

## Biology I Honors: Course Syllabus 2017-2018

**Instructor:** Lee Pearson      **Email:** [lvpearso@volusia.k12.fl.us](mailto:lvpearso@volusia.k12.fl.us)      **Room** 15-105

**Textbook(s):** Biology by Stephen Nowicki, Holt McDougal Publishers. An interactive workbook to accompany the text will also be supplied (class set).

### *Course Description*

The 9<sup>th</sup> grade course in Honors Biology is designed to help students understand the basic units in biology, including genetics, cellular structure and organization, DNA as the basic unit of heredity, taxonomic organization of life, interaction with the environment, six kingdoms, and evolution. Laboratory and fieldwork are used to introduce and develop these topics within a context of experiential learning.

### Course Objectives:

The objectives of the course are aligned with the topics found in the Biology curriculum map for Volusia County schools. At the end of the course, students must take the End-of-Course exam which will be administered before the end of the spring semester of 2017. This exam will count as 30% as the final grade for the course.

*Material Covered:* Material covered will follow the timeline provided in the Volusia County curriculum map as closely as possible. The approximate timeline is found later in this syllabus.

*Student Requirements:* A three (3) ring binder, paper, pencils and/or pens (blue or black ink) and two paper folder with tabs inside.

*Grading Procedures:* The county grading scale will be used. Summative grades will count as 60% of the course grade, and formative grades will count as 40% of the course grade. There will be seven district assessments (DIA) during the school year, which are written at the county level. They will be counted as summative grades. They are designed to assess student knowledge for the EOC exam. Summative assessments may also include exams, quizzes, lab reports, projects, etc. Formative assessments include daily assignments, daily activities and labs, worksheets or notebook assignments. The EOC exam must be passed for the student to obtain the Superintendent's Diploma of Distinction. Biology must be passed for the student to graduate.

*Late Work:* Work assigned must be turned in on time on the due date. If one day late, it will be accepted for 50% of the grade. After that, a grade of zero will be assigned.

*Make-up Policy:* Make-up work will be given for absences, with one day to complete the work for each day missed. It is the sole responsibility of the student to get the assignment from the teacher and return the completed work within the time guideline. Most missed assignments can be found under the "narrative" tab on Gradebook. It is the responsibility of the student to check Gradebook for missed assignments by looking under this tab if they were absent. *Long standing due dates on*

*assignments such as tests, projects, etc. are not included in this time frame due to the fact that these assignments are announced in advance. They are due on the day you return to school. This includes exams and exam dates that were made known days in advance.*

*Testing Policy:* Test dates are given approximately one week in advance. If a student is absent the day before a scheduled test and returns on the test day, the student will take the test on that day, provided no new content has been presented. If a student misses the day of the test, the test must be made upon the student's return. If a student is tardy swept on the day of an exam, the exam must be made up before the end of that school day. It is the student's responsibility to arrange the time and day of the makeup test with the teacher. During each 9-week grading period, students will have the opportunity to retake one summative assessment.

*Tutoring:* I am available for additional help at lunch and after school, but must be given advance notice that this is needed. Before the EOC exam is given in May, tutoring sessions will be provided to cover material needed for the exam.

*Class Behavior and Expectations:* All students should be prepared to begin when class starts and should be seated before the tardy bell rings. The school's tardy policy will be in effect in the classroom. Each student is expected to participate in all class activities to the best of his/her ability. Each student is expected to act in a responsible manner in class and during laboratory activities, and to follow the rules of lab safety as covered in class. While performing labs and class work, each student is expected to pay attention and follow instructions; this is especially critical in lab. Disruptive behavior is distracting to the learning process for everyone and will not be tolerated, and may result in loss of lab privileges. No food or drinks are allowed in class or in the lab. Restroom passes are limited to three per student per nine weeks. Students will not be released to go to the restroom for the first 10 or the last 10 minutes of class.

