



**Human Body Systems**  
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## **Course Description**

*Step inside the human body and explore the systems that help us move, protect us from disease or injury, and facilitate communication within the body and with the outside world. Solve a medical mystery. Analyze a medical case file and diagnose disease. Design experiments to explore structure and function of the human body. How do the systems of the body work together to keep us well?*

*In the Human Body Systems (HBS) course, students examine the interactions of body systems as they explore identity, communication, power, movement, protection, and homeostasis. Students design experiments, investigate the structures and functions of the human body, and use data acquisition software to monitor body functions such as muscle movement, reflex and voluntary action, and respiration. Exploring science in action, students build organs and tissues on a skeletal manikin, work through interesting real world cases, and often play the role of biomedical professionals to solve medical mysteries. Students practice problem solving with structured activities and progress to open-ended projects and problems that require them to develop planning, documentation, communication, and other professional skills.*

## **Course Content**

### **Unit 1 - Identity**

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. 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.

### **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. They explore the ways the endocrine system controls body function in order to solve a medical mystery.

### **Unit 3 - Power**

The goal of Unit 3 is for students to investigate the body's primary resources for energy and power—food, oxygen, and water. Students make a model of the digestive system, explore lung function by diagnosing a patient, and learn how 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**

In Unit 4 students will build muscle groups on their Maniken® model to study muscle location and action. Students design experiments to test the requirements for muscle contraction, create models to show relaxation and contraction of the sarcomere, and the role that smooth and cardiac muscles play in the body. At the end of the unit, playing the role of biomedical professionals, students design a comprehensive training plan for an athlete.

#### **Unit 5 - Protection**

In this unit students explore the protective functions of skin, bone, and the feeling of pain. Students investigate the roles of the immune and lymphatic system. Students analyze data from a fictional illness and relate antibody response to the action of specific white blood cells.

#### **Unit 6 - Homeostasis**

This final unit focuses on the connection between all of the human body systems and examines how these systems work together to maintain health and homeostasis. Students begin to discuss and design medical interventions for a fictional case study. The activities in this lesson are an engagement for the subsequent course, entitled Medical Interventions (MI).

### **Course Goals**

#### **Students will:**

- Think critically and problem solve
- Write scientifically and analyze scientific writing
- Master technology skills including internet, presentation & spreadsheet software, and other computer programs
- Master relevant lab skills using proper lab equipment
- Use proper medical terminology
- Gain a deeper understanding of the Biomedical Sciences field including content and career aspects through

### **HOSA**

*Future Health Professionals, formerly known as Health Occupations Students of America (HOSA), is a national career and technical student organization endorsed by the U.S. Department of Education and the Health Science Technology Education Division of Association for Career and Technical Education. HOSA is a great opportunity for **HBS** students to use the skills they learn to compete at the state and international level. In HOSA, students will volunteer on and off campus as well as implement awareness campaigns for the student body. HOSA membership is not a requirement for HBS.*

## Required Course Materials

- Pen/Pencil
- Laboratory Journal – spiral notebook or composition book
- School laptop and charger

## Course Policies

### Attendance/Absences/Makeup Work:

You must arrange, within one week of your return, to make up class work, tests, quizzes, and laboratory work missed due to documented, excused absences. Please make a point of talking to me about your situation so that we're both on the same page!

Unexcused or undocumented absences will result in a zero for missed classwork assignments, which may not be made up.

Take responsibility for your work - it is up to YOU to get your make up work - not for me to give it to you.

### Classroom Rules / Expectations:

- Be on time and ready to learn
- Be your best self
- Be respectful
- Be responsible

### By Permission:

- Food/drink
- Cell phones
- Headphones

### Assignment Policy:

All class assignments will be submitted online using the course website on **Canvas**. Late work will receive only partial credit (after the FIVE-day rule), and you are **expected** to keep up-to-date on your work and **be aware of all due dates**. *Cheating will not be tolerated and will result in a zero on that assignment* (for both the copier and anyone who allows the other to copy).

