**AP BIOLOGY SYLLABUS 2022-2023**

**The Lutheran High School of Kansas City**

A block: Class times: M-7:45-8:41, T- 7:45-9:11, Th- 7:45-9:11

Instructor: Mrs. Jonelle Hizer, B.A. Biological Sciences, M.S. Education

E-mail: jhizer@lhskc.com

School Phone: (816) 241-5478

Plan time: G block

**Course Description:** AP (Advanced Placement) Biology is a yearlong course in which students build upon what they learned in Biology and go more in depth in the study of 8 Biology units: chemistry of life, cells and cell membranes, cellular energetics, cell cycle/cell communication, heredity, gene expression and regulation, natural selection/evolution, and ecology.  Students will leave this course prepared with a solid foundation for future college Biology classes and prepared to take the AP exam in the spring. **AP BIO EXAM is set for Wednesday, May 10, 2023 in the afternoon 12 p.m. local time.** If students score a 3, 4, or 5 on the AP Biology exam, it will count as college credit for College Biology (check with the university you plan to attend to make sure they accept AP credit).

**Goals/Objectives**: Students who successfully complete this course will…

* Implement the scientific method to all laboratory procedures and successfully write completed lab reports
* Complete an advanced tour of the cell
* Understand and implement membrane structure and function
* Apply metabolism to energy reactions
* Apply cellular respiration to harvesting chemical energy
* Describe photosynthesis in terms of phases of the Calvin cycle, light, wavelength, and electromagnetic spectrum
* Understand and implement meiosis and sexual life cycles, Mendel and the gene idea to genetics, and the chromosomal basis of inheritance
* Apply microbiology to bacteria and viruses
* Understand the concepts of microevolution and how that affects populations and animal behaviors
* Be prepared for the AP exam in the spring

**Outcomes:** Students will complete:

* Individual and group labs: osmosis and water potential, diffusion, preparing, observing, and recording various cells, enzymes, mitosis, photosynthesis, chromosomal inheritance, bacteria lab, microorganisms and disease lab, enzymes, origami bird, Daphnia heart rate, isopod behavior, etc.
* Lab reports: proper format will be given to students, this involves using the scientific method to state the problem, research and gather information, form a hypothesis, test the hypothesis (identifying all variables), analyze data (using graphs/tables), and make a sound conclusion.
* Individual and group projects: cell membranes, cellular respiration, cell cycle, play-doh meiosis, pipe cleaner babies, genetics-design a species, pedigree project, current event for microorganisms and bacteria, dominant allele charts, evolutionary trends with rock pocket mice, genetics of corn, student learning guides on all the 8 units, etc.

**Methods:** The methods of learning students will be engaging in are:

* Book work: *Biology AP Edition*, 8th Edition by Campbell/Reece
* Learn-Biology.com- interactive online textbook-we will utilize daily and complete student learning guides for all units
* Cooperative learning using hands on labs and projects
* Note taking: PowerPoint lectures, smartboard activities
* “Do now” questions “Bell Work”: question on board to be answered when student enters class, pertaining to topic for the day, gets the brain ready and focused on our topic
* Quizzes: given throughout unit, to assess comprehension, format varies from multiple choice to fill in the blank, lab quizzes, filling in unknowns
* Tests: given at the end of the unit to assess comprehension, format varies from multiple choice, fill in the blank, short answer, lab tests, filling in unknowns
* Lab reports
* Homework: varies from practice problems, to projects that need to be completed outside of class
* Classwork: varies from demos, to quick labs, to problems

**Virtual Learning**

* If students are out for an extended period of time, due to COVID or other sickness, lessons will be provided to the student via various platforms such as zoom videos, youtube videos, powerpoint lectures, notes, etc.
* Please refer to Mrs. Hizer’s google classroom for posted materials