*Electronic Devices:* The county electronic device policy will be in effect in class. All electronic devices must be powered off and out of sight at all times. The first infraction will result in a warning, and the second will result in a referral with parent contact. If a student is caught using their phone or having their phone out during an exam, a grade of zero will be given for that exam and the test cannot be made up.

*Field Trips:* This biology course is part of the IBIS program for Volusia County. This program includes field trip for each class to Rose Bay Marine Sanctuary, located on US 1 in New Smyrna Beach. Transportation will be provided for the students, and the field trips will be at no cost. If a student is not able to attend, an alternate assignment must be done in place of the field trip grade. Parents will be asked to chaperone the field trips if at all possible. The field trip will be held in October.

*Notebook :* A three-ringed notebook should include all of the paperwork that is used in this class. This includes handouts, class notes, quizzes, tests, homework, and project work. Notebooks may

be collected and graded periodically for completeness & organization. The notebook should be brought to class on a daily basis.

*Academic Dishonesty:* It is the expectation of all students that any work handed in is completely the work of the student. If outside sources are used, they should be properly cited. If cheating occurs during an exam, a grade of “0%” will be given for that exam and that exam cannot be retaken. In cases of plagiarism, a zero will be given for that grade. If an electronic device, such as a phone is used, is visible, or the student has access in any way to a phone during the exam, a grade of 0% will be given for that exam and that grade cannot be made up.

Course Timeline:

First 9 weeks:

Introduction to Biology

Science Process

Water Properties

Macromolecules

Enzymes

Cell Theory

Microscope Types

Cell Structure/Function

Membrane Transport

2<sup>nd</sup> 9 weeks

Photosynthesis

Cellular Respiration

Cell Cycles

Mitosis/Meiosis

Genetics

Biotechnology

3<sup>rd</sup> 9 Weeks

DNA Structure

Protein Synthesis

Evolution Evidence

Mechanisms of Change

Taxonomy

Human Health,

Growth and Development

4<sup>th</sup> 9 Weeks

Plants

Matter and Energy in Ecosystems

Interdependence

Human Impact

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Review for EOC

End of Course Exam

Please sign and return:

I, \_\_\_\_\_, have read and understand all student requirements for Biology I class.

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Student Name Printed

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Parent Signature/Date

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Student Signature / Date

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Parent Email Address

**Biology II / AP Biology Course Syllabus 2017-2018**

**Instructor: Lee Pearson**

**Email: [lvpearso@volusia.k12.fl.us](mailto:lvpearso@volusia.k12.fl.us)**

**Textbook(s):** Campbell, Neil and Reece, Jane B. 2008. AP Edition Biology, Eighth Edition, San Francisco, CA: Pearson Benjamin Cummings.

**Course Description:** This course is designed to prepare the student or gain credit for a college biology course. The content includes molecular and cellular biology, organismal, and population biology. The Biology II course will be double blocked for two periods with Biology II being taught in the fall, and AP being taught in the spring semester.

AP Biology is very rigorous, as it is equivalent to a two semester college biology course. AP biology is different from a traditional high school biology course due to the content and depth of material covered. The students who have performed the most successfully on the AP exam are those students who are willing to work steadily throughout the two courses and who are willing to work independently

The Biology II course will follow the Volusia County Curriculum Map as closely as possible. At the end of the Biology II course, the EOC exam will be offered. The EOC is given at the county level, not administered by the state.

The AP biology exam will be administered in May. Review sessions will be held in the weeks prior to the exam, including one Saturday review. This exam can possibly grant the student college credit for biology if the score is 3-5 on the exam, depending upon the institution. Failing scores are 1-2 on the exam. This course in conjunction with the AP program includes an extensive laboratory component, so reading and independent study will be expected. Those students enrolled in AP biology are required to take the exam in May 2018. If a student fails to show up for the exam, the student must reimburse the school for the exam fee.

