The Beat Goes On

Grade Level: Fourth Grade
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Length of Unit: 4 – 6 weeks, 45 minutes daily

I. ABSTRACT

This science unit will provide an exciting adventure for the students to explore the circulatory system. Emphasis will be placed upon the Circulatory System as the major highway that transports blood, oxygen, and nutrients to all parts of the body by implementing language arts, writing, and math skills. Students will participate in a variety of learning activities by using technology, primary sources, research, and hands-on-activities. Upon the completion of this unit, the students will identify and explain the major functions and components of the Circulatory System. The students will also identify William Harvey and his accomplishments.

II. OVERVIEW

A. Concept Objectives

1. The student will gain an understanding of the accomplishments of William Harvey through library and Internet research.
2. The student will develop an understanding of the major components and functions of the parts of the circulatory system.
3. The student will understand how the circulatory system works and explain the significance of the circulatory system to the human body.
4. The student will understand how everyday life choices may affect their health.

B. Content from the *Core Knowledge Sequence*

1. The Circulatory System (*Core Knowledge Sequence*, page 104)
   a. Pioneering work of William Harvey
   b. Heart: four chambers (auricles and ventricles), aorta
   c. Blood
      Red blood cells (corpuscles), white blood cells (corpuscles), platelets, hemoglobin, plasma, antibodies
      Blood vessels: arteries, veins, capillaries
      Blood pressure, pulse
      Coagulation (clotting)
   d. Filtering function of liver and spleen
   e. Fatty deposits can clog blood vessels and cause a heart attack
   f. Blood types (four basic types: A, B, AB, O) and transfusions

B. Skill Objectives

1. The student will identify vocabulary of the Circulatory System.
2. The student will develop and understanding that the Circulatory System is a busy highway that carries blood, oxygen, and nutrients to all parts of the human body.
3. The student will use a variety of sources and tools to gather information on the works of William Harvey.
4. The student will identify and participate in the writing process steps (brainstorm, rough draft, self-edit, peer-edit, revise, final draft) to complete his/her research paper on the biography of William Harvey.
5. The student will understand the writing process steps involved in writing a research paper.

6. The student will recognize, identify, and correctly use grammatical and mechanical writing skills.
7. The student will explain the major components and functions of the heart.
8. The student will identify and explain the function of each type of the blood components.
9. The student will understand the process of coagulation.
10. The student will be able to calculate math problems relative to his/her heart rate.
11. The student will explain the functions of the liver and spleen.
12. The student will understand how fatty deposits clog blood vessels and cause heart attacks.
13. The student will learn about various diseases that affect the Circulatory System.
14. The student will identify and explain the four basic types of blood.
15. The student will work cooperatively in learning groups to accomplish goals. (TN SS Accomplishments 4.6.01B)

III. BACKGROUND KNOWLEDGE

A. For Teachers

1. E. D. Hirsch, Jr. *What Your Fourth Grader Needs to Know*.
2. Harcourt, *Harcourt Science*
3. Prentice Hall Science, *Human Biology and Health*

B. For Students

4. Students will review research techniques utilizing encyclopedias, dictionaries, and technology
5. Students will have prior knowledge of the human body from the *Core Knowledge Sequence*, third grade on pages 81 – 82.

