) by George Johnson and Peter Raven
Student Text ISBN 003066473X
Enhanced online edition ISBN: 0030371538

Course Methodology

This is a project- and inquiry-based course where you will be allowed to generate knowledge about biology via online readings, synchronous and asynchronous discussion with other students and with the teacher, interaction with online tutorials and animations, participation in online and hands-on inquiry-based simulations and activities, labwork and development of a semester project.

Your teacher will be a guide for the journey, a facilitator, an events planner, and a resource advisor.

Both formal and informal assessments methods will be used in the course. Informal assessment will include an evaluation of the quality and timeliness of participation in class activities. Formal assessment will involve multiple-choice quizzes, lab reports, and written assignments. A final exam will be given at the end of unit 8.

Course Objectives

At the end of Biology A, students will have an understanding of:

- the basic cell biology principles
- genetic principles
- evolution principles
- ecology principles
- diversity

Students will Further Study

- Biology and how it relates to them
- Chemistry of life
- Cell structure
- Cells and their environment
- Photosynthesis and cellular respiration
- Chromosomes and cell reproduction
- Meiosis and sexual reproduction
- Mendel and heredity
- DNA
- How proteins are made
- Gene technology
- History of life on Earth
- Theory of Evolution
- Classification of organisms
- Populations
- Ecosystems
- Biological communities
- Environment
- The kingdoms of life
- Viruses and bacteria
- Protists
- Fungi

Course Outline

Unit	Topics	Activities	Text Chapter (Optional)
1	Principles of Cell Biology	<ul style="list-style-type: none"> • Learning Outcomes • Pre-Assessment: Biology and You • Reading Chapter 1 and Chapter 2 (optional) • Read Cheetah Stories • Read Case of the Missing Mars Water • Read Fast Food Calories and Facts • Interactivity: Cancer Quest 1 • Lecture: Biology and You • Assignment: The Scientific Theory and 	1 and 2

		<ul style="list-style-type: none"> Santa Claus • Methods • Cricket Lab • Discussion • Pre-Assessment: Chemistry of Life • Lecture: Chemistry of Life • Assignment: Smallest Particles • Assignment: Building Blocks • Methods • Lab: Cell Chemistry Enzymes • Discussion Questions • Questions to Ponder: Iguana Chicken of the Trees, Combustion, Weight Loss • Unit Quiz • Project 	
2	Principles of Cell Biology (Continued)	<ul style="list-style-type: none"> • Learning Outcomes • Reading Chapter 3 and Chapter 4 (optional) • Read Antoine van Leeuwenhoek • Read Robert Hooke • Interactivity: Cancer Quest 2 • Lecture: Cell Structure • Cell Structure Presentation • Assignment: Cell Surface Area and Volume • Lab: Microscopy • Lecture: Cells and Their Environment • Cells and Their Environment Presentation • Discussion Questions • Unit Quiz • Project 	3 and 4
3	Principles of Cell Biology (Continued)	<ul style="list-style-type: none"> • Learning Outcomes • Reading: Chapter 5 and Chapter 6 (optional) • Reading: Why Leaves Change Color • Lecture: Photosynthesis and Cellular Respiration • Lecture: Chromosomes and Cell Reproduction • Presentation: Photosynthesis and Cellular Respiration • Presentation: Chromosomes • Video: Mitosis and Meiosis 	5 and 6

		<ul style="list-style-type: none"> • Assignment: Photosynthesis • Lab: Respiration • Assignment: Mitosis and Meiosis • Lab: Regulating the Cell Cycle • Discussion Questions • Unit Quiz • Project 	
4	Principles of Genetics	<ul style="list-style-type: none"> • Learning Outcomes • Reading Chapters 7 - 9 (optional) • Reading Why the Cheetah Lacks Genetic Diversity • Reading: The Life Discoveries of Gregor Mendel • Reading: A Structure for DNA • Reading: DNA in a Blender • Reading: Genetics Weblab • Lecture: Meiosis and Sexual Reproduction • Video: Meiosis • Lecture: Mendel and Heredity • Lecture: DNA: The Genetic Material • Presentation: Asexual and Sexual Reproduction • Presentation: Genes and DNA: Gregor Mendel's Rules of Heredity • Presentation: Genes and DNA • Video: Thread of Life • Video: Viruses, Cell Pirates • Interactivity: DNA Replication • Assignment: Punnet Squares • Lab: Genetics • Assignment: Biotechnology • Lab: DNA • Discussion Questions • Questions to Ponder • Unit Quiz • Project • Midterm 	7 - 9
5	Principles of Genetics (Continued)	<ul style="list-style-type: none"> • Learning Outcomes • Reading: Chapter 10 and Chapter 11 (optional) • Read: Cancer • Read: Onion Roots • Interactivity: Gene Builder Game 	10 and 11

		<ul style="list-style-type: none"> • Lecture: How Proteins Are Made • Lecture: Gene Technology • Video: Where and How Proteins Are Made • Gene Technology Flashcard Interactivity • Interactivity: Manufacturing Proteins • Interactivity: Structure of Proteins • Interactivity: The Genetic Code • Interactivity: Genetic Regulation • Discussion Questions • Unit Quiz • Project 	
6	Principles of Evolution	<ul style="list-style-type: none"> • Learning Outcomes • Reading: Chapters 12 - 14 (optional) • Reading: A Brief History of Life • Reading: Ingredients for Life • Reading: Recipe for Life • Reading: Carl Linnaeus • Reading: NASA Scientists Discover New Microorganism in California • Lecture: History of Life on Earth • Lecture: The Theory of Evolution • Lecture: The Classification of Organisms • Video: Carl Sagan on Evolution • Video: Evolution: Great Transformations • Video: Biological Classifications • Presentation: Darwin's Theory of Propagation of the Species • Presentation: Natural Selection and Adaptation • Presentation: Human Evolution and Darwinian Medicine • Presentation: Introduction to Classification • Presentation: The Five Kingdoms of Life • Assignment: Natural Selection • Assignment and Interactivity: Classifying Life • Lab: Mystery Plant • Questions to Ponder • Unit Quiz 	12 - 14