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*Student Requirements:* A three (3) ring binder, paper, ruler, pencils, and pens (blue or black ink).

*Grading Procedures:* The county grading scale will be used. Summative assessments will count as 60% of the course grade, and formative assessments will count as 40% of the course grade. Summative assessments include exams, quizzes, lab reports, projects, Formative assessments include daily assignments, daily activities and labs, worksheets or notebook assignments.

*Assessments:* The terms and objectives for each unit or chapter are given prior to covering the material and are given as homework assignments. Students are responsible for knowing the material given on the objective sheets and the associated terms. After the material is covered during lectures and lab time, exams are given at the end of units or chapters on the material. Unit exams, which will usually cover a single topic, will be given at the end of each section covered in class. The exams will mimic the exams given by the AP program, and may include material from previous tests in order to encourage you to continuously review previously learned topics. In

addition, pop quizzes may be given during each unit. The county grading scale will be used, as in 90% - 100% = A, etc.

*Make Up Policy:* Make-up work will be given for absences, and depending on the number of days missed, the student has one day to make up the work for each day that the student was out of school. It is the sole responsibility of the student to get the assignment from the teacher and return the completed work. **Assignment or projects that are long-standing when the due date was given days or weeks in advance are not included in this time frame, and are due upon the return to school.**

*Testing:* Test dates are given approximately one week in advance. If a student is absent the day before a scheduled test and returns on the test day, the student will take the test on that day, provided no new content has been presented. If a student misses the day of the test, the test must be made upon the student's return. It is the student's responsibility to arrange the time and day of the makeup test with the teacher. During each 9-week grading period, students will have the opportunity to retake one summative assessment after remediation is done for that grade.

*Tutoring:* Tutoring will be available for additional help on Wednesdays after school. In the weeks prior to the AP exam, tutoring and review sessions will be offered and attendance will be required.

*Class Expectations:* All students should be prepared to begin when class starts and should be seated before the tardy bell rings. Each student is expected to participate in all class activities to the best of his/her ability. Each student is expected to act in a responsible manner in class and during laboratory activities. While performing labs and class work, each student is expected to pay attention and follow instructions; this is especially critical in lab. Disruptive behavior is distracting to the learning process for everyone and will not be tolerated, and may result in loss of lab privileges. No food or drinks are allowed in class or in the lab. Bathroom passes will be limited to three per student per nine weeks. Students will not be allowed to use the restroom in the first or last 10 minutes of the class. If a substitute teacher is in the room in Mrs. Pearson's absence, appropriate class behavior is still expected during that time.

*Lab Work:* On the average, 1-2 classes per week are used to conduct lab investigations. The lab investigations consist of a combination of the AP Labs and teacher-written labs that are designed to coincide with and enrich the lecture material. These labs include fresh and preserved specimens, dissections, microscopic specimens, etc. Students are responsible for all material covered in the lab investigations. Labs are usually conducted weekly, and sometimes more frequently, depending upon the topic being covered. Some of the labs will be inquiry-based labs, in which the students design, implement, record, analyze, and evaluate their own work in order to determine the validity of the hypothesis. These labs will be a combination of those labs required by the AP program, plus labs done in order to enhance the material covered in class. *If a student misses class*

*on a lab day, there will be no lab make-ups. An alternate assignment comparable in length will be assigned.*

*Electronic Devices:* District policy states that all electronic devices such as telephones, Ipods,, etc. are to be turned off and out of sight during class time. You may not have them out in class for any reason. **If a phone or electronic device is out during an exam, is visible, or in the lab or on the desk of a student, the student will receive a grade of zero for that exam and that grade cannot be made up.** The county electronic device policy will be in effect in class. All electronic devices must be powered off and out of sight at all times. The first infraction will result in a warning, and the second will result in a referral with parent contact.