IV. RESOURCES

A. Harcourt, *Harcourt Science.* Orlando: Harcourt School Publishers, 2003, ISBN 0-15-328343-2

B. Hirsch, Jr. E.D. *What Your Fourth Grader Needs to Know.* New York: Dell Publishing, 1993, ISBN 0-385-31260-1

C. Prentice Hall Science. *Human Biology Science.* New Jersey: Prentice-Hall, Inc. 1994, ISBN 0-13-225491-3

D. Cole, Joanna. *The Magic School Bus Inside the Human Body*. New York: Scholastic, Inc., 1989, ISBN 0-590-41427-5

E. Internet access: http://www.puzzlemaker.com

F. Internet access: http://biology.about.com/library/organs/blcircsystem2.htm

G. Internet access: http://www.blupete.com/Literature/Biographies/Science/Harvey.htm

H. Internet access: http://www.explore-biography.com/biologists/W/William_Harvey.html

I. Internet access: http://www2.sjsu.edu/depts/Museum/harvey.html

J. Internet access: http://www.evgschool.org/Heart.htm

K. Showers, Paul. *A Drop of Blood.* New York: Thomas Y. Crowell Company, 1967.

L. Card game: *The Body* by Workman Publishing

M. CD: *My Amazing Human Body* by DK Interactive Learning

N. *The Human Body* by Geo Safari Electronic Learning Game

O. Flash cards: *The Human Body Game* by The Mailbox Magazine

P. *Visible Pumping Heart Model* by Lindberg Hobbies, Inc.

V. LESSONS

Lesson One: Hop Aboard the Circulatory Highway

A. Daily Objectives

1. Concept Objective(s)

a. The student will develop an understanding of the major components and functions of the parts of the circulatory system.

b. The student will understand how the circulatory system works and explain the significance of the circulatory system to the human body.

2. Lesson Content

a. The Circulatory System

3. Skill Objective(s)

a. The student will develop an understanding that the Circulatory System is a busy highway that carries blood, oxygen, and nutrients to all parts of the human body.

b. The student will share background knowledge with other students to begin creating a K-W-L chart activity.

c. The student will identify vocabulary of the Circulatory System.

d. The student will demonstrate art skills.

e. The student will work cooperatively in learning groups to accomplish goals. (TN SS Accomplishments 4.6.01B)

B. Materials

1. worksheet: "The Circulatory System Vocabulary Crossword Puzzle"
2. handout: Circulatory System Vocabulary (Appendix A)
3. Internet access: http://www.puzzlemakercom
4. paper and pencils
5. markers/crayons
6. chart paper for K-W-L chart
7. book: *The Magic School Bus Inside the Human Body* by Joanna Cole.
8. student portfolio
9. poster: "The Circulatory System"
10. poster: "The Heart"

C. Key Vocabulary

1. The ***heart*** is a strong muscular, four-chambered organ that pumps blood through the body.
2. The ***aorta*** carries the blood from the left ventricle to all parts of the body.
3. The ***left ventricle*** sends oxygenated blood to the body and heart.
4. The ***right ventricle*** receives blood from the right atrium and sends the blood to the lungs.
5. The ***right atrium (auricle)*** receives deoxygenated blood from the body.
6. The ***left atrium (auricle)*** receives oxygenated blood from the lungs.
7. The ***pulmonary artery*** carries blood directly from the right ventricle of the heart to the lungs.
8. The ***septum*** is a dividing wall of membrane that separates the ventricles of the heart.
9. The ***upper vena cava*** is a vein that carries blood from the head and arms to the right atrium.
10. The ***lower vena cava*** is a vein that carries blood from the body (trunk) and legs to the right atrium.

11. The ***artery*** is a blood vessel that carries blood, rich with oxygen and nutrients, away from the heart.
12. The ***vein*** is a blood vessel that carries blood back to the heart for fresh oxygen from the lungs.
13. The ***capillaries*** are tiny blood vessels that carry blood between the arteries and veins.
14. The ***valves*** are membranes that control the flow of blood into and out of the heart.
15. The ***pulmonary vein*** carries blood from the lungs into the left atrium of the heart.

D. Procedures/Activities

1. Introduce the lesson by having students brainstorm K-W-L responses on large chart paper. Label the headings "What We Know About the Circulatory System" and What We Want to Know About the Circulatory System."
2. Display the poster "Circulatory System" for students to review as they study the Circulatory System.
3. Read orally *The Magic School Bus Inside the Human Body* by Joanna Cole to the students. After completing the book, ask the students to draw a picture of a heart, as best they can. Students' drawings may be very "sketchy" and simple; however, that is okay.
4. Display the poster "The Heart" and then, have the students to compare their drawings with the diagram of the heart on the poster and discuss the differences. **Note:** The main idea is that the heart is not the shape of a valentine, but it has chambers and tubes for blood to go in and out.
5. Introduce key vocabulary the students will use as they study the Circulatory System. **Note:** Give each student a handout with vocabulary and definitions for his/her student portfolio (Appendix A).
6. Divide the students into cooperative learning groups to complete the vocabulary crossword puzzle "The Circulatory System Vocabulary" created from the Internet web-site http://www.puzzlemaker.com **Note:** Assign groups that perhaps consist of one high, one low, and two average academic level students which allows all students (gifted, talented, or special ed.) to be successful in learning.
7. Summarize the lesson by reviewing the K-W-L chart "What We Want to Know About the Circulatory System."

