Biology 1 (2000310), Biology 1 Honors (2000320) Scope and Sequence

Unit	Standards	Suggested Time Frame
Unit 1: Approaches to Biological Research	SC.912.N.1.1, SC.912.N.1.4, SC.912.N.1.6, SC.912.N.2.1, SC.912.N.2.2 **Honors:** SC.912.N.2.4	2 block days
Unit 2: Biological Molecules	SC.912.L.18.12, SC.912.L.18.1, SC.912.L.18.11 **Honors:** SC.921.L.18.2, SC.912.L.18.3, SC.912.L.18.4	7 block days
Unit 3: Cell Theory	SC.912.L.14.1, SC.912.L.14.3, SC.912.L.14.4, SC.912.N.1.3, SC.912.N.3.1, SC.912.N.3.4	3 block days
Unit 4: Cellular Structure and Function	SC.912.L.14.2, SC.912.L.14.3, SC.912.L.14.4, SC.912.N.1.1, **Honors:** SC.912.L.14.5	4 block days
Unit 5: Cellular Respiration, Photosynthesis and Plants	SC.912.L.18.8, SC.912.L.18.10, SC.912.L.18.7, SC.912.L.18.9, SC.912.L.14.7 **Honors:** SC.912.P.8.7, SC.912.P.10.1	6 block days
Unit 6: Cellular Reproduction	SC.912.L.16.14, SC.912.L.16.8, SC.912.L.16.16, SC.912.L.16.17, HE.912.C.1.7, **Honors:** SC.912.L.16.12, SC.912.L.16.15,	6 block days
Unit 7: Genetics	SC.912.L.16.1, SC.912.L.16.2	6 block days
Unit 8: Nucleic Acids and Gene Expression	SC.912.L.16.3, SC.912.L.16.9, SC.912.L.16.5, SC.912.L.16.4	5 block days
Unit 9: Biotechnology	SC.912.L.16.10	2 block days
Unit 10: Classification	SC.912.L.15.6, SC.912.L.15.4, SC.912.L.15.5, SC.912.N.1.6	3 block days
Unit 11: Mechanisms of Evolution/ Mutations	SC.912.L.15.1, SC.912.L.15.8, SC.912.L.15.13, SC.912.L.15.14, SC.912.L.15.15, SC.912.N.1.3, SC.912.N.1.4, SC.912.N.1.6, SC.912.N.2.1, SC.912.N.3.1, SC.912.N.3.4	4 block days
Unit 12: Hominid Evolution	SC.912.L.15.10, SC.912.N.1.4, **Honors:** SC.912.L.15.2, SC.912.L.15.3,	3 block days
Unit 13: Energy Flow through Ecosystems	SC.912.E.7.1, SC.912.L.17.9, SC.912.L.17.2	3 block days
Unit 14: Population Dynamics	SC.912.L.17.5, SC.912.L.17.2, SC.912.L.17.4, SC.912.N.1.4, SC.912.N.1.3	4 block days
Unit 15: Human Impact	SC.912.L.17.11, SC.912.L.17.8, SC.912.L.17.20, SC.912.L.17.13, SC.912.N.1.3, HE.912.C.1.3, **Honors:** SC.912.L.17.16,	3 block days
Unit 16: Human Systems	SC.912.L.14.26, SC.912.L.14.36, SC.912.L.16.13, SC.912.L.14.52, SC.912.L.14.6, HE.912.C.1.3, HE.912.C.1.5, HE.912.C.1.7 **Honors:** SC.912.L.14.27, HE.912.C.1.8	7 block days

GENERAL NOTES

Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).

Instructional Practices

Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

Science and Engineering Practices (NRC Framework for K-12 Science Education, 2010)

- Asking questions (for science) and defining problems (for engineering).
- Developing and using models.
- Planning and carrying out investigations.
- Analyzing and interpreting data.
- Using mathematics, information and computer technology, and computational thinking.
- Constructing explanations (for science) and designing solutions (for engineering).
- Engaging in argument from evidence.
- Obtaining, evaluating, and communicating information.

Literacy Standards in Science

Secondary science courses include reading standards for literacy in science and technical subjects 6-12 and writing standards for literacy in history/social studies, science, and technical subjects 6-12. The courses also include speaking and listening standards. Additional standards/ practices that are to be taught in this course:

- ELA.K12.EE.1.1 -Cite evidence to explain and justify reasoning.
    - **Clarifications:**
      K-1 Students include textual evidence in their oral communication with guidance and support from adults. The evidence can consist of details from the text without naming the text. During 1st grade, students learn how to incorporate the evidence in their writing.
    - 2-3 Students include relevant textual evidence in their written and oral communication. Students should name the text when they refer to it. In 3rd grade, students should use a combination of direct and indirect citations.

