Spaulding High School 2021-2022 Course Syllabus

Course Title: SCI500 - Advanced Placement® Biology **Department:** Science
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Course Description: Advanced Placement® (AP®) Biology is designed to be equivalent to a college introductory biology course. AP® Bio differs significantly from traditional high school biology due to complexity and depth of content, as well as time and effort required to achieve mastery. The course revolves around performing scientific practices as well as understanding scientific content from all areas of life science.

Note: Students are required to take the AP® Biology Exam. Depending on the outcome of the test, this course could count for college credit. The test will be administered at Spaulding. The cost of the exam is $94.00. If this is a concern, contact your school counselor.

Approximate Course Outline: This class will meet each school day, both 1st and 2nd semester.

- Unit 1: Biochemistry (2-3 wks)
- Unit 2: Cells (3-4 wks)
- Unit 3: Cellular Energy (2-3 weeks)
- Unit 4: Cellular Communication (2-3 wks)
- Unit 5: Heredity (2-3 wks)
- Unit 6: Genetic Regulation (4-5 wks)
- Unit 7: Natural Selection (4-5 wks)
- Unit 8: Ecology (4-5 wks)
- AP® Exam Prep and Practice (2 wks)
- Final Research Project (4 wks)

Topic Areas: AP® Biology is structured around four big ideas outlined by the College Board® as well as science practices detailed by the Next Generation Science Standards. See the attached documents for more specifics.

Practice: There will be various types of learning opportunities, which may look like hands-on activities, mini-projects, labs, discussions, worksheets, practice tests, etc. These may not be formally graded; they are important in order to learn content and practice skills before formal assessment and may be used to provide feedback and gauge progress. They also may be used as evidence of readiness for an assessment or reassessment. If activities are not completed during class they may be assigned to complete at home. It is the student's responsibility to keep past assignments organized as evidence of progress.

Homework: Students will be responsible for assigned reading outside of class in order to be prepared to engage with the material in class. Additional assignments and informative videos may be given as needed.

Summer Assignment: Students are required to complete an assignment in advance of the first week of class. Extensions may be granted on a case-by-case basis for students joining the class in the summer or early fall.

Final Project: After the AP® Exam, there are still 4 weeks of school. These will be used to enrich learning via a student-choice research project, which complies with a Spaulding High School literacy initiative. Students are expected to engage in learning until the close of the school year.

Laboratory: Approximately 25% of instructional time will be spent in lab activities. Effective participation in labs is essential to attaining proficiency. Students must be prepared to engage in the activities and uphold appropriate laboratory behavior any time they are in class. A breach in the Spaulding High School Laboratory Safety Contract (attached below) may result in disciplinary action, including removal from the activity. These activities may need to be made up outside of class time.

Assessment: Students will be assessed on the accompanying course standards. There will be a variety of assessment types, including projects, tests, labs, quizzes, and College Board released example AP® Biology Exam questions. Specific expectations will be provided for each assessment. Late assessments without a teacher-approved extension will not be eligible for an exemplary grade.

> **Passing the Course:** Students must achieve "Proficient" or higher in all 8 standards in order to earn "Proficient" in the class, as is spelled out in the SHS Course Performance Outline. To accomplish this a student must earn "Proficient" in the majority of the performance indicators (PI) for each standard, with at least "Beginning" in the rest (no "NE").

Students can pass with a score of “Partially Proficient”, which requires “Proficient” or better in a majority of standards and at least “Developing” in the rest.

To be eligible for “Exemplary” or “Partially Exemplary” students must have “Proficient” or better in every performance indicator. Partially Exemplary requires at least two standards to be exemplary, Exemplary requires a majority of standards to be Exemplary.

Note: Passing the course and passing the AP® Biology exam are not the same. The exam will not have an effect on the course grade, and passing the course does not guarantee a good score on the exam.

Reassessment: As per school policy, after a graded assessment is returned, a student has the opportunity to create a reassessment plan with the teacher, including reviewing information before attempting reassessment. It is the student’s responsibility to schedule this and complete the plan.

