**Biology I Honors Syllabus- Franklin County High School

Course Title**: Biology I Honors

**Course Description**: This course covers End-of-Course Test curriculum while providing the student with the opportunity to engage in higher-level thinking skills and hands-on laboratory experiences as preparation for the science reasoning portion of the ACT test. This class is the recommended class for students planning to enroll in Biology II/AP Biology, Chemistry Honors and/or Chemistry II Honors.

**Teacher Introduction**: Margaret Bandy Middle Tennessee State University
Major– Biology
Minors– History, Sociology, Secondary Education
Masters-Tennessee State University Administration and Supervision

**State Standards**:

**BIOLOGY I: COURSE OVERVIEW** The academic standards for High School Biology I establish the content knowledge and skills for Tennessee students in order to prepare them for the rigorous levels of higher education and future job markets. The course provides students with a wealth of experiences for both science practices and content knowledge needed in an ever changing world. The academic standards for Biology I are research-based, supported by the National Research Council’s Framework for K-12 Science Education, and establish the core ideas and practices of science and engineering that will prepare students to use scientific thinking to examine and evaluate knowledge encountered throughout their lives.

The Major disciplinary core ideas utilized for Biology I include:

|  |  |
| --- | --- |
| Life Sciences (LS) | Engineering, Technology, and Applications of Science (ETS) |
| From Molecules to Organisms: Structure and Process* Organic Molecules
* DNA structure and function
* Protein Synthesis
* Cellular differentiation and coordinated functions
* Eukaryotic cell cycle
* Membrane Transport
* Photosynthesis and respiration
 | Engineering Design |
| Ecosystems: Interactions, Energy, and Dynamics* Population Dynamics
* Carbon Cycle
* Energy Transfer
* Succession
* Biodiversity and ecosystem stability
 | Links Among Engineering, Technology, Science and Society* Molecular biotechnology applications
* Ethical debates of biotechnology use
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| Heredity: Inheritance and Variation of Traits* Sexual reproduction
* Phenotype determining factors
* Pedigree analysis and predictions
 | Applications of Science |
| Biological Change: Unity and Diversity* Evidence for evolution
* Natural Selection
* Evolutionary processes
* Speciation
* Global biodiversity patterns
* Human activities that impact biodiversity
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Although science is a body of knowledge consisting of theories that explain data, science is also a set of practices that use analysis and argumentation to establish, extend, and refine knowledge. The science and engineering practices are used as a means to learn science by doing science. These practices are not intended to be a sequence of steps nor are they intended to be taught as a separate, introductory unit for the course. By combining content knowledge with skill, students discover how scientific knowledge is acquired and applied to solve problems or advance scientific knowledge further. In addition, there are seven crosscutting concepts that are fundamental to the nature of science and thus stretch across all science disciplines. The Biology I standards have been constructed by explicitly integrating practices and crosscutting concepts, iteratively and in combination, within each core idea to provide students with a well-rounded education in science.

 Tennessee's state mathematics standards are integrated into the science standards, specifically LS3.3. Special attention is given to science literacy through the use of the science and engineering practices. Students are required to gather information from reliable sources to construct evidenced-based arguments. Finally, STEM integration is supported both as a stand-alone disciplinary core idea as well as integrated into the life science core ideas. By the end of high school, it is expected that all students should be able to demonstrate the skills and content knowledge emphasized in the following standards.

**BIO1.LS1: From Molecules to Organisms: Structures and Processes**

1) Compare and contrast existing models, identify patterns, and use structural and functional evidence to analyze the characteristics of life. Engage in argument about the designation of viruses as non-living based on these characteristics.

2) Evaluate comparative models of various cell types with a focus on organic molecules that make up cellular structures.

3) Integrate evidence to develop a structural model of a DNA molecule. Using the model, develop and communicate an explanation for how DNA serves as a template for self-replication and encodes biological information.

4) Demonstrate how DNA sequence information is decoded through transcriptional and translational processes within the cell in order to synthesize proteins. Examine the relationship of structure and function of various types of RNA and the importance of this relationship in these processes.

 5) Research examples that demonstrate the functional variety of proteins and construct an argument based on evidence for the importance of the molecular structure to its function. Plan and carry out a controlled investigation to test predictions about factors, which should cause an effect on the structure and function of a protein.

 6) Create a model for the major events of the eukaryotic cell cycle, including mitosis. Compare and contrast the rates of cell division in various eukaryotic cell types in multicellular organisms.

7) Utilize a model of a cell plasma membrane to compare the various types of cellular transport and test predictions about the movement of molecules into or out of a cell based on the homeostasis of energy and matter in cells.

8) Create a model of photosynthesis demonstrating the net flow of matter and energy into a cell. Use the model to explain energy transfer from light energy into stored chemical energy in the product.

9) Create a model of aerobic respiration demonstrating flow of matter and energy out of a cell. Use the model to explain energy transfer mechanisms. Compare aerobic respiration to alternative processes of glucose metabolism.

**BIO1.LS2: Ecosystems: Interactions, Energy, and Dynamics**

1) Analyze mathematical and/or computational representations of population data that support explanations of factors that affect population size and carrying capacities of populations within an ecosystem. Examine a representative ecosystem and, based on interdependent relationships present, predict population size effects due to a given disturbance.

2) Create a model tracking carbon atoms between inorganic and organic molecules in an ecosystem. Explain human impacts on climate based on this model.

3) Analyze through research the cycling of matter in our biosphere and explain how biogeochemical cycles are critical for ecosystem function.

4) Analyze data demonstrating the decrease in biomass observed in each successive trophic level. Construct an explanation considering the laws of conservation of energy and matter and represent this phenomenon in a mathematical model to describe the transfer of energy and matter between trophic levels.