**Expectations for classroom conduct**

* Be prepared for class: be on time, have assignments ready, have all materials required for class
* Respect yourself and others: no verbal putdowns or classroom disruptions tolerated
* Listen to directions
* Follow school handbook
* Respect and appropriate behavior shown toward instructor
* Homework labeled and on time: if you are absent it is **your responsibility** to obtain assignment and turn in within 1 block day of returning to school. Homework is to be labeled with first and last name, date, and block in upper right hand corner. Assignments are to be turned in at the beginning of the hour.
* “Do Now” Question/Bell Work: At beginning of hour, be in seat, copy, and answer “do now” question located on board. A unit’s worth of “do now” questions/bell work will need to be kept on the same piece of paper that will serve as part of your weekly classwork. In addition, below the “Do Now” question on the smartboard will be our agenda for the day entitled, “What are we doing?”
* Pay attention in class: there is no sleeping in class, laying your head down, or eating. You may have a bottle of water. (water only, no sodas, Monster drinks, etc.!) At end of class, remain in seat until dismissal bell rings.
* **NO CELL PHONES:** there is a cell phone holder in the front of the class, please put your phone in the holder (matching your table number). If you are caught with your cell phone or it goes off on your person, your cell phone will be turned into the office for you to pay to get back. If this becomes an excessive issue, other disciplinary measures will be put into place. Note: If there is a poor attitude about handing over the phone, your phone and you can be directly sent to the office even on the first offense.

**Consequences for poor behavior/bad choices/no homework in**

* 1st- Light warning: this could be verbal, look, or note
* 2nd- Major warning: this could be conference, note, verbal
* Parental/Guardian contact: this could be phone call, e-mail
* Detention: after parent has been contacted students will be subject to detention for same offense
* Referral to Disciplinarian and Parental contact
* Students may be immediately referred to Disciplinarian if they do not heed warning and there is a constant disruption to the learning process.
* Late work will negatively impact your grade: **you will lose 20% for every class it is late**. If you get behind in AP Biology, it is very difficult to catch back up, so do not get behind! Because this is a college class and we have to cover all units, there is no slowing down!
* Cheating policy: If you are caught cheating (this includes tests, finals, and homework, i.e. handing another student your homework to write down answers and/or writing down those answers) you will receive a deduction of 50% to 100% depending on the severity of the cheating.

**Advantages for good behavior/good choices/homework in on time**

* Respect from instructor and peers- this is a great thing! You must give respect to earn respect.
* Good grades- and even better, finishing this course with an appreciation for science and the world God has made for us!
* End of year Science award
* Sharp work displayed- bragging rights
* Parental/Guardian contact: acknowledging excellence, this could be phone call, or e-mail

**Evaluation**

* Homework/classwork = **33%** of overall quarter grade
* Lab work/projects: participation in lab, lab reports, and projects= **33%** of overall quarter grade
* Exams/Quizzes: **34%** of overall quarter grade
* Your **1st semester grade** will be broken down as follows:

**40%**- 1st quarter final grade

**40%**- 2nd quarter final grade

**20%**- final exam (comprehensive exam from all semester’s material)

* Your **2nd semester grade** will be broken down as follows:

**40%**- 3rd quarter final grade

**40%**- 4th quarter final grade

**20%**- final exam (comprehensive exam from all semester’s material

**Required Materials**

* Biology AP book
* Laptop/chrome book for Learn-Biology interactive textbook
* Aprons (these will be provided to you, and will need to be kept cleaned and wiped down after all labs)
* 3 ring binder (1.5 or 2 inch) with paper and divider that separates lab/lecture sections- there’s a lot of SLG’s for you to keep track of
* Folder or pocket divider to keep handouts in (this can be put into your 3 ring binder)
* Pen/pencil (no red ink)
* Colored pencils and/or markers for graphs/charts/projects
* Roll of paper towels

**Calendar:**

The following are units and topics we will be discussing in AP Biology this year.

 \*Please note that the teacher may adjust these topics of study and important concepts at any time in order to accommodate student learning.