E. Assessment/Evaluation

1. Evaluate students' responses and participation on their knowledge of the Circulatory System.
2. Evaluate students' drawings of the heart.
3. Observe students as they work in cooperative learning groups for perhaps a participation grade.
4. Evaluate students' vocabulary crossword puzzle for vocabulary skills and place in students' portfolios.

Lesson Two: William Harvey' Biography: The Writing Activity

A. Daily Objectives

1. Concept Objective(s)

a. The student will gain an understanding of the accomplishments of William Harvey through library and Internet research.

2. Lesson Content

a. Pioneering Work of William Harvey

3. Skill Objective(s)

a. The student will use a variety of sources and tools to gather information on the works of William Harvey.

b. The student will write a four-paragraph research paper of the biography on the life and accomplishments (works) of William Harvey.

c. The student will identify and participate in the writing process steps (brainstorm, rough draft, self-edit, peer-edit, revise, final draft) to complete his/her research paper on the biography of William Harvey.

d. The student will understand the writing process steps involved in writing a research paper.

e. The student will recognize, identify, and correctly use grammatical and mechanical writing skills.

f. The student will work cooperatively in learning groups or partners to accomplish goals. (TN SS Accomplishments 4.6.01B)

g. The student will work independently and cooperatively to accomplish goals. (TN SS Accomplishments 4.6.01B)

B. Materials

1. dictionary
2. encyclopedias
3. handout: The Writing Process Steps (Appendix B)
4. computer/monitor
5. Internet access: http://biology.about.com/library/organs/blcircsystem2.htm
6. Internet access: http://www.blupete.com/Literature/Biographies/Science/Harvey.htm
7. Internet access: http://www.explore-biography.com/biologists/W/William_Harvey.html
8. Internet access: http://www2.sjsu.edu/depts/Museum/harvey.html
9. paper and pencils
10. dry erase board, markers, eraser
11. library access
12. CD-ROM encyclopedia
13. student portfolio
14. research outline: "William Harvey Research Report" (Appendix C)
15. rubric for assessment (Appendix D)

C. Key Vocabulary

1. A ***biography*** is the story of a person's real life and accomplishments that is written by someone else.
2. ***Brainstorm*** is way to focus a writing topic by listing any thoughts that comes to mind about the topic.
3. A ***rough draft (prewriting)*** is the process of writing which the writer captures ideas on paper.
4. ***Self-edit*** is when the writer edits his/her own paper for grammatical and mechanical errors such as sentence fragments, punctuation, capitalization, and spelling.
5. ***Peer edit*** is when a partner edits a student's paper for grammatical and mechanical errors such as sentence fragments, punctuation, capitalization, and spelling.
6. ***Revise*** is to improve a draft by adding or taking out information, combining and reordering sentences, elaborating or changing word choices according to the purpose and audience.

7. ***Final draft (publishing)*** is sharing your final, written work with an audience.

D. Procedures/Activities

1. Introduce the lesson by writing the word **"biography"** on the dry erase board. Ask the students to define the word and write their responses on the board. Then, ask the students to write the new word and definition in their student portfolio.
2. Give each student a handout with the explanation of the writing process steps for his/her student portfolios (Appendix B).
3. Review the steps of the writing process. After reviewing the writing steps, present the research outline (Appendix C) the students will be using to gather information for their research paper on the biography of William Harvey. Also, explain the rubric assessment (Appendix D) that will be used for evaluation of their research report.
4. Introduce students to the variety of sources and tools required for research (dictionary, encyclopedia, CD-ROM encyclopedia, library access, Internet access). **Note:** Use the Internet web-sites listed on materials.
5. The students will work with partners to gather information from available sources. The students will share notes for accuracy with another partner. Then, students will work independently and write their rough draft. **Note:** To ensure success for each student, the teacher will choose partners according to their learning abilities to motivate and promote academic learning as well as self-esteem and social skills.
6. The students will self-edit, peer edit, revise, and complete final draft (publish) their research paper on the biography of William Harvey.
7. After the final draft is completed, instruct the students to create a cover page that includes the title (William Harvey's Biography), student's name, and date.
8. Summarize the lesson by allowing the students to share their William Harvey's biography with other grade levels.

