

# Unit 4: Transport

Content Area: **Science**  
Course(s): **Anatomy/Physiology Lab**  
Time Period: **4th Marking Period**  
Length: **5 weeks**  
Status: **Published**

## Unit Overview

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This unit is developed to describe how blood, heart, blood vessels, and lymphatic vessels help maintain homeostasis in the body.

## Transfer

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Students will be able to independently use their learning to.....

- Understand what blood is, what it does, and understand their own blood type.
- Be able to take a blood pressure and understand how the heart works.
- Identify lymph nodes and what their function is.
- Why certain people have food allergies.

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For more information, read the following article by Grant Wiggins.

[http://www.authenticeducation.org/ae\\_bigideas/article.lasso?artid=60](http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=60)

## Meaning

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## Understandings

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Students will understand that.....

- Blood has solid and liquid components with different functions.
- How red blood cell production is controlled.
- How a white blood cell differential count is calculated.
- Leukemia is a blood cancer.
- Blood types coincide with the presence or absence of red blood cell surface molecules.
- The heart has major portions that have different functions.
- The heart is a large muscle.
- How blood pressure is produced and controlled.
- Compare the blood flow through the various blood vessels.
- Describe and locate various lymph nodes.
- What is meant by an allergic response.

## **Essential Questions**

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Students will keep considering.....

- Why is blood red? and why do white blood cells appear purple?
- Why is blood liquid, yet contains solid cells?
- Why do I have one blood type and my mother has another?
- How does the heart continue beating?
- Why doesn't blood pour directly over our body tissues?
- Why do some people develop heart disease?
- How can we explain the meaning of an ECG?
- Why would someone develop swollen glands?
- How does the body defend itself against infection?

## **Application of Knowledge and Skill**

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### **Students will know...**

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Students will know.....

- Red blood cells, white blood cells, and platelets are the solid parts of blood, and plasma is liquid.
- Red blood cell production is affected by diet.
- White blood cells protect against disease.
- Blood plasma contains nutrients, gases, but mostly water.
- Blood is able to clot due to clotting factors.
- Agglutination is the clumping of red blood cells following a transfusion reaction.
- The ABO blood group is based on the presence or absence of antigens A or B.
- The cardiovascular system is composed of a closed system of blood vessels.
- The heart has 4 chambers.
- The heart contains valves that allow blood to pass through one way.
- The main blood supply to the heart is the coronary arteries.
- An ECG is a recording of the electrical changes of the heart during a cardiac cycle.
- There are 3 major types of blood vessels: capillaries, arteries and veins.
- There are different factors that affect blood pressure.
- The aorta is the largest artery in the body.
- The lymphatic system helps the body fight infection and disease.
- Lymph nodes help filter harmful substances.
- The thymus and spleen are two major lymphatic organs.

## **Students will be skilled at...**

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Students will be skilled at....

- Using the microscope to identify RBC and WBC, and also differentiate among the types of white blood cells.
- Using a "pseudo" blood typing lab, understand the mechanisms behind agglutination.
- Using models and animal hearts, they will be able to identify structures of the heart.
- Using charts and labeling, identify and understand the path of blood through the heart.
- Using blood pressure equipment, identify the systole and diastole during a cardiac cycle.
- Using ECG charts of "real" cases, diagnose heart problems.
- Using the microscope, identify parts of lymphatic tissue.
- Using models, be able to identify locations of lymph nodes.

## **Academic Vocabulary**

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erythrocyte leukocyte erythropoietin hemoglobin macrophages bilirubin biliverdin granulocytes  
agranulocytes

neutrophils eosinophils basophils monocytes lymphocytes platelets plasma coagulation thrombus  
embolus

fibrin fibrinogen agglutination antigen antibody Rh blood group cardiovascular pulmonary  
systemic pericardium

atria ventricles tricuspid bicuspid (mitral) pulmonary valve aorta coronary systole diastole cardiac  
cycle

functional synctium pacemaker ECG veins arteries capillaries vasoconstriction vasodilation  
myocardial infarction

angina pectoris lymphatic system lymph nodes spleen thymus immunity

## **Learning Goal 1**

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Students will be able to describe the general characteristics of blood and discuss its major functions, as well explain the significance of the separate parts of blood; they will also be able to list the major steps in blood coagulation and determine blood types.

Proficiency Scale

SCI.HS-LS1-3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
SCI.HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

**Target 2**

Students will be able to distinguish among the 5 types of white blood cells and the functions of each type.

**Target 3**

Students will be able to describe the components of plasma and explain the mechanisms of hemostasis.

**Target 4**

Students will be able to explain how blood typing is done and how it is used to avoid adverse reactions, including reactions that may occur between fetal and maternal tissues.

**Learning Goal 2**

Students will be able to differentiate structures of the heart and blood vessels, blood flow throught the heart, describe parts of an ECG, how blood pressure is produced and major paths of circulation.

Proficiency Scale

SCI.HS-LS1-3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
SCI.HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

**Target 1**

Students will be able to identify and locate the major parts of the heart, and the functions of each.

## **Target 2**

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Students will be able to trace the pathway of blood through the heart and the vessels of coronary circulation; they will also compare the structures and functions of the major types of blood vessels.

## **Target 3**

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Students will be able to explain how blood pressure is produced and controlled.

## **Target 4**

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Students will be able to compare the pulmonary and systemic circuits of the cardiovascular system.

## **Learning Goal 3**

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Students will be able to describe the general functions of the lymphatic system, describe what a lymph node is, discuss the locations and functions of the spleen and thymus, and describe what immunity is.

### Proficiency Scale

SCI.HS-LS1-3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
SCI.HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

## **Target 1**

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Students will be able to describe the general functions of the lymphatic system.

## **Target 2**

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Students will be able to describe a lymph node, their locations, and functions.

### **Target 3**

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Students will be able to discuss the locations and functions of the thymus and spleen and the roles that they play in one's immunity.

### **Formative Assessment and Performance Opportunities**

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Labs, worksheets and classwork diagrams and charts, guided notes, group activities

### **Summative Assessment**

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The unit assessment will be created collaboratively and used for every student in the course. In addition, there will be other assessments in the form of labs, pen and paper tests, projects, and quizzes. Common Assessment is administered through LinkIt.

### **Accommodations/Modifications**

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- Additional Resource <http://www.haspi.org/>
- Make use of online review resources for the circulatory system
- Pair struggling students with a study partner

### **Unit Resources**

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Hole's Essentials of Human Anatomy and Physiology 11th Edition

### **21st Century Life and Careers**

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|-----------------|--|
| CAEP.9.2.12.C.1 | Review career goals and determine steps necessary for attainment.      |
| CAEP.9.2.12.C.3 | Identify transferable career skills and design alternate career plans. |

## Interdisciplinary Connections

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LA.WHST.11-12.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
LA.WHST.11-12.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
LA.SL.11-12.5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.