		<ul style="list-style-type: none"> • Project 	
7	Principles of Ecology	<ul style="list-style-type: none"> • Learning Outcomes • Reading: Chapters 15 - 18 (optional) • Reading: Human Numbers Through Time • Reading: Earth in Peril • Reading: Be a Demographer • Lecture: Populations • Lecture: Ecosystems • Lecture: Biological Communities • Lecture: The Environment • Assignment: Population • Presentation: Introduction to Ecosystems • Presentation: Ecosystems and Biomes • Presentation: Survival in the Sonoran Desert • Presentation: The Rainforest • Presentation: Food Chains • Presentation: The Water Cycle • Presentation: The Carbon Cycle • Presentation: Exploring the Nitrogen Cycle • Presentation: Energy Flow • Presentation: Populations within Ecosystems • Presentation: Predators and Prey of the Serengeti • Presentation: The Human Impact • Film Presentation: The 11th Hour Narrated by Leonardo di Caprio • Video: Biomes • Lab: Create a Food Web • Lab: The Ecosystem Paradox • Discussion Questions • Unit Quiz • Project 	15 - 18
8	Exploring Diversity	<ul style="list-style-type: none"> • Learning Outcomes • Reading: Chapters 19 - 22 (optional) • Reading: Four Corners • Reading: Microbe Mysteries • Lecture: The Kingdoms of Life • Lecture: Viruses and Bacteria 	19 - 22

		<ul style="list-style-type: none"> • Lecture: Protists • Lecture: Fungi • Presentation: Introduction to Classification • Presentation: The Kingdoms of Life • Presentation: How Viruses Work • Presentation: The Littlest Assassins: What Are Viruses? • Presentation: Vaccines and the Treatment of Viruses • Assignment: Virtual Plant Dip • Lab: Making Vaccines • Discussion Questions • Unit Quiz • Project--Turn In Final • Final Exam Part I • Final Exam Part II 	
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Course Expectations

1. Students are expected to review the assigned materials by the assigned due dates.
2. Students are expected to actively participate in all Discussions.
3. All coursework must be typed and submitted in a Word document.
4. Students are expected to turn in quality work which, in addition to meeting content requirements, is grammatically correct and free of spelling errors. (Poor grammar and/or spelling will result in a reduction in the overall grade for the assignment.
5. Each student will prepare a 5 - 10 page term paper on a selected subject approved in collaboration with the instructor.
6. Each student will complete a multiple choice mid-term and final examination.
7. Students are encouraged to challenge the correctness of specific examination questions by stating the question number, the answer they believe is correct and specific reference to justify their answer.
8. Students will be held accountable for all information and materials presented in class.
9. Students are expected to turn in all work on the date it is due.
10. Late work will be accepted only in the case of an emergency and only if an agreement has been made previously with the instructor.
11. Any other late work will be penalized and result in a markdown of the grade for the assignment.
12. Students are expected to familiarize themselves with the National University Virtual High School policies on plagiarism, cheating, and other

academic dishonesty, as well as the penalties as found in the Student Handbook.

13. There are no opportunities for extra credit, making up class work, etc.

14. There are no opportunities for re-examinations.

General Policy

Ethics: Ethical behavior is required of every student. Students are also expected to identify ethical policies and practices relevant to course topics.

Technology: Students are expected to be competent in using word-processing, spreadsheets, and presentation software in this course. Use of the Internet and email is required.

Academic Integrity: Ethical behavior in the classroom is required for every student. Students are also expected to identify ethical policies and practices relevant to course topics.

Diversity: Learning to work with and value diversity is essential in every degree program. Students are required to act respectfully toward other students and instructors throughout the course. Students are also expected to exhibit an appreciation for multinational and gender diversity in the classroom and develop leadership skills and judgment appropriate to such diversity.

Grading Scale

Letter Grade	Percentage Earned
A	90% - 100%
B	80% - 89%
C	70% - 79%
D	60% - 69%
F	59% and lower

NUVHS Expected Schoolwide Learning Results (ESLRs):

It is anticipated that NUVHS students will be:

Engaged Learners

1. Demonstrate self-directed learning skills such as time management, and personal responsibility through the completion of course requirements
2. Develop an understanding of their own preferred learning styles to enhance their overall academic potential
3. Incorporate effective and relevant internet and multimedia resources in their learning process to broaden their knowledge base

Critical Thinkers

1. Effectively analyze and articulate sound opinions on a variety of complex concepts
2. Illustrate a variety of problem-solving strategies that strengthen college preparation and workforce readiness
3. Formulate a framework for applying a variety of technology and internet-based research to enhance information literacy and collaborative thinking

Effective Communicators

1. Demonstrate awareness and sensitivity to tone and voice in multiple forms of communication
2. Express concepts and ideas in a variety of forms
3. Enhance communication skills through the use of media rich or other technology resources

Global Citizens

1. Appreciate the value of diversity
2. Understand the range of local and international issues facing today's global community
3. Demonstrate awareness of the importance of cultural sensitivity and social responsibility in the 21st century