E. Assessment/Evaluation

1. Evaluate students' knowledge, responses, and participation during class discussion on the steps of the writing process.
2. Observe students working and participation with partners for perhaps a grade.
3. Evaluate students' research outline on brainstorming and place in students' portfolios.
4. Evaluate and record grade on students' rubric assessments (Appendix D) and attach to research paper.
5 Observe students' oral presentations on research paper for a grade. **Note:** Place in students' portfolios.

Lesson Three: The Busy Pump

A. Daily Objectives

1. Concept Objective(s)

a. The student will develop an understanding of the major components and functions of the parts of the circulatory system.

b. The student will understand how the circulatory system works and explain the significance of the circulatory system to the human body.

2. Lesson Content

c. Heart: four chambers (auricles and ventricles), aorta

3. Skill Objective(s)

a. The student will learn that the heart is a fist-sized muscle that pumps blood all through the body.
b. The student will identify the four chambers and aorta of the heart.
c. The student will explain the major components and functions of the heart.
d. The student will work independently to accomplish goals. (TN SS Accomplishments 4.6.01B)

B. Materials

1. book: *Human Biology and Health* by Prentice Hall Science
2. dry erase board, markers, eraser
3. squeeze bottle
4. computer/monitor
5. Internet access: http://www.evgschool.org/Heart.htm
6. worksheet: "Parts of the Heart" (Appendix E)
7. answer key: "Part of the Heart" (Appendix F)
8. paper and pencils
9. student portfolio

C. Key Vocabulary

1. ***Blood*** is the red liquid in the veins, arteries, and capillaries that carries oxygen and nutrients to all parts of the human body.
2. A ***pump*** is a machine that pumps or forces liquids into or out of things.
3. The ***kidney*** is an organ that removes or filters waste products from the blood.

D. Procedures/Activities

1. Introduce the lesson by presenting the idea that the heart is a pump and ask students to offer their definitions of "pump." Clarify and agree on a class definition.
2. Review vocabulary from Lesson One, located in students' portfolios. Then, write and discuss new key vocabulary on the dry erase board. Ask students to write the new vocabulary and definitions in their student portfolios.
3. Read lesson orally from *Human Biology and Health* textbook pages 80 – 88 about the "The Body's Transportation System" and "Circulation in the Body."
4. Ask the students: "How is the heart like a pump?" Listen to the students' responses. Tell the students the heart is fist-sized muscle that pumps blood all over the body through blood vessels. The blood passes through the kidneys for cleaning. Then, it returns to the heart and lungs to reload. Also, the heart can only contract, it can not expand. Have the students see for themselves. Ask the students to squeeze an open, empty squeeze bottle. It will go back to its original shape and will not get any larger. Squeeze it again, only this time feel the air rushing out of the top. Close the top and squeeze again. Ask the students: "What happens when the heart valves get blocked?" Listen to the students' responses. Tell the students the heart can not pump blood through the valves because they are blocked.
5. Have the students to form a semi-circle near the large computer monitor to engage in a learning activity. Access the Internet web site: http://www.evgschool.org/Heart.htm .The students will participate in an activity about the heart. Discuss with the students how the heart is a strong muscle that consists of four chambers (right/left auricles and right/left ventricles) and a large artery called aorta that comes out of the top of your heart. Also, discuss with the

students how the heart works like two pumps with alternating rhythms that pump blood into and out of the heart.

6. After completing the Internet activity, ask the students the following review questions:
   a. Name the four chambers of the heart. **(right ventricle, right atrium/auricle, left ventricle, left atrium/auricle)**
   b. What are the names of the veins that lead blood into the right atrium? **(superior vena cava, inferior vena cava)**
   c. What veins lead blood into the left atrium? **(pulmonary veins)**
   d. What artery does blood enter when it leaves the heart on its way to the lungs? **(pulmonary artery)**
   e. Which artery has fresh oxygenated blood that is starting its journey all round the body? **(aorta)**
7. Summarize the lesson by assigning worksheet "Parts of the Heart" (Appendix E) to access for comprehension of the lesson. **Note:** Students may use vocabulary handout in students' portfolios.