*Field Trips:* The AP biology course is part of the IBIS program for Volusia County. The AP program includes two field trips, one to Lyonia Preserve and one to Rose Bay Marine Sanctuary, located on US 1 in New Smyrna Beach. Transportation will be provided for the students, and the field trips will be at no cost. Attendance at the field trips is required and are part of the program. If a student does not participate, an assignment of equal time and length will be given.

*Notebook :* A notebook should include all of the paperwork that is used in this class. This includes handouts, class notes, quizzes, tests, homework, and project work. Notebooks may be collected and graded periodically for completeness & organization.

*Academic Dishonesty:* It is the expectation of all students that any work handed in is completely the work of the student. If plagiarism is suspected, a zero will be given for that assignment. In cases of cheating on an exam, a grade of “0%” will be given for that exam and that exam cannot be retaken.

### **Order of the Biology II Curriculum:**

First 9 weeks

Scientific Investigations

Scientific Theory

Properties of Water

Chemistry

Macromolecules

Enzymes

Energy Flow/ATP

Chemiosmosis

Respiration

Second 9 weeks

Photosynthesis

Cell Structure

Cell Cycles

Binary Fission

Viral and Bacterial

Genetics

Gene Expression

Gene Regulation

Mutations

DNA Structure

Protein Synthesis

Biotechnology

Third 9 weeks

Vertebrate senses

Nerve Conduction

Nervous Systems

Cell Signaling

Evolution

Change Over Time

Speciation

Ecology

Fourth 9 weeks

Taxonomy

Botany

Flower Structure

Alternation of Generations

Fungi

Please sign and return:

I, \_\_\_\_\_, have read and understand all student requirements for Biology II / AP Biology class.

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Student Name Printed

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Parent Signature/Date

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**Student Signature / Date**

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**Parent Email Address—Please Print Clearly**

### Biology II / AP Biology Course Content

This course is structured around the four Big Ideas and Enduring Understandings (EU's) identified in the Curriculum Framework. [CR2] All Essential Knowledge (EK) will be taught and all

Learning Objectives (LO's) will be met through this curriculum. The course will be based on inquiry based laboratory work and the use of the science practices in both lab and non-lab activities.

Big Idea 1: The process of evolution drives the diversity and unity of life.

Big Idea 2: Biological systems utilize free energy and molecular building blocks to grow, to reproduce and to maintain dynamic homeostasis.

Big Idea 3: Living systems store, retrieve, transmit and respond to information essential to life processes.

Big Idea 4: Biological systems interact, and these systems and their interactions possess complex properties.

Students will be given a copy of the Big Ideas, Enduring Understandings (EU's) and Learning Objectives to self-monitor mastery as course objectives are met. The Big Ideas and Enduring Understandings will be posted in the room. As connections are made across Big Ideas, a line will join the related EU's, visually building a web of relatedness as the course progresses.

## Big Ideas

The Big Ideas are interrelated and will not be taught in isolation. The course will connect the Enduring Understandings from one Big Idea with those of the others wherever practical. Students will maintain a curricular map of the Big Ideas and Enduring Understanding showing connections as they are made.

Examples illustrating the types of connections to be made throughout the course:

Big Idea 1 and 3:[CR3a]

EU 1.B: Organisms are linked by lines of descent from common ancestry

EU 3.A: Heritable information provides for continuity of life.

DNA and RNA are carriers of genetic information through transcription, translation and replication (LO 1.15). Students will model information flow in a kinesthetic activity and discuss the similarities in the process among different domains. This will be connected to EK 3.A.1.5: DNA replication ensures continuity of hereditary information (LO 3.3). This is an example of a student activity that will connect Enduring Understandings between different Big Ideas. This assignment is an example of what students will do throughout the course.

Big Idea 1, 2 and 4: [CR3a] & [CR3b]

EU 1.B: Organisms are linked by lines of descent from common ancestry.

EU 2.B: Growth, reproduction, and dynamic homeostasis require that cells create and maintain internal environments that are different from their external environments.

