Honors Biology Course Syllabus, Fall 2020

Course
Honors Biology

Instructor
Matt Curtis

Contact Information
Please call or email with questions, concerns, or comments. Your involvement and support are important.
East Paulding High School Phone Contact: 770-445-5100

Instructor Email Address mcurtis@paulding.k12.ga.us\

Instructor Webpage: https://www.paulding.k12.ga.us/Page/6561

Class Canvas Page: https://paulding.instructure.com/login/ldap

Office Hours: By appointment.

Curriculum Description as provided by the Georgia Department of Education
This laboratory-based course will focus on instructing students on the research, laboratory, and technical skills needed in the study of Biology. The course will be taught through the process of scientific inquiry, which will require the students to conduct investigative labs that apply biological concepts. Biology is the study of life and will be taught in five major domains: cells, organisms, genetics, ecology and evolution. Each honors student will need to:

- Complete reading and writing assignments based on current science research and concepts.
- Participate in a variety of collaborative activities, discussions and hands-on labs.
- Take the GA Milestone End-of-Course Test to ensure mastery of the Georgia Biology Standards of Excellence.
- Monitor the classroom website on a daily basis.

Textbook Options for Biology:
Biology: Concepts & Connections 9th Ed. (Campbell) *Cost: $145.47 (if damaged/lost)*

Materials
The course text is provided as an in-class resource. Students will have access to an on-line copy of the text free of charge. More information regarding the on-line textbook will be forthcoming. Students are required to have a 3-ring binder specific for this course, as well as paper, pens/pencils, composition book and basic calculator (their math calculator is fine).

Grading Procedures as determined by the Paulding County School System:

Grading Category	Percentage of Final Grade	Description of Grading Category
Summative	71%	Summative assessments may include unit exams, projects, labs, course midterm, and other culminating performance products.
Formative	29%	Formative assessments may include quizzes, projects, labs, oral question/answer, and class/homework assignments.
Informal	0%	Informal scores may include class/homework and general instructional checks.

* Students' grades may be accessed through Infinite Campus, Parent Portal.

Lab Safety
Lab Safety is critical to a science-based classroom. Students are provided a copy of the Flinn Safety Contract and are expected to review and sign off on compliance with lab safety precautions. Parents/Guardians are also expected to review and **sign off** on this document.

School and Classroom Non-Negotiables
General Science Classroom Rules, Code of Conduct, & Attendance Policy are discussed. Students and parents/guardians are expected to review and **sign off** on this document. Rules and procedures specific to Mr. Curtis' class will be addressed on the Honors Biology Rules & Procedures document.

GA Biology Standard of Excellence – "What you are expected to know/understand/be able to do by the end of the course:

SB1. Obtain, evaluate, and communicate information to analyze the nature of the relationships between structures and functions in living cells.

a. Construct an explanation of how cell structures and organelles (including nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome, Golgi, endoplasmic reticulum, vacuoles, ribosomes, and mitochondria) interact as a system to maintain homeostasis.
b. Develop and use models to explain the role of cellular reproduction (including binary fission, mitosis, and meiosis) in maintaining genetic continuity.
c. Construct arguments supported by evidence to relate the structure of macromolecules (carbohydrates, proteins, lipids, and nucleic acids) to their interactions in carrying out cellular processes.
d. Plan and carry out investigations to determine the role of cellular transport (e.g., active, passive, and osmosis) in maintaining homeostasis.
e. Ask questions to investigate and provide explanations about the roles of photosynthesis and respiration in the cycling of matter and flow of energy within the cell (e.g., single-celled alga).

SB2. Obtain, evaluate, and communicate information to analyze how genetic information is expressed in cells.

a. Construct an explanation of how the structures of DNA and RNA lead to the expression of information within the cell via the processes of replication, transcription, and translation.
b. Construct an argument based on evidence to support the claim that inheritable genetic variations may result from:

- new genetic combinations through meiosis (crossing over, nondisjunction);
- non-lethal errors occurring during replication (insertions, deletions, substitutions); and/or
- heritable mutations caused by environmental factors (radiation, chemicals, and viruses).

c. Ask questions to gather and communicate information about the use and ethical considerations of biotechnology in forensics, medicine, and agriculture.

SB3. Obtain, evaluate, and communicate information to analyze how biological traits are passed on to successive generations.

a. Use Mendel's laws (segregation and independent assortment) to ask questions and define problems that explain the role of meiosis in reproductive variability.
b. Use mathematical models to predict and explain patterns of inheritance.
c. Construct an argument to support a claim about the relative advantages and disadvantages of sexual and asexual reproduction.

SB4. Obtain, evaluate, and communicate information to illustrate the organization of interacting systems within single-celled and multi-celled organisms.

a. Construct an argument supported by scientific information to explain patterns in structures and function among clades of organisms, including the origin of eukaryotes by endosymbiosis. Clades should include:
- archaea
- bacteria
- eukaryotes
  - fungi
  - plants
  - animals

b. Analyze and interpret data to develop models (i.e., cladograms and phylogenetic trees) based on patterns of common ancestry and the theory of evolution to determine relationships among major groups of organisms.

c. Construct an argument supported by empirical evidence to compare and contrast the characteristics of viruses and organisms.

SB5. Obtain, evaluate, and communicate information to assess the interdependence of all organisms on one another and their environment.

a. Plan and carry out investigations and analyze data to support explanations about factors affecting biodiversity and populations in ecosystems.

b. Develop and use models to analyze the cycling of matter and flow of energy within ecosystems through the processes of photosynthesis and respiration.
- Arranging components of a food web according to energy flow.
- Comparing the quantity of energy in the steps of an energy pyramid.
- Explaining the need for cycling of major biochemical elements (C, O, N, P, and H).

c. Construct an argument to predict the impact of environmental change on the stability of an ecosystem.

d. Design a solution to reduce the impact of a human activity on the environment.

e. Construct explanations that predict an organism's ability to survive within changing environmental limits (e.g., temperature, pH, drought, fire).

SB6. Obtain, evaluate, and communicate information to assess the theory of evolution.

a. Construct an explanation of how new understandings of Earth's history, the emergence of new species from pre-existing species, and our understanding of genetics have influenced our understanding of biology.

b. Analyze and interpret data to explain patterns in biodiversity that result from speciation.

c. Construct an argument using valid and reliable sources to support the claim that evidence from comparative morphology (analogous vs. homologous structures), embryology, biochemistry (protein sequence) and genetics support the theory that all living organisms are related by way of common descent.

d. Develop and use mathematical models to support explanations of how undirected genetic changes in natural selection and genetic drift have led to changes in populations of organisms.

e. Develop a model to explain the role natural selection plays in causing biological resistance (e.g., pesticides, antibiotic resistance, and influenza vaccines).