E. Assessment/Evaluation

1. Evaluate students' responses and participation during classroom discussion on lesson comprehension about the heart.
2. Evaluate and observe students during hands-on activity.
3. Evaluate and record grade on students' knowledge and comprehension skills on the worksheet "Parts of the Heart" (Appendix E) and place in students' portfolios.

Lesson Four: Blood – The Highway of Life

A. Daily Objectives

1. Concept Objective(s)

a. The student will develop an understanding of the major components and functions of the parts of the circulatory system.
b. The student will understand how the circulatory system works and explain the significance of the circulatory system to the human body.

2. Lesson Content

a. Blood
   Red blood cells (corpuscles), white blood cells (corpuscles), platelets, hemoglobin, plasma, antibodies
   Blood vessels: arteries, veins, capillaries
   Coagulation (clotting)

3. Skill Objective(s)

a. The student will identify and explain the function of each type of the blood components.
b. The student will follow and trace the path of the blood through the human body.
c. The student will describe the three types of blood vessels.
d. The student will understand the process of coagulation.
e. The student will work independently to accomplish goals. (TN SS Accomplishments 4.6.01B)

B. Materials

1. book: *A Drop of Blood* by Paul Showers
2. dry erase board, markers, eraser

3. book: *What Your Fourth Grader Needs to Know* by E. D. Hirsch
4. transparency: "Journey Through the Heart" (Appendix G)
5. model: "The Visible Pumping Heart" (A working model illustrating the function of the human heart and part of the human Circulatory System."
6. paper and pencil
7. student portfolio
8. overhead projector
9. worksheet: "Interbody Highway System" (Appendix H)

C. Key Vocabulary

1. ***White blood cells*** are cells that defend the body against invading organism.
2. ***Red blood cells*** are cells that carry oxygen throughout the body.
3. A ***platelet*** is a cell fragment that aids in blood clotting.
4. ***Hemoglobin*** is an iron-containing protein found in red blood cells.
5. ***Plasma*** is the fluid portion of the blood.
6. ***Antibodies*** are proteins produced by the immune system in response to bacteria.
7. ***Blood vessels*** are arteries, veins, and capillaries.
8. ***Coagulation*** is the clotting or thickening of the blood.

D. Procedures/Activities

1. Introduce the lesson by reading orally *A Drop of Blood* by Paul Showers. The book portrays to the students the highway of life within the body.
2. Write and discuss new key vocabulary on the dry erase board. Ask students to write the new vocabulary and definitions in their student portfolios.
3. Read lesson orally from *What Your Fourth Grader Needs to Know* pages 326-329 about the blood and the blood vessels. Also, read lesson orally from *Harcourt Science page* A17 about the blood and blood vessels.
4. Discuss the following essential information about the blood to the students using the transparency "Journey Through the Heart" (Appendix G). The Circulatory System carries life-giving blood to every cell in your body through a system of blood vessels. There are three kinds of blood vessels: arteries, veins, and capillaries. The arteries like main highways carry blood from the heart. They have elastic, muscular walls able to expand to handle the continuous pumping of the blood from the heart. Each artery branches at least 15 to 20 times, becoming tinier and tinier. The smallest arteries lead into a network of capillaries, which are narrow, thin blood vessels that connect veins to the arteries. The walls of the capillaries may be as thin as one cell thick. It is through these thin walls that nutrients and oxygen diffuse. The veins also like main highways return blood to the heart. Blood carries nutrients and oxygen throughout the Circulatory System. Plasma, the yellowish fluid part of the blood, carries dissolved wastes, various proteins, and nutrients. As the materials travel through the capillaries that are thin and have holes in their walls, the plasma leaks into the separate cells, supplying the much needed nutrients and oxygen. Red blood cells carry oxygen to the cells throughout the body. The red color is a combination of hemoglobin and oxygen. As red blood cells move about, the oxygen is absorbed by the tissues. Inside the tissues, carbon dioxide is accumulated by hemoglobin and plasma and then transported to the lungs for exhaling. White blood cells are larger and less numerous than red blood cells. They fight infection in the body by attacking and eating bacteria (antibodies), wastes, and dead cells. Platelets are another part of your body's defense. Platelets act with proteins to seal blood vessels; this is the coagulation of blood that appears in an open cut or wound. As

soon as a blood vessel is cut, platelets begin to collect around the cut. Eventually, the plasma hardens and forms a clot. Anytime your body forms a scab in response to a cut or a scrape, you are experiencing the clotting (coagulation) process. A scab, you can see, is a clot that forms on the surface of your skin. If platelets do not release chemicals that set off a series of reactions to help stop the flow of blood from the body, death could result.

