Human Body Systems
Course Syllabus 2019-2020
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Course Description

Students examine the interactions of human body systems as they explore identity, power, movement, protection, and homeostasis. Exploring science in action, students build organs and tissues on a skeletal Maniken®; use data acquisition software to monitor body functions such as muscle movement, reflex and voluntary action, and respiration; and take on the roles of biomedical professionals to solve real-world medical cases.

Goals for Student Learning

Unit 1: Identity The goal of Unit 1 is to engage students in a discussion of what it means to be human. Students investigate the body systems and functions that all humans have in common and then look at differences in tissues, such as bone and muscle, and in molecules, such as DNA, to pinpoint unique identity.

Unit 2: Communication The goal of Unit 2 is for students to investigate modes of communication within the human body as well as the ways the human body communicates with the outside world. Students map the function of key regions of the brain and explore how the body detects, processes, and responds to internal and external stimuli.

Unit 3: Power The goal of Unit 3 is for students to investigate the human body systems that work to obtain, distribute, or process the body's primary resources for energy and power—food, oxygen, and water.

Unit 4: Movement The goal of Unit 4 is for students investigate movement of the human body as well as the movement of substances within the body.

Unit 5: Protection The goal of Unit 5 is for students to explore ways in which the human body protects itself from injury and disease.

Textbook and Materials

- *1.5-2 inch Binder & Paper*
- *Colored Pencils*
- *Lab Gloves*
- *Pens/Pencils*
- *HCPL Library Card*
- *Headphone/Earbuds (Optional)*
- *Personal Portable Technology (Optional)*
- *Accounts with various online services will also be required throughout the year.*

Course Outline

Unit 1: Identity Students play the role of forensic anthropologists as they unlock the clues of identity found in bone and use restriction analysis and gel electrophoresis to analyze differences in DNA. Students begin to study histology and build upon their knowledge of human tissue. In the HBS course, students will be working with an Anatomy in Clay™ two foot skeletal model. Students will work in pairs on an assigned Maniken® model and will use clay to build various organs, tissues, and vessels on the skeletal frame. Over the year each Maniken model will take on a unique identity. Even though students are technically building the same structures on their model, students will notice that the Manikens do not all look the same. Faces will look different. Muscles may be more defined. Blood vessel placement may vary slightly. The Maniken may manifest a disease or illness. The core remains the same, but the specific details will lead to the individual.

Unit 2: Communication Students investigate the roles of electrical and chemical signals in communication and response in the human body. They explore the ways in which hormones and the endocrine system control body function in order to solve a medical mystery. Students compare response time to reflex and voluntary actions using data acquisition software, and they design experiments to test factors that can impact this response. By investigating the anatomy and physiology of the human eye, students learn how the body receives and interprets stimuli from the outside world.

Unit 3: Power Students make a model of the digestive system and design experiments to test the optimal conditions for enzymatic digestion. They explore lung function by diagnosing and treating a patient with breathing problems and use probes and data acquisition software to monitor their own lung function. Students investigate the anatomy and physiology of the urinary system and run simulated urinalysis to identify health conditions and diagnose disease.

Unit 4: Movement By building muscle groups on a skeletal model, students learn how a muscle's structure is directly related to its function and to the actions it can produce. Students design experiments to test the requirements for muscle contraction and create models to show relaxation and contraction of the sarcomere. A study of blood flow illustrates the roles that smooth and cardiac muscles play in the transport of substances around the body. At the end of the unit, students combine information about power and movement to describe how the body fuels and responds to exercise. Playing the role of biomedical professionals in a combined medical practice that caters to athletes, students design a comprehensive training plan for an athlete. The plan includes all aspects of training, from diet and exercise to hydration and injury prevention.

Unit 5: Protection Before students investigate specific defense mechanisms and the immune system, they explore the protective functions of skin, bone, and the feeling of pain. Antigen-antibody interactions are introduced as well as the structure of the lymphatic and immune system. Students analyze data from a fictional illness and relate antibody response to the action of specific white blood cells.

HCPS Grading Policy

Examples of Product, Process, and Practice		
PRODUCT (50%) *Culminating Demonstration of Knowledge*	**PROCESS (30%)** *Addressing Specific Short-Term Learning Outcomes*	**PRACTICE (20%)** *Building Attitudes, Habits, and Skills*
Does it measure how well students achieved specific learning goals, standards, and/or competencies?	Does it provide feedback to students regarding growth towards the attainment of specific learning goals, standards and competencies?	Does it allow students to practice skills and/or reinforce content learning?
• Primarily completed in presence of teacher • Rubric aligned to standards • Accuracy graded	• Primarily completed in presence of teacher • Rubric aligned to standards • Accuracy graded	• Graded for completion and participation

Extra credit will not be given for non-academic purposes

Mastery Assessments

One of the core elements of gamification is the ability for a student to get immediate feedback, learn from their mistakes, and try again. As such there will be a small quiz for every activity (i.e. 1.1.1) that students must complete successfully to move on to the next piece of content.

If a student does not successfully pass the boss battle, they will have to retake the quiz. Students will be told what questions they got wrong but not what the correct answers are. Students are expected to revisit the applicable instruction before taking the quiz again. If a student is unsuccessful passing the quiz after 3 attempts, they are locked out and must visit their teacher to get clarification and move on.

Accumulation Grading

The most shocking element of game design in a classroom for most parent and students is the concept of building your grade. As described in the video from the X-Prize foundation most classes think of grading as starting with an A and that grade falling over the course of the semester with every mistake. However, in game design you build your grade from nothing, every action you perform will raise your grade. This means that at the start of a unit you will see a grade book full of zeros and you will build your grade up as high as you can. To provide you correct feedback, grades will be updated very often (hopefully daily).

Absent Work Policy

All assignments should be submitted on time. Students will be given the number of class periods equal to the number of lawful class periods absent to turn in completed make up assignments without penalty. If a student is unlawfully absent, work will be accepted (for the next 2 class periods after the due date) with a penalty of one letter grade off the assessed value.

Late Work Policy

All assignments should be submitted on time. If a student submits an assignment late (past the due date) within the next 2 class periods after the due date, the assignment will be accepted and will receive a letter grade penalty off the assessed value.

Academic Integrity

Academic integrity is taking responsibility for the quality and completion of one's own work. Academic dishonesty is taking someone else's work and claiming it as one's own. Students at Bel Air High School are responsible for knowing what is considered to be Academic Dishonesty and the subsequent consequences. More information can be found in the BAHS Student Planner.

Classroom Rules and Procedures

Dissections: There is a participation grade associated with the dissections. The animals used in this class are to be treated with respect and care. Any cruelty to these animals will result in a zero for the participation grade of that dissection and you will be excluded from all future dissections.

Cell Phone Policy

Students will place their electronic devices (including, but not limited to, cell phones, listening devices, smart watches, laptops, and iPads), either on silent or off, in a teacher designated area as they enter each classroom. Teachers will review with students the specific location for each room. The devices will remain in the teacher designated areas unless teachers explicitly tell students to use them as a part of classroom instruction.

- Devices will remain in the teacher designated area during bathroom visits.
- Devices will be retrieved from the teacher designated area at the end of the class at the direction of the teacher.
- School-appropriate cellphone use is permitted during class changes and lunch. Students are not permitted to make phone calls during school hours.
- Students will NOT be permitted to carry their electronic devices in a book bag throughout the school day.

If the electronic device policy is violated, the student shall then be subject to disciplinary action up to, and including, confiscation of the device as well as an office referral.