- 4-5 Students continue with previous skills and reference comments made by speakers and peers. Students cite texts that they've directly quoted, paraphrased, or used for information. When writing, students will use the form of citation dictated by the instructor or the style guide referenced by the instructor.
- 6-8 Students continue with previous skills and use a style guide to create a proper citation.
- 9-12 Students continue with previous skills and should be aware of existing style guides and the ways in which they differ.

- ELA.K12.EE.2.1 Read and comprehend grade-level complex texts proficiently.
  - **Clarifications:**
    See Text Complexity for grade-level complexity bands and a text complexity rubric.

- ELA.K12.EE.3.1 Make inferences to support comprehension.
  - **Clarifications:**
    - Students will make inferences before the words infer or inference are introduced. Kindergarten students will answer questions like "Why is the girl smiling?" or make predictions about what will happen based on the title page. Students will use the terms and apply them in 2nd grade and beyond.
- ELA.K12.EE.4.1 Use appropriate collaborative techniques and active listening skills when engaging in discussions in a variety of situations.
  - **Clarifications:**
    In kindergarten, students learn to listen to one another respectfully.
  - In grades 1-2, students build upon these skills by justifying what they are thinking. For example: "I think _____ because _____." The collaborative conversations are becoming academic conversations.
  - In grades 3-12, students engage in academic conversations discussing claims and justifying their reasoning, refining and applying skills. Students build on ideas, propel the conversation, and support claims and counterclaims with evidence.
- ELA.K12.EE.5.1 Use the accepted rules governing a specific format to create quality work.
  - **Clarifications:**
  - Students will incorporate skills learned into work products to produce quality work. For students to incorporate these skills appropriately, they must receive instruction. A 3rd grade student creating a poster board display must have instruction in how to effectively present information to do quality work.
- ELA.K12.EE.6.1 Use appropriate voice and tone when speaking or writing.
  - Clarifications:
  - In kindergarten and 1st grade, students learn the difference between formal and informal language. For example, the way we talk to our friends differs from the way we speak to adults. In 2nd grade and beyond, students practice appropriate social and academic language to discuss texts.

Florida Standards for Mathematical Practice:
Integrate Common Core Standards for Mathematical Practice (MP) as applicable:

- MA.K12.MTR.1.1 Mathematicians who participate in effortful learning both individually and with others:
  - Analyze the problem in a way that makes sense given the task.
  - Ask questions that will help with solving the task.
  - Build perseverance by modifying methods as needed while solving a challenging task.

- Stay engaged and maintain a positive mindset when working to solve tasks.
- Help and support each other when attempting a new method or approach.
- **Clarifications:**
  - Teachers who encourage students to participate actively in effortful learning both individually and with others:
  - Cultivate a community of growth mindset learners.
  - Foster perseverance in students by choosing tasks that are challenging.
  - Develop students' ability to analyze and problem solve.
  - Recognize students' effort when solving challenging problems.

- MA.K12.MTR.2.1 Demonstrate understanding by representing problems in multiple ways.
  - Mathematicians who demonstrate understanding by representing problems in multiple ways:
    - Build understanding through modeling and using manipulatives.
    - Represent solutions to problems in multiple ways using objects, drawings, tables, graphs and equations.
    - Progress from modeling problems with objects and drawings to using algorithms and equations.
    - Express connections between concepts and representations.
    - Choose a representation based on the given context or purpose.
  - **Clarifications:**
    - Teachers who encourage students to demonstrate understanding by representing problems in multiple ways:
    - Help students make connections between concepts and representations.
    - Provide opportunities for students to use manipulatives when investigating concepts.
    - Guide students from concrete to pictorial to abstract representations as understanding progresses.
    - Show students that various representations can have different purposes and can be useful in different situations.
- MA.K12.MTR.3.1 Complete tasks with mathematical fluency.
  - Mathematicians who complete tasks with mathematical fluency:
    - Select efficient and appropriate methods for solving problems within the given context.
    - Maintain flexibility and accuracy while performing procedures and mental calculations.
    - Complete tasks accurately and with confidence.
    - Adapt procedures to apply them to a new context.
    - Use feedback to improve efficiency when performing calculations.
  - **Clarifications:**
    - Teachers who encourage students to complete tasks with mathematical fluency:
    - Provide students with the flexibility to solve problems by selecting a procedure that allows them to solve efficiently and accurately.
    - Offer multiple opportunities for students to practice efficient and generalizable methods.
    - Provide opportunities for students to reflect on the method they used and determine if a more efficient method could have been used.
- MA.K12.MTR.4.1 Engage in discussions that reflect on the mathematical thinking of self and others.
  - Mathematicians who engage in discussions that reflect on the mathematical thinking of self and others:
    - Communicate mathematical ideas, vocabulary and methods effectively.
    - Analyze the mathematical thinking of others.
    - Compare the efficiency of a method to those expressed by others.