5. Ask the students the following review questions:
   a. What are the four main components of the blood? **(plasma, red blood cells, white blood cells, platelets)**
   b. What is the yellowish fluid portion of the blood? **(plasma)**
   c. What cells contain hemoglobin? **(red blood cells)**
   d. How do platelets help the body? **(control bleeding)**
   e. What cells fight against bacteria, viruses, and other microscopic organisms? **(white blood cells)**
   f. What helps form blood clots to stop the flow of blood when a blood vessel is cut? **(platelets)**
6. During a hands-on group activity, the students will follow and trace the path of the blood of the heart throughout the body using the model "The Visible Pumping Heart" The students will have a better understanding of how the heart functions.
7. Summarize the lesson by asking each student independently to complete the worksheet "Interbody Highway System" (Appendix H).
   Answer key:

1. artery	2 across: bone	1 down: infection
2. vein	3 across: water	4 down: color
3. capillary	4 across: clot	5 down: red
4. artery	6 across: oxygen	

E. Assessment/Evaluation

1. Evaluate students' responses and participation during classroom discussion on lesson comprehension about the blood.
2. Evaluate and observe students' responses and participation during hands-on group activity.
3. Evaluate and record grade on students' knowledge and comprehension skills on the worksheet "Interbody Highway System" (Appendix H) and place in students' portfolios.

Lesson Five: Feel the Beat

A. Daily Objectives

1. Concept Objective(s)

a. The student will develop an understanding of the major components and functions of the parts of the circulatory system.
b. The student will understand how the circulatory system works and explain the significance of the circulatory system to the human body.

2. Lesson Content

a. Blood pressure, pulse

3. Skill Objective(s)

a. The student will be able to locate his/her pulse.
b. The student will be able to calculate math problems relative to his/her heart rate.

c. The student will gain an understanding of the effects of physical exercise on the heartbeat rate.

d. The student will work cooperatively with partners to accomplish goals. (TN SS Accomplishments 4.6.01B)

B. Materials

1. book: *Human Biology and Health* by Prentice Hall Science
2. dry erase board, markers, eraser
3. student portfolio
4. pencils or markers
5. construction paper
6. clock or watch with second hand
7. paper
8. gym or playground

C. Key Vocabulary

1. ***Blood pressure*** is the pressure of the blood against the inner walls of the arteries that forces the blood to move.
2. ***Pulse*** is the regular beating of the arteries caused by the rush of blood into them after each contraction of the heart.

D. Procedures/Activities

1. Introduce the lesson by asking the students if they have ever felt any changes in their bodies after they have been running or exercising strenuously during physical education. Listen to the students' responses. Then, ask students to clarify what they mean when they say their heart is pounding or racing.
2. Read lesson orally from *Human Biology and Health* pages 99 – 102 about blood pressure and pulse.
3. Point out to the students that when the left ventricle of the heart pumps blood, it produces a pulse and blood pressure. Explain that blood pressure is the force of the blood against the arterial walls, which forces the blood to move. Blood pressure rises each time the heart contracts to pump blood and blood pressure fails slightly each time the heart relaxes between beats. **Note:** Write the definitions for blood pressure and pulse on the dry erase board and ask the students to write the new vocabulary and definitions in their student portfolios.
4. Demonstration by the teacher: Ask the students to look carefully as I show how to measure your heart rate (pulse) by using only two fingers. To locate your pulse, place the index and middle finger of one hand on your other wrist where it joins the base of your thumb. Move the two fingers slightly until you locate your pulse. **Note:** Walk around the room to be sure all students can see the area on the wrist where the pulse can be taken.
5. Help the students locate their heartbeat on their wrist. Check to ensure that each student was able to locate his/her pulse that can be felt well enough for accurate count. Ask students to volunteer the number of beats in their pulse.
6. Hands-on math activity: Assign each student a partner. The students will use a clock or watch to calculate how many times their partner's heart beats per minute, hour, day, and year. The students will draw a chart on construction paper and record the calculations. **Note:** To promote learning and understanding of the concept skills, assign partners according to their learning abilities so each student will feel successful.
7. Ask two partners to come to the front of the classroom and demonstrate how to find each partner's heart rate and share their chart calculations. Allow a variety of

students to demonstrate how to find their pulse and share their chart information. **Note:** This activity will enable students to help others that were having difficulty.