EU 4.1: Interaction within biological systems lead to complex properties.

Electron Transport Chain (ETC) and chemiosmosis kinesthetic activity. Students build an inner mitochondrial membrane and identify it as a feature allowing separation within the cell. Student explain and justify how this separation is conducted in prokaryotes to generate a proton gradient, and discuss the evolutionary connections across domains through a BLAST search for proteins in the ETC. (Connects LO 1.16 and LO 2.14, LO 4.5, LO4.6) This is an example of a student activity which will connect Enduring Understandings between different Big Ideas. [CR4a] & [CR4b]

Big Idea 1,3 and 4: [CR3a] & [CR3c]

EU 1.A: Change in the genetic makeup of a population over time is evolution.

EU 3.A: Heritable information provides for continuity of life.

EU 4.B: Competition and cooperation are important aspects of biological systems.

Students will participate in a Hardy Weinberg activity where they calculate allelic frequency change. These alleles will be connected to DNA and related back to evolutionary history. In a second part of this activity students will investigate the role of environmental change in the changing genetic make-up of a population. This is an example of a student activity that will connect Enduring Understandings between different Big Ideas. This assignment is an example of what students will do throughout the course. [CR4a] & [CR4c]

Social and Ethical Concerns [CR5]

It is vitally important that students connect their classroom knowledge to socially important issues. The course will allow students to learn about and discuss many issues in a variety of formats. Issues will be discussed in a class setting, both live and electronic, and students may research and report on a current topic that has social or ethical issues associated with it. Since the goal will be to discuss a timely event, the list below should be seen as illustrative as new issues continually appear.

Stem Cell Research (Big Idea 3)

Global Warming (Big Idea 4)

Antibiotic Resistance and the Problems with Improper Antibiotic Use (Big Idea 1)

Genetically Modified Food (Big Idea 3)

The Use of Genetic Information (Big Idea 3)

The Seven Science Practices: Use outside of the laboratory portion of the course.

The Science Practices are used throughout the course. All activities and class work will be connected to at least one science practice and that will be clearly communicated to students so they can see the science practices as the framework around which the learning of the course takes place. Representative examples of activities are below:

SP 1: The student can use representations and models to communicate scientific phenomena and solve scientific problems.

This science practice will be incorporated extensively in all aspects of the course. An example of a student activity showing incorporation of this science practice outside of the specific laboratory program:

The student will work with models such as: immune system, digestive system, action potential, action at the nephron, working of the sarcomere, and cellular communication which allow students to problem solve as they change conditions within the model. Students will model the effect of change (for example disease or drugs) and communicate the results predicted due to change. (LO3.36 for example)

SP 2: The student can use mathematics appropriately.

This science practice will be incorporated extensively in all aspects of the course. An example of a student activity showing incorporation of this science practice outside of the specific laboratory program:

Students will participate in a Hardy Weinberg simulation as a class activity. Within this activity, students will make predictions and test them using mathematical models to study population genetics. (LO1.6)

SP3: The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course.

This science practice will be incorporated extensively in all aspects of the course. An example of a student activity showing incorporation of this science practice outside of the specific laboratory program:

Students will choose several organisms to examine some aspect of their evolutionary relatedness. Students will narrow down an appropriate, under-explored question through research and develop testable hypotheses. Students will share research results. (LO1.16)

SP4: The student can plan and implement data collection strategies appropriate to a particular scientific question. This science practice will be incorporated extensively in all aspects of the course. An example of a student activity showing incorporation of this science practice outside of the specific laboratory program:

Students will examine evidence regarding speciations and extinctions on Earth. Students will plan, design, and carry out data collection to evaluate these scientific claims. (LO 1.21)

SP5: The student can perform data analysis and evaluation of evidence.