        - Recognize errors and suggest how to correctly solve the task.
        - Justify results by explaining methods and processes.
        - Construct possible arguments based on evidence.
    - **Clarifications:**
        - Teachers who encourage students to engage in discussions that reflect on the mathematical thinking of self and others:
        - Establish a culture in which students ask questions of the teacher and their peers, and error is an opportunity for learning.
        - Create opportunities for students to discuss their thinking with peers.
        - Select, sequence and present student work to advance and deepen understanding of correct and increasingly efficient methods.
        - Develop students' ability to justify methods and compare their responses to the responses of their peers.
- MA.K12.MTR.5.1 Use patterns and structure to help understand and connect mathematical concepts.
    - Mathematicians who use patterns and structure to help understand and connect mathematical concepts:
        - Focus on relevant details within a problem.
        - Create plans and procedures to logically order events, steps or ideas to solve problems.
        - Decompose a complex problem into manageable parts.
        - Relate previously learned concepts to new concepts.
        - Look for similarities among problems.
        - Connect solutions of problems to more complicated large-scale situations.
    - **Clarifications:**
        - Teachers who encourage students to use patterns and structure to help understand and connect mathematical concepts:
        - Help students recognize the patterns in the world around them and connect these patterns to mathematical concepts.
        - Support students to develop generalizations based on the similarities found among problems.
        - Provide opportunities for students to create plans and procedures to solve problems.
        - Develop students' ability to construct relationships between their current understanding and more sophisticated ways of thinking.
- MA.K12.MTR.6.1 Assess the reasonableness of solutions.
    - Mathematicians who assess the reasonableness of solutions:
        - Estimate to discover possible solutions.
        - Use benchmark quantities to determine if a solution makes sense.
        - Check calculations when solving problems.
        - Verify possible solutions by explaining the methods used.
        - Evaluate results based on the given context.
    - **Clarifications**:
        - Teachers who encourage students to assess the reasonableness of solutions:
        - Have students estimate or predict solutions prior to solving.
        - Prompt students to continually ask, "Does this solution make sense? How do you know?"
        - Reinforce that students check their work as they progress within and after a task.
        - Strengthen students' ability to verify solutions through justifications.
- MA.K12.MTR.7.1 Apply mathematics to real-world contexts.
    - Mathematicians who apply mathematics to real-world contexts:

- Connect mathematical concepts to everyday experiences.
- Use models and methods to understand, represent and solve problems.
- Perform investigations to gather data or determine if a method is appropriate. • Redesign models and methods to improve accuracy or efficiency.
- **Clarifications:**
  - Teachers who encourage students to apply mathematics to real-world contexts:
  - Provide opportunities for students to create models, both concrete and abstract, and perform investigations.
  - Challenge students to question the accuracy of their models and methods.
  - Support students as they validate conclusions by comparing them to the given situation.
  - Indicate how various concepts can be applied to other disciplines.

English Language Development Standards:

- ELD.K12.ELL.SC.1 English language learners communicate information, ideas and concepts necessary for academic success in the content area of Science.
- ELD.K12.ELL.SI.1 English language learners communicate for social and instructional purposes within the school setting.

English Language Development ELD Standards Special Notes Section:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate information, ideas and concepts for academic success in the content area of Science. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link: http://www.cpalms.org/uploads/docs/standards/eld/SC.pdf

Additional Instructional Resources:

A.V.E. for Success Collection is provided by the Florida Association of School Administrators: http://www.fasa.net/4DCGI/cms/review.html?Action=CMS_Document&DocID=139

CPALMS:

There are more than 1740 related instructional/educational resources, 393 student resources, and 116 parent resources available for this on CPALMS. Click on the following link to access them: http://www.cpalms.org/Public/PreviewCourse/Preview/4258