8. Summarize the lesson by having the students engage in a physical activity with their partners. The students will discover through an experiential activity that the rate at which his/her heart beats will increase as a direct result of physical exercise. Take the students to the gym or outside on the playground and participate in a physical activity such as running or jumping jacks to determine if their heart rate (pulse) will rise due to exercise. The students will record their pulse for one minute. Discuss students' results. Compare results taken inside the classroom to the physical activity results. Explain to the students that the heart beats faster after the exercise in order to pump more blood (oxygen) to the working muscles.

E. Assessment/Evaluation

1. Evaluate students' responses and participation during class discussion on lesson comprehension about blood pressure and heart rate.
2. Evaluate and observe students working and participation during hands-on activity with partners in the classroom for perhaps a grade.
3. Evaluate and record grade on math chart calculations and place in students' portfolios.
4. Observe students' participation during physical activity.

Lesson Six: The Body's Chemical Factory

A. Daily Objectives

1. Concept Objective(s)

a. The student will develop an understanding of the major components and functions of the parts of the circulatory system
b. The student will understand how the circulatory system works and explain the significance of the circulatory system to the human body.

2. Lesson Content

a. Filtering function of liver and spleen

3. Skill Objective(s)

a. The student will identify the liver and spleen.
b. The student will understand that the liver is a hard-working organ that makes and processes important chemicals for the body.
c. The student will explain the functions of the liver and spleen.
d. The student will work independently to accomplish goals. (TN SS Accomplishments 4.6.01B)

B. Materials

1. book: *Human Biology and Health* by Prentice Hall Science
2. dry erase board, markers, eraser
3. paper and pencils
4. coffee filters
5. squeezed fruit juice
6. two dishes
7. lard
8. margarine
9. french fry
10. dish detergent
11. pan

12. student portfolio
13. worksheet: "The Body's Chemical Factory" (Appendix I)

C. Key Vocabulary

1. The ***liver*** is a large reddish-brown organ that makes bile and helps the body absorb food.
2. The ***spleen*** is a ductless, gland-like organ located near the stomach, which stores blood and helps filter foreign substances from the blood

D. Procedures/Activities

1. Introduce the lesson by explaining to the students that the liver acts as a filter for the body, and also the spleen helps filter foreign substances from the blood.
2. Have the students observe a hands-on class activity. To simulate what the liver does for our bodies, perform the following experiment using coffee filters. Pour different substances through the filters. For instance, try freshly squeezed fruit juice. Ask the students: "What happens?" "What slips through the filter?" "What stays in?" Write students responses on the dry erase board.
4. Explain to the students that the liver is an important organ that acts like a warehouse for your body's nutrients. It helps your body break down or change carbohydrates, fats, and proteins so that your body can use them. It also removes harmful substances from your blood. Your liver filters old blood cells and processes most of the nutrients that are absorbed from the small intestine. When red blood cells wear out or is damaged, it is broken down in the liver and the spleen. So many red blood cells are destroyed in the spleen each day that this organ has been called "cemetery" of red blood cells.
5. Write the definitions of liver and spleen on the dry erase board. Ask students to write the new vocabulary and definitions in their student portfolios.
6. Read lesson orally from *Human Biology and Health* textbook pages 90 –91 about the liver and spleen.
7. Then, ask the students: "What happens to fatty foods inside your body?" Write students' responses on the dry erase board.
8. To show what happens to fatty foods inside your body, smear two dishes with lard, margarine, a greasy french fry, or some other oily substance. Put one dish in a pan of water for a few seconds. Have students run their fingers across the dish. It still feels greasy! Add a squirt or two of dish detergent to the tub. Explain that this detergent works much the same way as bile, an oily chemical made in the liver. Swish the water to disperse the detergent and place the second dish in the pan. Lift it out and feel the surface. Is it slimy? The detergent has surrounded the bits of grease, forcing them to separate from the dish. The bits of grease are still there; each one is just hidden inside a film of detergent like a nut inside a shell. Bile "washes" and "packages" fat in much the same way. The liver stores these little fat packages until fat-digesting chemicals "eat" them.
9. Summarize the lesson by asking each student independently to complete the worksheet "The Body's Chemical Factory" (Appendix I).
   Answer key:

1. B	2. C	3. A	4. C	5. B
6. C	7. C	8. C	9. B	

E. Assessment/Evaluation

1. Evaluate students' responses and participation during classroom discussion on lesson comprehension about the liver and spleen.
2. Evaluate and observe students' responses and participation during hands-on group activities.