Dates Topic/Unit Concept

First Semester

Aug 17th -Oct 14th: first quarter Unit 1: Chemistry of Life basic chemistry, structure of water and hydrogen bonding, carbon and functional chemistry, biochemistry

 Unit 2: Cells and cell membranes: cell structure and function, cell membrane structure/function/osmosis

Oct 17th-Dec 19th: second quarter Unit 3: Cellular energetics enzyme and enzyme regulation,

Energy and cellular respiration,

 Photosynthesis

 Unit 4: Cell Communication/ cell communication/signal Cell cycle transduction, feedback and homeostasis, mitosis, cell cycle

 Cell cycle regulation

***Jan 4th-20th Winterim Session***

Second Semester

Jan 24th- March 24th: third quarter Unit 5: Heredity meiosis, sex determination, nondisjunction, genetics, chromosomal basis of inheritance, Labs: Modeling chromosomal inheritance, pedigree project, pipe cleaner babies, genetics- design a species

 Unit 6: Gene Expression DNA structure and replication,

 Regulation transcription, translation, bacterial

 Gene regulation/operons, eukaryotic gene regulation, animal development, cell specialization, mutations, viruses, genetic engineering

March 27th-May 19th: fourth quarter Unit 7: Natural Selection/Evolution: population genetics, species and speciation, phylogeny, classification Labs: Bacteria growth lab, enzyme lab, Daphnia heart rate lab

**AP BIO EXAM: Wednesday, May 10, 2023- afternoon 12 p.m. local time**

 Unit 8: Ecology: animal behaviors, energy flow through ecosystems, population and community ecology, biodiversity, ecosystem disruption, Labs: isopod behavior, evolution of the origami bird

This syllabus is for students and parents to keep for reference. Feel free to contact me anytime (note that I may not be able to answer e-mails/calls during instruction time, but will get back to you ASAP). A parental and student signature is required to acknowledge you have reviewed the classroom policies. Attached is the signature form.

**Science Laboratory Safety Rules**

One of the first things a scientist learns is that working in the laboratory can be an exciting experience. But the laboratory can also be quite dangerous if proper safety rules are not followed at all times. To prepare you for a safe year in the laboratory, read over the following safety rules. Make sure you understand each rule. If you do not, ask me (Mrs. Hizer) to explain any rules you are unsure of.

**Dress code:**

* Many materials in the lab can cause eye injury. To protect yourself from possible injury, wear safety goggles whenever you are working with chemicals, burners, or any substance that might get into your eyes.
* Wear a lab apron whenever you are working with chemicals or heated substances and dissections of organisms.
* Tie back long hair to keep your hair away from any chemicals, burners, or other lab equipment.
* Remove or tie back any article of clothing or jewelry that can hang down and touch chemicals and flames. Do not wear sandals or open-toed shoes when using chemicals in the lab. Never walk around the lab barefoot.

**General Safety Rules**

* Be serious and alert when working in the lab. Never “horse around” in the lab.
* Be prepared to work when you arrive in the lab. Be sure that you understand the procedure to be employed in any lab investigation and the possible hazards associated with it.
* Read all directions for an investigation several times. Follow the directions exactly as they are written. If you are in doubt about any part of the investigation, ask me (Mrs. Hizer) for assistance.
* Never perform activities that are not authorized by me (Mrs. Hizer). Obtain permission before “experimenting” on your own.
* Never handle any equipment unless you have specific permission.
* Take extreme care not to spill any material in the lab. If spill occurs, ask me (Mrs. Hizer) immediately about the proper cleanup procedures. Never simply pour chemicals or other substances into the sink or trash.
* Never eat or taste or smell anything in the lab unless directed to do so. This includes food, drinks, candy, and gum, as well as chemicals. Wash your hands before and after performing every investigation.
* Know the location and proper use of safety equipment such as the fire extinguisher, fire blanket, first-aid kit, and eyewash station.
* Keep your lab area clean and free of unnecessary books, papers, and equipment. No book bags allowed in lab.
* Stay at your assigned lab station at all times. No moving about unless instructed to do so.
* Report all accidents no matter how minor to me (Mrs. Hizer) immediately.