5) Analyze examples of ecological succession, identifying and explaining the order of events responsible for the formation of a new ecosystem in response to extreme fluctuations in environmental conditions or catastrophic events.

**BIO1.LS3: Heredity: Inheritance and Variation of Traits**

1) Model chromosome progression through meiosis and fertilization in order to argue how the processes of sexual reproduction lead to both genetic similarities and variation in diploid organisms. Compare and contrast the processes of sexual and asexual reproduction, identifying the advantages and disadvantages of each.

 2) Explain how protein formation results in phenotypic variation and discuss how changes in DNA can lead to somatic or germ line mutations.

3) Through pedigree analysis, identify patterns of trait inheritance to predict family member genotypes. Use mathematical thinking to predict the likelihood of various types of trait transmission.

**BIO1.LS4: Biological Change: Unity and Diversity**

1) Evaluate scientific data collected from analysis of molecular sequences, fossil records, biogeography, and embryology. Identify chronological patterns of change and communicate that biological evolution is supported by multiple lines of empirical evidence that identify similarities inherited from a common ancestor (homologies).

2) Using a model that demonstrates the change in allele frequencies resulting in evolution of a population over many generations, identify causative agents of change.

3) Identify ecosystem services and assess the role of biodiversity in support of these services. Analyze the role human activities have on disruption of these services.

 **BIO1.ETS2: Links among Engineering, Technology, Science, and Society**

1) Obtain, evaluate, and communicate information on how molecular biotechnology may be used in a variety of fields.

 2) Investigate the means by which karyotypes are utilized in diagnostic medicine.

3) Analyze scientific and ethical arguments to support the pros and cons of application of a specific biotechnology technique such as stem cell usage, in vitro fertilization, or genetically modified organisms.

**Assessment Types:**  May include the following: announced quizzes, surprise quizzes, tests, quarterly exams, EOC exam, lab process, lab write-ups, journals, and projects. On a daily basis, students should prepare as if they expect a surprise quiz over either the material just covered or the next lesson before it is covered in class.

**Class requirements**1. A lab fee is required ($10.00).
2. A notebook is required (Composition size).
3. Students are responsible for completing all assignments.

4. Students are expected to follow all school rules and class rules (as listed below).

5. Students are expected to follow all lab safety rules. (see attachment).

**Class rules**
1. Please be considerate of the other students in class.
2. Be prepared to work the entire class period.
3. No food or drink is allowed in lab area. You may eat and drink at tables in center of room as long as classroom is cleaned at end of class.
4. Do not enter storage room unless asked to do so.
5. Clean work area and equipment before leaving class. Fourth block students should put chairs on the table.
6. When the bell rings to dismiss class you should be seated in your assigned seat. The teacher dismisses class.

**Consequences for failure to follow class rules and/or requirements:**
1. Conference with teacher.
2. Parents will be called if unacceptable behavior continues and may be asked to come to the
school to discuss problems in class.
3. Students with a pattern of disruptive behavior and/or failure to complete homework and
class assignments may be asked to report to the Assistant Principal for counseling and/or punishment.

**Grading system:** Points shall be awarded for homework, cooperative leaning (group work), quizzes, tests, exams, and participation. Points earned shall be divided by points possible and then multiplied by 100 for each grading period.
Daily work (includes quizzes, homework, chapter tests, journals, labs notebook)
Cumulative quarter tests or EOC test

**Point Sheet:** Student SHOULD keep a point sheet in the back of his/her notebook. All grades should be recorded on the point sheet as they are returned. STUDENTS ARE RESPONSIBLE FOR RECORDING, CHECKING GRADES AGAINST SKYWARD GRADES AND KNOWING IF THEY ARE MISSING ASSIGNMENTS.

EXAMPLE OF POINT SHEET:

|  |  |  |
| --- | --- | --- |
|  Title of assignment |  Points earned |  Points possible |
| Quiz Chapter 1 | 9       | 10 |
| Worksheet Chapter 1     | 45 | 50 |
| Drawing Microscope | 15 | 20 |
| Test Chapter 1 | 80 | 100 |
| Questions Chapter 2 | 34 | 35 |
| Notebook | 98 | 100 |
| Total Points | 281 | 315 |

**How to determine your report card grade:**
1. Divide your total points earned by the total points possible.
        281 / 315 = .89
Then multiple this number by 100
       .89 x 100=89

Honors students would add 3 points to the average above.

**Standardized Testing Preparation:** Although I do not believe that a standardized test is a good measurement of your biology knowledge, the state mandated End of Course Standardized Test is one fourth of your grade for the final grading period and; therefore, a significant portion of this class will be directed toward the EOC test.

**Materials: REQUIRED:** Chrome book, composition notebook, pencil or ink pen, notebook paper
**HELPFUL TO HAVE:** dry erase pens, calculator, and your own colored pencils (if you are picky)
I provide the above supplies, however, some students prefer to have their own.

**Make-up:** It is the responsibility of the student to manage his or her make-up work. You must get the assignments, take the make-up tests etc. Do not expect me to automatically inform you of missed assignments and schedule your make-up work. You will be expected to use the Google Classroom website and other tools to avoid falling behind.

**Textbook:** The textbook for Biology I is an online tech-book for Discovery Education:

<http://www.discoveryeducation.com/>

Students access the tech-book through their school Google account. They can access the tech-book by using the Classlink tab on their chrome book and then clicking on Discovery Education Link. Through Classlink, they can also access Study Island, and USA Test Prep.

**Contact Information:** FCHS phone 967-2821; e-mail: Margaret.bandy@fcstn.net;

**This syllabus is a tentative outline of this course and may be changed as deemed necessary by the instructor.**