

Carmel High School
Science Department
Honors Biology, Room 34
Mr. Dooner
2019- 2020

*“Equipped with his five senses, man
explores the universe around him and
calls the adventure Science”-- Edwin Hubble*

Honors Biology(NGSS)

UC/CSU: Fulfills D- Life Science requirement

Grades: 9-12

Credits: 10 with weighted GPA

Est. Daily Homework: 30- 45 minutes

Prerequisites: Integrated I with a grade of C or better, concurrent enrollment in Integrated I or higher, or teacher/counselor recommendation

Successful completion: Meets the life science graduation requirement and is a prerequisite for AP Biology, Chemistry, and Physics

OVERVIEW:

Honors Biology is an introductory, college preparatory laboratory science course which meets the standards and expectations of the Next Generation Science Standards (NGSS). The content is rigorous and is presented at an accelerated pace. The main ideas of the course build upon students’ science understanding of disciplinary core ideas, science and engineering practices, and crosscutting concepts from earlier grades. There are four Life Science “disciplinary core ideas” in high school:

- 1) *From Molecules to Organisms: Structures and Processes*
- 2) *Ecosystems: Interactions, Energy, and Dynamics*
- 3) *Heredity: Inheritance and Variation of Traits*
- 4) *Biological Evolution: Unity and Diversity*

As seen in the Course Content section below, these core ideas will serve as the baseline and be augmented with the additional content, skills, and experiences traditionally found in an introductory high school biology course. Throughout the class activities, laboratory experiences, and assessments, emphasis will be placed on the NGSS Science and Engineering Practices. They are:

- 1) Asking Questions and Solving Problems
- 2) Engaging in Argument from Evidence
- 3) Obtaining, Evaluating, and Communicating Information
- 4) Analyzing and Interpreting Data
- 5) Planning and Carrying Out Investigations
- 6) Using Mathematics and Computational Thinking
- 7) Developing and Using Models
- 8) Constructing Explanations and Designing Solutions.

Naturally, the NGSS “Crosscutting Concepts” will be emphasized throughout and serve as a conceptual link between various topics in the course. Those crosscutting concepts are:

- 1) SCALE, PROPORTION, and QUANTITY
- 2) STRUCTURE and FUNCTION
- 3) PATTERNS
- 4) ENERGY and MATTER: FLOWS, CYCLES, and CONSERVATION
- 5) STABILITY and CHANGE
- 6) CAUSE and EFFECT: MECHANISM and EXPLANATION
- 7) SYSTEMS and SYSTEM MODELS

Performance Expectations:

1. *Students can demonstrate that they can use investigations and gather evidence to support explanations of cell function and reproduction.*
2. *Students understand the role of proteins as essential to the work of the cell and living systems.*
3. *Students can use models to explain photosynthesis, respiration, and the cycling of matter and flow of energy in living organisms.*
4. *Students can use mathematical reasoning to demonstrate understanding of fundamental concepts of carrying capacity, factors affecting biodiversity and populations, and the cycling of matter and flow of energy among organisms in an ecosystem.*
5. *Students will demonstrate a conceptual understanding of systems and demonstrate an ability to develop design solutions for reducing the impact of human activities on the environment and maintaining biodiversity.*
6. *Students will be able to ask questions, make and defend a claim, and use concepts of probability to explain the genetic variation in a population. Students can demonstrate understanding of why individuals of the same species vary in how they look, function, and behave. Students can explain the mechanisms of genetic inheritance and describe the environmental and genetic causes of gene mutation and the alteration of gene expression.*
7. *Students can construct explanations for the processes of natural selection and evolution and communicate how multiple lines of evidence support these explanations. Students can evaluate evidence of the conditions that may result in new species and understand the role of genetic variation in natural selection. Students can apply concepts of probability to explain trends in populations as those trends relate to advantageous heritable traits in a specific environment.*

COURSE CONTENT:

Unit One- Scientific Method

- Use of metric system
- Use of microscope
- Dimensional(unit) analysis
- Use of chemical indicators
- Quantitative/Qualitative Measurement and Observation
- Graphing
- Hypothesis Testing and Theory Formation

Unit Two- Biological Chemistry

- Atomic Structure
- Chemical Bonds
- Molecules
- Compounds
- Monomers
- Polymers
- Acids and Bases
- pH
- Carbohydrates
- Lipids
- Proteins
- Nucleic Acids(RNA & DNA)
- Enzymes