### Five-Day Rule:

Students will have a minimum of five (5) school days beyond the assignment or assessments posted due date or the date it was returned, to complete it, unless there are extenuating circumstances. A zero will be placed in the grade book until the work is complete or until the end of the five days. When the work is complete the grade will be changed to the earned grade permitting it is within the timeframe specified above.

## Grading Policy & Distribution

- **Assessment** - 45% (lab reports, quizzes, practical/exams)
- **Activities** - 30% (labs, projects)
- **Assignments** - 15% (classwork and homework)
- **Participation** - 10% (entry task, exit task, leadership, discussion)

<b><i>Point Value</i></b>	<b><i>Letter Grade</i></b>	<b><i>High Percentage</i></b>	<b><i>Low Percentage</i></b>
<i>4.00</i>	<i>A</i>	<i>100.00</i>	<i>93.00</i>
<i>3.70</i>	<i>A-</i>	<i>92.99</i>	<i>90.00</i>
<i>3.30</i>	<i>B+</i>	<i>89.99</i>	<i>87.00</i>
<i>3.00</i>	<i>B</i>	<i>86.99</i>	<i>83.00</i>
<i>2.70</i>	<i>B-</i>	<i>82.99</i>	<i>80.00</i>
<i>2.30</i>	<i>C+</i>	<i>79.99</i>	<i>77.00</i>
<i>2.00</i>	<i>C</i>	<i>76.99</i>	<i>73.00</i>
<i>1.70</i>	<i>C-</i>	<i>72.99</i>	<i>70.00</i>
<i>1.30</i>	<i>D+</i>	<i>69.99</i>	<i>67.00</i>
<i>1.00</i>	<i>D</i>	<i>66.99</i>	<i>60.00</i>
<i>0.70</i>	<i>F</i>	<i>59.99</i>	<i>57.00</i>
<i>0.30</i>	<i>F</i>	<i>56.99</i>	<i>53.00</i>
<i>0.00</i>	<i>F</i>	<i>52.99</i>	

## Agreement for PLTW: Human Body Systems

I, \_\_\_\_\_ (write name legibly) have read and agree to follow all of the classroom policies and safety rules (on this and the next page) set forth in this document. I agree to obtain all necessary materials for the course and tell **Ms. Bradley** ASAP, if I am unable to get any of the necessary materials. I realize that I must obey the safety rules listed in order to ensure my own safety, and that of my fellow students and instructors. I will cooperate to the fullest extent with my instructor and fellow students to maintain a safe lab environment. I will also closely follow the oral and written instructions provided by the instructor. I am aware that any violation of the safety contract may result in my being removed from the laboratory, detention, and/or receiving a failing grade.

Student Signature \_\_\_\_\_ Date \_\_\_\_\_

Dear Parent or Guardian:

I feel that you should be fully informed about your child's opportunities and experiences in my class, as well as the expectations that I place upon them.

Please read through this syllabus, especially the general policies, expectations, safety contract and laptop use agreement (see below). No student will be permitted to perform laboratory activities unless this contract is signed by both the student and parent/guardian and returned to Ms. Bradley.

Your signature on this contract indicates that you have read this document, are aware of my expectations and the measures taken to ensure the safety of your child in the science laboratory, and will instruct your child to uphold the agreement to follow these rules and procedures in the laboratory.

Parent/Guardian Name \_\_\_\_\_ (write name legibly)

