



Biology Syllabus
CHS Science Department

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- Google Classroom

CCSD Vision Statement: The Chillicothe City School District will provide tomorrow's leaders with a high quality education by developing high expectations and positive personal relationships among students, staff, and community members.

CCSD Mission Statement: The Chillicothe City School District empowers students to learn, to lead, and to serve.

Course Description and Prerequisite(s) from Course Handbook:

Biology - 311

State Course #: 132230

Prerequisite: Passage of Physical Science (for 10th graders only) / No prerequisite for incoming freshmen

Required option

Grade: 9-10

Graded Conventionally

Credit: 1

Course Description:

This course investigates the composition, diversity, complexity and interconnectedness of life on Earth. Fundamental concepts of heredity and evolution provide a framework through inquiry-based instruction to explore the living world, the physical environment and the interactions within and between them.

Students engage in investigations to understand and explain the behavior of living things in a variety of scenarios that incorporate scientific reasoning, analysis, communication skills and real-world applications. **There is a \$15 lab fee.**

Learning Targets: Defined below for clarity are the Unit Titles, Big Ideas of every Unit taught during this course, and the Essential Questions to be answered to better understand the Big Ideas. A student's ability to grasp and answer the Essential Questions will define whether or not he or she adequately learns and can apply the skills found in Big Ideas. This

will ultimately define whether or not a student scores well on assessments administered for this course.

- **1st Quarter**
 - **Unit I Title: Scientific Inquiry & Biology as A Science**
 - **Big Idea #1:** I can explain that science is a process of inquiry, observation, experimentation, and analysis.
 - *Essential Question #1: How do I use the scientific method to answer a question and design a controlled experiment?*
 - *Essential Question #2: How do I design a controlled experiment to appropriately test a hypothesis?*
 - *Essential Question #3: How do I recognize patterns and trends to draw conclusions given a set of data and experimental conditions?*
 - **Big Idea #2:** I can explain how science and technology are interdependent.
 - *Essential Question #1: How do I explain the difference between science and technology?*
 - *Essential Question #2: How do I apply the interdependence of science and technology to modern culture?*
 - **Unit II Title: Cellular Nature of Life - Structure**
 - **Big Idea #1:** I can explain the differences between different types of cells.
 - *Essential Question #1: How do I compare and contrast prokaryotic and eukaryotic cells?*
 - *Essential Question #2: How do I compare and contrast plant and animal cells?*
 - **Big Idea #2:** I can explain how cells consist of specialized structures called organelles.
 - *Essential Question #1: How do I model cell organelles?*
 - *Essential Question #2: How do I explain the function of cell organelles?*
 - **Big Idea #3:** I can explain the complex structure of the cell membrane, a barrier that separates the cell from its surroundings
 - *Essential Question #1: How do I illustrate the components of the cell membrane and explain their functions?*
 - *Essential Question #2: How can I compare and contrast osmosis and diffusion?*
 - *Essential Question #3: How can I distinguish between active and passive transport?*
- **2nd Quarter**
 - **Unit III Title: Cellular Nature of Life - Function**
 - **Big Idea #1:** I can explain that the essential functions of the four categories of macromolecules.
 - *Essential Question #1: How do I name the four categories of macromolecules and connect them to cellular and life functions?*

- **Big Idea #2:** I can explain how cells function within a narrow range of temperature and pH.
 - *Essential Question #1: How do I describe the structure of the enzyme?*
 - *Essential Question #2: How can I predict the effects of pH and temperature changes on enzyme activity?*
- **Big Idea #3:** I can explain how living things store and release energy using cellular processes.
 - *Essential Question #1: How can I describe how producers convert light energy into chemical energy during the process of photosynthesis?*
 - *Essential Question #2: How can I describe how all organisms release stored energy from food to make cells function?*
 - *Essential Question #3: How can I explain the relationship between the processes of photosynthesis and cellular respiration?*
 - *Essential Question #4: How do I explain how cells store and release energy in the absence of oxygen?*
- **Unit IV Title: Cell Cycle**
 - **Big Idea #1:** I can explain how new cells are created by cell division?
 - *Essential Question #1: How can I explain the events of the cell cycle?*
 - *Essential Question #2: How can I explain the process of mitosis?*
 - *Essential Question #3: How can I describe the process of meiosis?*
 - **Big Idea #2:** I can explain how specific cells in multicellular organisms become differentiated and specialized.
 - *Essential Question #1: How can I identify cells that do not go through cell division?*
 - *Essential Question #2: How can I identify embryonic tissue layers and the structures that arise from them?*
- **MID-TERM EXAM**
- **3rd Quarter**
 - **Unit V Title: Heredity**
 - **Big Idea #1:** I can explain how traits are defined by directions encoded in genes.
 - *Essential Question #1: How can I explain that genes have two, sometimes several, forms called 'alleles'?*
 - **Big Idea #2:** Not all traits are inherited solely by dominant or recessive mechanisms.
 - *Essential Question #1: How can I interpret the results of monohybrid and dihybrid crosses and pedigrees?*
 - *Essential Question #2: How can I interpret the inheritance patterns of epistasis, pleiotropy, and other complex mechanisms?*
 - **Unit VI Title: DNA/RNA**
 - **Big Idea #1:** I can explain how the science of genetics has been advanced through collaboration of many talented individuals.
 - *Essential Question #1: How can I describe the contributions of various scientists to the model of DNA?*