Call Back Guidelines: In order to be permitted to attend the “call back” day to improve your standing, here are the following criteria:

- ➢ If students do not attend Required Office Hours or follow through with their PAS they will be ineligible for Call Back.
- ➢ It is at the teachers discretion to determine whether or not the amount of work needed to earn proficiency is attainable. For this class: A student can only reassess up to 4 performance indicators that are below P - and only 2 of those may be B - per semester.
- ➢ No NE may be reassessed on Call Back

Classroom Expectations: The primary expectation in class is to maintain a safe and respectful learning atmosphere. Below are some ideas of what this looks like:

- Speaking and acting respectfully to each other, the teacher, and guests/substitutes:
  - Appropriate language and interactions
  - Active listening
  - Clear communication about any concerns
- Respecting the space and the materials used:
  - Make safety top priority
  - Follow directions
  - Keep everything clean and functional (report any issues right away)
- Respecting the content
  - Keep an open mind, try new things/ideas
  - Be present - on time and engaged
  - Ask questions to help clarify the material

Offer each other kindness and understanding:
We are all here to learn, we might not get it right the first time!

This class is conducted at the college level and students are expected to work accordingly. Each unit students will be assessed on “Advanced Placement Readiness”, which involves timely and effective work completion, according to a rubric that will be provided

Cell phones and other devices will ONLY be used by teacher discretion. Students must ask before they use it. If teacher permission is not granted and a device is in use, it can be confiscated and returned at the end of class.

Absences: If a student is absent, they are responsible for checking in with me (outside of class) and making up required work. In the case of a planned absence, it helps if students let me know ahead of time so I can plan.

Support: I am here to help students achieve success. If a student has any questions and/or concerns I encourage them to contact me to discuss it as soon as possible. E-mail is the best way to reach me. Students and parents/guardians may schedule to meet with me outside of class; in person or by phone/video call.

Spaulding High School Science Safety Contract

Science investigations allow students to learn science through discovery. Many investigations utilize equipment and chemicals that must be used safely and responsibly. Science teachers will assure that you have a safe laboratory experience, but you must also do your part. Read the following safety contract. Signing the contract signifies you understand and will follow it. A parent or guardian must also sign so everyone is committed to safe laboratory practices.

1. Follow all written and verbal instructions as directed by the teacher.
2. Never attempt unauthorized experiments. Do laboratory work only when the teacher is present.
3. Keep the work area clear of everything except laboratory materials.
4. Food and drink is not allowed in the laboratory area. Do not chew gum. When using chemicals or preserved specimens, keep hands away from face, eyes, mouth, and body.
5. Students are not permitted in any chemical storage room.
6. Never run in the laboratory. To prevent accidents, be aware of your environment at all times.
7. Your teacher will describe the location of exits and all safety equipment. Know where the closest fire alarm is.
8. Use equipment (balances, Bunsen burner, etc.) in the correct way, as instructed by the teacher.
9. Properly dispose of broken glassware and other sharp objects in designated areas.
10. Any time chemicals, heat or glassware are used, students, teachers, and visitors will use laboratory goggles. Lab aprons must be used when there is danger of chemical spills or biological contamination.
11. Long hair must be tied back and dangling jewelry and baggy clothing are not appropriate. Shoelaces must be tied and sandals are not allowed.
12. Immediately report any spills, accidents, or injuries to the teacher.
13. If a chemical splashes in your eye(s) or on your skin, flush with water. Inform the teacher immediately.
14. Never touch, taste, or smell chemicals or other substances unless directed to do so.
15. Follow all provided instructions when handling chemicals.
16. Follow all provided instructions when handling glassware, equipment, and when heating substances.
17. Never point the open end of a test tube containing any substance at yourself or others.
18. Dispose of all chemical and biological waste properly. The teacher will tell what materials can be poured down the drain and what materials must be placed in a waste container.
19. Clean all work surfaces and equipment at the end of laboratory work and return all equipment to the proper storage area.
20. Wash your hands with soap and water after performing all investigations and before you leave the lab area.
21. If you are unclear or confused about proper safety procedures and/or laboratory instructions, ask the teacher before proceeding.