Unit Three- Cell Biology

- Cell Theory
- Viruses
- Prokaryotes
- Eukaryotes(Plant and Animal)
- Cell Membranes
- Osmosis and chemiosmotic gradients
- Cell Energy(photosynthesis and cellular respiration)
- Organelle structure and function

Unit Four- Genetics(Meiosis and Fertilization)

- Mitosis
- Meiosis
- Genetic variation in populations
- Mutations
- Random segregation
- Fertilization
- Role of chromosomes in sex determination

Unit Five- Genetics(Mendelian)

- Genetics problems using Punnett Squares(autosomal, sex-linked, simple dominance, codominance, incomplete dominance, and multiple alleles)
- Pedigrees
- Karyotypes

Unit Six- Genetics(Molecular Biology)

- General structure of nucleic acids and proteins
- DNA replication
- Base pairing rules
- Transcription and translation
- Sequencing DNA
- Gene expression

Unit Seven- Genetics(Biotechnology)

- Genetic engineering
- Basic DNA technology(including gel electrophoresis)
- Recombinant DNA
- Plasmids and bacterial transformation

Unit Eight- Evolution(Population Genetics)

- Natural selection
- Allele frequencies
- Hardy Weinberg equilibrium

Unit Nine- Evolution(Speciation)

- Origin of Life and Earth/Geologic Time
- Genetic drift
- Reproductive and geographic isolation
- Fossil evidence and comparative embryology
- DNA and protein sequence comparisons
- Episodic speciation and mass extinctions
- Cladograms and molecular clocks

Unit Ten- Ecology

- Biogeochemical cycles
- Energy pyramids and food webs
- Stability and change in ecosystems
- Human influences and other impacts on ecosystems
- Organismal adaptations to the environment

Unit Eleven- Dissections(time allowing)

TEACHER CONTACT INFORMATION:

I am available to assist students or confer with parents before and after school, during my prep period (1st), and during Office Hours on Thursdays(7:45-8:25 AM).

My e-mail address and telephone number are:

tdooner@carmelunified.org

624-1821 ext 3741

My preferred method of communication is e-mail and I will attempt to respond to your communication within 12 hours.

Safety:

The safety of students and staff is a top priority and all students and their parents are required to read and sign the Flinn Scientific Safety Contract. The contract developed by Flinn is comprehensive in nature and addresses all of the hazardous situations which can occur in a Biology classroom. I will always minimize student exposure to potentially hazardous substances and situations and provide students with a clean, organized, and safe laboratory environment with serviceable equipment. Students are expected to be active participants in creating a safe learning environment.

Textbook:

Miller, Kenneth and Levine, Joseph. Biology. Prentice-Hall Pearson. 2007

CHS Testing Schedule:

The designated testing day for the Science Department is Friday. This does not apply to quizzes, long-term projects, or short(less than 15 minutes) quizzes.

Attendance Policies:

The quantity of material presented in an accelerated introductory biology course makes regular attendance a prerequisite to academic success. All CHS guidelines related to Tardiness and Truancy will be adhered to in this class. When excessive absences/tardies/truancies begin to affect the academic progress of the student or adversely affect the learning environment—parents will be notified and a teacher/student/parent/counselor conference will be arranged to help identify and

remediate the cause of the problem. Makeups for assignment/activities missed due to unexcused absence will be accepted following a teacher/student conference.

Grading:

Formative assessments(homework, class assignments, activities, etc), laboratory activities, and summative assessments(tests, quizzes, and semester exams) will be used to assist in the learning process and provide objective evidence of mastery of the NGSS Standards. Quarter grades will be based on 30%(Lab Activities), 10%(Homework), and 60%(quizzes, tests, and examinations). A minimum of three(3) summative assessments(tests) will be administered each Quarter and the Semester Final will be comprehensive in nature and comprise 20% of the Semester grade.

Semester letter grades will be assigned as follows: 90-100%: A; 80-89%: B; 70-79%: C; 60-69%: D; 59% and below: F.

My School/Moodle:

Students should log on regularly to the Honors Biology Moodle in order to access daily and weekly assignments, answer keys, rubrics, supplementary readings, class notes and study guides, and links to Biology resources.

Extra Credit:

Multiple opportunities to demonstrate mastery of standards will be provided to all students throughout the year. No “extra” credit is available. Your course grade will reflect your mastery of the Content Standards.

I HAVE READ THE COURSE SYLLABUS FOR HONORS BIOLOGY.

Student: _____ **Parent:** _____