- **Big Idea #2:** I can describe how DNA copies itself to ensure traits are consistently passed on to future generations.
 - *Essential Question #1: How do I explain the DNA replication process?*
 - *Essential Question #2: How do I explain the process of transcription?*
 - *Essential Question #3: How do I explain the process of translation?*
 - *Essential Question #4: How can I tell what happens when DNA gets altered or misread?*
 - **Big Idea #3:** I can explain the technique of separating DNA fragments from one another.
 - *Essential Question #1: How can I explain and interpret the results of gel electrophoresis testing?*
 - **4th Quarter**
 - **Unit VII Title: Diversity and Evolution**
 - **Big Idea #1:** I can explain how evolution (the changes in genes in a population over time) occurs as a result of natural selection through various mechanisms.
 - *Essential Question #1: How can I explain biodiversity by citing the similarities in DNA and RNA amongst organisms?*
 - *Essential Question #2: How do I explain how similarities in DNA help scientists establish an evolutionary classification scheme?*
 - *Essential Question #3: How can I describe sexual selection?*
 - **Big Idea #2:** I can explain how genetic diversity occurs and is organized.
 - *Essential Question #1: How can I describe genetic diversity?*
 - *Essential Question #2: How do I explain how classification systems show morphological similarities and how cladograms show common ancestry of organisms?*
 - *Essential Question #3: What are the categories of Linnaeus' Classification categories?*
 - **Big Idea #3:** I can explain how evolution is the consequence of interactions of several factors.
 - *Essential Question #1: How do I explain the Hardy-Weinberg principles of population genetics?*
 - *Essential Question #2: How can I explain how population growth affects/influences evolution?*
 - *Essential Question #3: How can I explain how earth undergoes geological changes that influence life-forms?*
 - *Essential Question #4: How can I explain the sources of variation of genes in a population?*
 - *Essential Question #5: How can I describe how competition for resources and survival of the fittest influence evolution?*
 - **Unit VIII Title: Ecology**
 - **Big Idea #1:** I can explain how ecology is the study of relationships among organisms and their environments.
 - *Essential Question #1: How can I use food webs and/or food chains to explain the relationships or events within an ecosystem?*

- *Essential Question #2: How do I use food webs, food chains, and/or ecological pyramids to explain that energy flow in ecosystems is unidirectional?*
- *Essential Question #3: How do I explain the relationships that occur between individual organisms?*
- **Big Idea #2:** I can explain how interacting factors in an ecosystem can affect population growth.
 - *Essential Question #1: How can I explain the factors that can affect population growth?*
 - *Essential Question #2: How can I use graphs to evaluate logistic and exponential growth of a population?*
 - *Essential Question #3: How can I mathematically explain carrying capacity and limiting factors of populations and how they can affect homeostasis of the ecosystem?*
- **END OF COURSE EXAM**

Course Materials:

- Google Chromebook
- Colored Pencils

Textbook:

- Biology by Ken Miller and Joe Levine, 2019. Pearson Publishing Company. ISBN-13: 978-0328925124

Electronic Resources:

- Pearson Online

Course Expectations:

- Each student will be expected to keep all papers in the file inside the classroom. This includes graded work and work in progress.
- Students are expected to have materials every day: textbook, paper, notebook, pencil or pen.
- Students will be expected to complete all assignments on time.
- Students will participate in classroom discussion/activities.
- Students will check their individual Progress Book grades regularly.
- **Each student must realize that this is a college preparatory course. In keeping with this philosophy, you are going to have certain expectations in regard to conduct, work ethic, and responsibility. Please be prepared every day to work toward meeting these expectations.**

Grading:

Unit Exams	50%
Assessments (Including: Quizzes, Essays, Labs, and Projects)	30%
Class work/Homework	20%

- Each nine week's grade comprises 20% of a student's final grade.
- The Mid-Term Exam and End of Course Exam each comprise 10% of a student's final grade.

Grading Scale:

The grading scale for Chillicothe High School can be found in the student handbook or online at <http://www.chillicothe.k12.oh.us/1/Content2/studenthandbook>.

Late Work: Late work will be subject to the Board-adopted policy on assignments that are submitted late (to be reviewed in class).

- Regardless of the absence type (excused or unexcused), students will be expected to make up work and be held accountable for learning all material they missed.
- Any student who is absent from school (excused or unexcused) will have one (1) additional day for every day they missed, to make up his/her work for full credit (100%).
- Any student who exceeds the allotted time to turn in an assignment for full credit may still turn in late work for partial credit.
 - Any student who turns in work up to 1 week late must at least be given the opportunity to earn 75% on that assignment.
 - Any student who turns in work between 1 and 2 weeks late must at least be given the opportunity to earn 60% on that assignment.
- The end of the 9 weeks is the cut off point for teachers to accept late work from students for full or partial credit, unless the teacher decides to give the student an incomplete for the 9 weeks due to extenuating circumstances.

Performance Based Section: writing assignments, exams, presentations, and use of technology

One or more of the end of unit exams may be performance-based. According to the Ohio Department of Education, “Performance-based assessments (PBA) provides authentic ways for students to demonstrate and apply their understanding of the content and skills within the standards. The performance-based assessments will provide formative and summative information to inform instructional decision-making and help students move forward on their trajectory of learning.” Some examples of performance-based assessments include, but are not limited to, portfolios, experiments, group projects, demonstrations, essays, and presentations.

CHS Biology Course Syllabus

After you have reviewed the preceding packet of information with your parent(s) or guardian(s), please sign this sheet and return it to me so that I can verify you understand what I expect out of each and every one of my students.

Student Name (please print): _____

Student Signature: _____

Parent/Guardian Name (please print): _____

Parent/Guardian Signature: _____

Date: _____