



# Anatomy and Physiology - Unit 5 - Blood or Immune Systems

## Unit Focus

After engaging in learning activities focused on the nervous and cardiovascular systems, the students will have the choice of which system they would like to investigate in depth. Throughout the unit, students will work to uncover the details of their chosen system and develop a model and website to explain the structures and functions of the body system. The website, which will include the student-developed model, will be used for the summative assessment in which students will analyze a case study and determine the physiological cause of the symptoms.

## Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
<b>Next Generation Science</b> <i>High School Life Sciences: 9 - 12</i> <ul style="list-style-type: none"> <li>Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. <i>HS-LS1-2</i></li> </ul> <b>Next Generation Science Standards (DCI)</b> <i>Science: 10</i> <ul style="list-style-type: none"> <li>Systems of specialized cells within organisms help them perform the essential functions of life. <i>LS1.9.A1</i></li> <li>Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. <i>LS1.9.A4</i></li> </ul> <b>Madison Public Schools Profile of a Graduate</b> <i>Critical Thinking</i> <ul style="list-style-type: none"> <li>Analyzing: Examining information/data/evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2)</li> </ul>	<b>T1</b> Create models to explore complex systems, show mastery of key science concepts, and/or develop solutions through creation of a product open to testing and redesign. <b>T2</b> Communicate effectively based on purpose, task, and audience to promote collective understanding and/or recommend actions.	
	<b>Meaning</b>	
	<b>Understanding(s)</b>	<b>Essential Question(s)</b>
	<b>U1</b> The structure of a given organ or organ system is related to its function. <b>U2</b> Individual components of a body system all work together to create a functioning system. <b>U3</b> When the natural feedback loops or structures and functions of a system fail, typical symptoms will manifest that can be used to analyze the underlying causes of the issue.	<b>Q1</b> How does structure relate to function? <b>Q2</b> How do the materials that are necessary for a person's health and well-being move through the body? <b>Q3</b> How do the components of a body systems function together to allow organisms to complete a specified task, either voluntarily or involuntarily? <b>Q4</b> How can I apply my understanding of how body system work to analyze a medical issue?
	<b>Acquisition of Knowledge and Skill</b>	
	<b>Knowledge</b>	<b>Skill(s)</b>
	<b>K1</b> The major structures of the blood are: plasma, red and white blood cells, and platelets. All of which work together and have specific structures that allow them to function in transporting materials through the body. <b>K2</b> Blood provides the functions of transportation, protection, and regulation for the body.	<b>S1</b> Conducting research to investigate, model, and communicate detailed information about a body system. <b>S2</b> Developing a visual model that explains how the individual parts of a body system work together to make a functioning system.

## Stage 1: Desired Results - Key Understandings

**K3** Hemostasis is the process that halts bleeding and causes coagulation.

**K4** The human blood types are: A, B, AB, O. The Rh factor determines if a blood type is positive or negative. Antigens and antibodies associated with a person's blood type have implications in the medical field.

**K5** Scientists are able to provide blood transfusions to people in need based on an understanding of blood type, antibodies, and antigens.

**K6** Due to the chemical makeup of the components of blood, people only receive certain kinds of blood during a blood transfusion.

**K7** Blood type is determined by parental genetics.

**K8** The major structures of the blood are: complement proteins, granulocytes, macrophages, dendritic cells, helper T cells, Killer T cells, B cells, plasma cells, and memory B cells. All of which work together and have specific structures that allow them to function in protecting the body from infection.

**K9** Viruses and bacteria have different structures and processes, which has implications for the immune system as well as medical treatment and prevention approaches.

**K10** The immune system is responsible for allowing a person's body fight of a viral or bacterial infection.

**K11** The human body has nonspecific defenses against infection.

**K12** Students will know the cause, symptoms, treatment, and relevant statistics associated with an infectious disease of choice (either bacterial or viral).

**K13** Scientists have been able to extract DNA from blood cells in order to gain information and solve issues ranging from paternity, crime, and genetic links to disease.

**K14** People who are immunocompromised can suffer and die from infections that typically do not severely impact the health of people with immune systems that are not compromised.

**S3** Creating a website that correctly uses medical terminology and that can be used as a reference for others to learn about a chosen body system.

**S4** Analyzing case studies and applying content to determine the physiological cause of the condition.