Parent/Guardian Signature \_\_\_\_\_ Date \_\_\_\_\_

Home phone: \_\_\_\_\_ Cell phone: \_\_\_\_\_

Email Address: \_\_\_\_\_

Do you prefer that I contact you by phone or by email? \_\_\_\_\_

**Lab Safety Contract**

1. Conduct yourself in a responsible manner at all times in the laboratory. If in doubt about anything, ASK **Ms. Bradley**
2. Follow all written and verbal instructions carefully. If you do not understand a direction or part of a procedure, ask the instructor before proceeding.
3. Never work alone. No student may work in the laboratory without an instructor present.
4. When first entering a science room, do not touch any equipment, chemicals, or other materials in the laboratory area until you are instructed to do so.
5. **Do not eat food, drink beverages, or chew gum in the laboratory (this is a hard NO!).**
6. Perform only those experiments authorized by the instructor.
7. Never fool around in the laboratory. Horseplay, practical jokes, and pranks are dangerous and prohibited.
8. Clean up after yourself. Observe good housekeeping practices. Work areas should be kept clean and tidy at all times.
9. Keep aisles clear. Push your chair in when not in use..
10. Know the locations and operating procedures of all safety equipment including the first aid kit, eyewash station, safety shower, fire extinguisher, and fire blanket. Know where the fire alarm and the exits are located.
11. Dispose of all chemical waste properly. Never dump chemicals in sink drains. Sinks are to be used only for water and those solutions designated by the instructor. Solid chemicals, metals, matches, filter paper, and all other insoluble materials are to be disposed of in the proper waste containers, not in the sink. When in doubt, ASK **Ms. Bradley!**
12. Keep hands away from face, eyes, mouth and body while using chemicals or preserved specimens. Wash your hands with soap and water after performing all experiments. Clean (with detergent), rinse, and wipe dry all work surfaces (including the sink) and apparatus at the end of the experiment. Return all equipment clean and in working order to the proper storage area.
13. Experiments must be personally monitored at all times. You will be assigned a laboratory station at which to work. Do not wander around the room, distract other students, or interfere with the laboratory experiments of others.
14. Any time chemicals, heat, or glassware are used, students will wear laboratory goggles.
15. Dress properly during a laboratory activity. Long hair, dangling jewelry, and loose or baggy clothing are a hazard in the laboratory. Long hair must be tied back and dangling jewelry and loose clothing must be secured. Shoes must completely cover the foot.
16. Report any accident (spill, breakage, etc.) or injury (cut, burn, etc.) to the instructor immediately, no matter how trivial it may appear. Never handle broken glass with your bare hands. Tell **Ms. Bradley** and SHE will clean it up!
17. If a chemical should splash in your eye(s) or on your skin, immediately flush with running water from the eyewash station or safety shower for at least 20 minutes. Notify **Ms. Bradley** immediately.
18. All chemicals in the laboratory are to be considered dangerous. Do not touch, taste, or smell any chemicals unless specifically instructed to do so. The proper technique for smelling chemical fumes will be demonstrated to you. Never remove chemicals or other materials from the laboratory area.
19. When removing an electrical plug from its socket, grasp the plug, not the electrical cord. Hands must be completely dry before touching an electrical switch, plug, or outlet.
20. Examine glassware before each use. Never use chipped or cracked glassware. Never use dirty glassware. Do not immerse hot glassware in cold water; it may shatter. If you notice that your glassware is damaged, ask **Ms. Bradley** for a replacement.
21. Exercise extreme caution when using a gas burner. Take care that hair, clothing and hands are a safe distance from the flame at all times. Do not put any substance into the flame unless specifically instructed to do so. Never reach over an exposed flame. Never leave a lit burner unattended. Never leave anything that is being heated or is visibly reacting unattended. Always turn the burner or hot plate off when not in use.

## Classroom Computer Use

**Laptop Usage:** Students will use laptops in the class on a near-daily basis. It is expected that students will treat these technological devices with extreme care. The laptops and internet will be used to pull up curriculum, complete

research, online activities, daily exit tickets, and take quizzes and/or tests. Students are required to have this page signed and returned to Ms. Bradley before they will be allowed to use their laptop in the classroom. Students are responsible for coming to class with their laptop and charger daily.

**Improper Use of Laptops:** *Students will be docked their participation points if laptops are used for activities not related to class.* If a student is caught using the laptops to play games, surf the internet for non-activity related items, etc. a warning will be given. If it occurs again in a class period, the student will lose 5 participation points and be asked to put the laptop away for the remainder of the class. The next time the student is caught doing this, they will lose points and must put the laptop away. **On the third offense, a detention will be served.**