**Heating and Fire Safety**

* Report any fires to me (Mrs. Hizer) at once.
* Never reach across a flame.
* Make sure you know how to light a Bunsen burner (I will demonstrate the proper procedure for lighting a burner). If the flame leaps out of a burner toward you, turn the gas off immediately. Do not touch the burner. It may be hot. And never leave a lighted burner unattended.
* Point a test tube or bottle that is being heated away from you and others. Chemicals can splash or boil out of a heated test tube.
* Never heat a liquid in a closed container.
* Never pick up a container that has been heated with first holding the back of your hand near it. If you can feel the heat on the back of your hand, the container may be too hot to handle. Use a clamp, tongs, or heat-resistant gloves when handling hot containers.

**Using Chemicals Safely**

* Never mix chemicals for the “fun of it.” You might produce a dangerous, possibly explosive, substance.
* If you are instructed to note the fumes in an investigation, gently wave your hand over the opening of a container and direct the fumes toward your nose. Do not inhale the fumes directly from the container.
* Use only those chemicals needed in the investigation. Keep all lids closed when a chemical is not being used. Notify me (Mrs. Hizer) whenever chemicals are spilled.
* Dispose of all chemicals as instructed by me (Mrs. Hizer). To avoid contamination, never return chemicals to their original containers.
* Be extra careful when working with acids or bases. Pour such chemicals over the sink, not over your lab table.
* When diluting an acid, pour the acid into water. Never pour water into the acid.
* Rinse any acids off your skin or clothing with water. Immediately notify me (Mrs. Hizer) of any acid spill.

**Using Glassware Safely**

* Keep in mind that hot glassware will not appear hot. Never pick up glassware without first checking to see if it’s hot.
* Never use broken or chipped glassware. If glassware breaks, notify your teacher and dispose of the glassware in the proper trash container.
* Clean glassware thoroughly before putting it away.

**Using Sharp Instruments**

* Handle scalpels or razor blades with extreme care. Never cut material toward you; cut away from you.
* Be careful when handling sharp, pointed objects such as scissors, pins, and dissecting probes.

**Handling Living/Nonliving Organisms**

* Treat all living things with care and respect. Do not touch any organism in the classroom or lab unless given permission to do so.
* Animals should be handled only if necessary.
* Treat all microorganisms as if they were harmful. Use antiseptic procedure when working with microbes. Dispose of microbes as directed.
* Treat all specimens with respect, as they were once living organisms.
* Always wear gloves when working with specimens.

**End-of-Investigation Rules**

* When an investigation is completed, clean up your work area and return all equipment to its proper place.
* Wash your hands with soap and warm water after every investigation.
* Turn off all burners before leaving the lab. Check that the gas line leading to the burner is off as well.

**Parent and Student Signatures:**

This syllabus is for students and parents to keep for reference. Feel free to contact me anytime (note that I may not be able to answer e-mails/calls during instruction time, but will get back to you ASAP). A parental and student signature is required to acknowledge you have reviewed the classroom policies. Below is the signature form.

Class name: \_\_\_\_\_\_\_**AP Biology**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block: \_\_A\_\_\_\_\_\_\_\_

I have read and understand the syllabus for Mrs. Hizer’s AP Biology class.

Student name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Student signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Parent(s) name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Parent(s) signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Lab Safety Contract**: Once you have read all the safety information and are sure you understand all the rules, please sign the safety contract that follows. Signing this contract tells me (Mrs. Hizer) that you are aware of the rules of the laboratory. A parental and student signature is required to acknowledge you have reviewed the lab safety rules. You will not be allowed to work in the laboratory until you have returned your signed contract.

I, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, have read the Science Laboratory Safety Rules handout. I understand its contents completely, and agree to follow all the safety rules and guidelines that have been established in each of the following areas.

(Please check)

☐Dress code

☐General safety rules

☐ Heating and Fire Safety

☐ Using Chemicals Safely

☐ Using Glassware Safely

☐ Using Sharp Instruments

☐ Handling Living/Nonliving Organisms

☐ End-of-Investigation Rules

Student name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Student signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Parent(s) name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Parent(s) signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_