ADDITIONAL, SPECIFIC INSTRUCTIONS WILL BE GIVEN PRIOR TO LABORATORY ACTIVITIES.

Science Practices from Next Generation Science Standards:

- SP1: Model: The student can use representations and models to communicate scientific phenomena and solve scientific problems.
- SP2: Math: The student can use mathematics appropriately.
- SP3: Query: The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP® course.
- SP4: Data Collection: The student can plan and implement data collection strategies appropriate to a particular scientific question.
- SP5: Analysis: The student can perform data analysis and evaluation of evidence.
- SP6: Explain: The student can work with scientific explanations and theories.
- SP7: Connect: The student is able to connect and relate knowledge across various scales, concepts and representations in and across domains.

The Big Ideas from College Board:

1. Evolution: The process of evolution drives the diversity and unity of life.
2. Energy: Biological systems utilize free energy and molecular building blocks to grow, to reproduce and to maintain dynamic homeostasis.
3. Information: Living systems store, retrieve, transmit, and respond to information essential to processes.
4. Systems: Biological systems interact. These systems and their interactions possess complex properties

AP® Biology Assessed Course Standards

For each standard, students will use the performance indicators to demonstrate their understanding of the concept outlined in each "standard" box. Within each performance indicator is a variety of themes, concepts, and terms that a student must show that they can apply effectively.

Standard #1: Biochemistry: The chemical structures and interactions that make up living organisms

Performance Indicators:

- **APB1.1:** Biological Macromolecules
- **APB1.2:** Unit overview
- **APB1.3:** Transpiration Lab
- **APB1.4:** Final Independent Project
- **APB1.5:** Advanced Placement Readiness

Standard #2: Cells: They are the basic units of life and have many complex interactions

Performance Indicators:

- **APB2.1:** Cell structure and function
- **APB2.2:** Membrane transport
- **APB2.3:** Unit overview
- **APB2.4:** Osmosis Lab
- **APB2.5:** Advanced Placement Readiness

Standard #3: Energy: The chemical reactions and processes that transform energy in cells

Performance Indicators:

- **APB3.1:** Photosynthesis/Respiration
- **APB3.2:** Unit overview
- **APB3.3:** Photosynthesis Lab
- **APB3.4:** Enzyme Activity Lab
- **APB3.5:** Advanced Placement Readiness

Standard #4: Cellular Communication: Cell signalling and life cycle

Performance Indicators:

- **APB4.1:** Cell communication
- **APB4.2:** The cell cycle and mitosis
- **APB4.3:** Unit overview
- **APB4.4:** Transformation Lab
- **APB4.5:** Advanced Placement Readiness

Standard #5: Genetic Inheritance: How organisms store and transfer genetic information

Performance Indicators:

- **APB5.1:** Meiosis and variation
- **APB5.2:** Patterns of inheritance
- **APB5.3:** Unit overview
- **APB5.4:** Math Modeling Lab
- **APB5.5:** Advanced Placement Readiness

Standard #6: Molecular Genetics: How genes are expressed and can be altered using technology

Performance Indicators:

- **APB6.1:** Protein Synthesis
- **APB6.2:** Regulation of expression
- **APB6.3:** Unit overview
- **APB6.4:** Restriction Enzyme Lab
- **APB6.5:** Advanced Placement Readiness

Standard #7: Evolution and Natural Selection: The diversity of life and how it changes over time

Performance Indicators:

- **APB7.1:** Mechanisms of evolution
- **APB7.2:** Evidence of evolution
- **APB7.3:** Unit overview
- **APB7.4:** Artificial Selection Lab
- **APB7.5:** Advanced Placement Readiness

Standard #8: Ecology: Interactions between abiotic and and biotic components in the environment

Performance Indicators:

- **APB8.1:** Population ecology
- **APB8.2:** Biodiversity
- **APB8.3:** Unit overview
- **APB8.4:** DNA Comparison Lab
- **APB8.5:** Advanced Placement Readiness