This science practice will be incorporated extensively in all aspects of the course. An example of a student activity showing incorporation of this science practice outside of the specific laboratory program:

Students will select and read an article in a scientific journal on a medical procedure, device, drug trial or similar event. Students will statistically analyze and evaluate the data and report on the findings. (LO3.37 for example)

SP6: The student can work with scientific explanations and theories.

This science practice will be incorporated extensively in all aspects of the course. An example of a student activity showing incorporation of this science practice outside of the specific laboratory program:

Students will compare cells in different domains with regard to internal membranes and their function. Students will extend this analysis in an examination and application of scientific explanations in endosymbiont theory. (LO2.13)

SP7: The student is able to connect and relate knowledge across various scales, concepts and representations in and across domains.

This science practice will be incorporated extensively in all aspects of the course. An example of a student activity showing incorporation of this science practice outside of the specific laboratory program:

### The Laboratory Program

The students will be engaged in investigative laboratory work for a minimum of 25% of instructional time. [CR7] These labs will be inquiry based, student directed investigations. There will be at least 2 laboratory experiences per Big Idea selected from the list below from the AP Biology Investigative Lab Manual: An Inquiry-Based Approach (2012), or other similar labs.

[CR6] These labs will be spread throughout the school year. The descriptions below summarize the student inquiry portion of the investigation. Additional prescribed activities supplement the student inquiry.

### Big Idea 1: Evolution

Hardy Weinberg: Spreadsheet development to investigate factors affecting Hardy Weinberg Equilibrium.

Artificial Selection: Students will grow organisms such as Fast Plants and select for specific traits over several generations.

### Big Idea 2: Cellular Processes

Cellular Respiration: Students investigate cell respiration in yeast under a variety of student selected conditions.

Photosynthesis: Students investigate photosynthetic rate under a variety of student selected conditions.

Diffusion/Osmosis: Students investigate diffusion and osmosis in leaves of Elodea and by using dialysis tubing.

### Big Idea 3: Genetics and Information Transfer

Cell Division: Mitosis and Meiosis: Students compare mitotic rate under a selected conditions.

Bacterial Transformation: Students investigate bacterial transformation.

Restriction Enzyme Analysis: Students investigate restriction enzyme analysis.

### Big Idea 4: Ecology

Energy Dynamics: Students develop and analyze model systems that describe energy flow.

Fruit Fly Behavior: Students investigate chemotaxis in fruit flies.

Transpiration: Students investigate the movement of water through plants in a model system.

Enzyme Investigation: In an open inquiry lab, students will investigate and quantify factors that affect enzyme action.

Application of the Science Practices in the Laboratory Program [CR6]

Students will be able to apply the science practices throughout the laboratory work. A matrix describing their application is below. SP refers to the science practice and the Lab number relates to the list above. Many of the science practices will be used in all of the student-directed lab and field investigations, however, some science practices will be emphasized to a greater degree than others in each investigation. Those that are emphasized are indicated by an “X” in the matrix.

[CR6]

	SP 1	SP 2	SP 3	SP 4	SP 5	SP 6	SP 7
Lab 1 HW	X	X			X		
Lab 2 Artificial Selection	X	X			X		X
Lab 3 Cellular Respiration	X	X	X			X	X
Lab 4 Photosynthesis	X	X	X	X		X	X
Lab 5 Diffusion Osmosis		X		X	X		
Lab 6 Cell Division: Mitosis and Meiosis	X				X	X	X
Lab 7 Bacterial Transformation	X		X		X	X	X
Lab 8 Restriction Enzyme Analysis			X			X	
Lab 9 Energy Dynamics	X	X	X	X	X	X	X
Lab 10 Insect Behavior	X		X	X	X	X	X

Lab 11 Transpiration	X	X		X		X	X
Lab 12 Enzymes					X	X	X

### Communication

Students will communicate to others in formats such as group presentations, PowerPoint presentation, poster sessions and written reports. Communication tools are not only for the laboratory experiences, but represent examples of the collaboration, reflection, and articulation seen in the course as a whole. [CR8]