3. Evaluate and record grade on students' knowledge and comprehension skills on the worksheet "The Body's Chemical Factory" (Appendix I) and place in students' portfolios.

Lesson Seven: Watch Out For Cholesterol

A. Daily Objectives

1. Concept Objective(s)

a. The student will understand how everyday life choices may affect their health.

2. Lesson Content

a. Fatty deposits can clog blood vessels and cause a heart attack

3. Skill Objective(s)

a. The student will understand the importance of maintaining a good cholesterol level.

b. The student will understand how fatty deposits clog blood vessels and cause heart attacks.

c. The student will learn about various diseases that affect the Circulatory System.

B. Materials

1. paper and pencils
2. dry erase board, markers, eraser
3. book: *Human Biology and Health* by Prentice Hall Science
4. sink
5. paper towels
6. filter
7. healthy snacks
8. student portfolio

C. Key Vocabulary

a. ***Heart attack*** is a heart disease caused by fatty material that has blocked the arteries and causes parts of the heart to die because less blood gets to the heart.

b. ***Cholesterol*** is a soft, fatlike substance found in our bloodstream among fats.

c. ***Atherosclerosis*** is the thickening of the inner wall of an artery.

d. ***Hypertension*** is high blood pressure.

D. Procedures/Activities

1. Introduce the lesson by explaining to the students that today, people are living longer than they have in the past. But as people's life expectancies have increased, so have the numbers of people who suffer from chronic diseases such as heart attacks. Heart attacks are one of the leading killers of Americans today. Ask students to share any personal experience about a family member, friend, or someone they know who has experienced a heart attack.
2. Ask the students to draw a heart on a sheet of paper and write as many reasons as they can think of for heart disease on their paper heart. Write reasons on dry erase board.
3. Write the definitions of heart attack, cholesterol, atherosclerosis, and hypertension on the dry erase board and ask students to write the new vocabulary and definitions in their student portfolios.

4. Explain to students that too much cholesterol and other fats in the bloodstream can affect the heart in a negative way. Cholesterol and fats tend to "stick" or build up on the walls of blood vessels. Point out that this buildup is similar to the buildup seen in old plumbing pipes. Plumbing pipes close over time, as do our blood vessels from cholesterol and fatty deposits. This narrowing of blood vessels, called atherosclerosis, prevents oxygen-carrying blood from reaching the heart. The result can be severe chest pain and eventually heart attack.
5. Read lesson orally from *Human and Biology and Health* textbook pages 96 – 101 about heart disorders.
6. Ask students the following review questions:
    a. How does diet contribute to increased cholesterol levels in the bloodstream? **(A diet that is high in fats will increase the level of fats, or cholesterol, in the bloodstream.)**
    b. How does a fatty diet contribute to hypertension, or high blood pressure? **(Cholesterol tends to clog, or clump, in the arteries, decreasing the effective capacity of that artery. This translates directly to higher blood pressure, or hypertension.)**
    c. Explain how cholesterol is both beneficial and harmful to the human body. **(The human body needs relatively small amounts of cholesterol to produce various hormones and to promote cell development. The cholesterol that is needed is produced by the liver. Excessive cholesterol in the bloodstream, resulting from a poor choice of diet, results in the clogging of arteries.)**
    d. What are things you can do to decrease your risk of cardiovascular disease? **(Lead students' responses toward the concept of everyday healthful life choices.)**
7. Demonstration by the teacher: Take the students to the high school science lab. Show the students how easily the water flows down the sink. Explain to the students this demonstrates the healthy flow of blood through the arteries of the heart. Then, place paper towels in the sink to show how the paper towels prevent water from going down the sink. **Note:** Place a filter in the drain to hold the paper towels so the drain does not really clog. Explain to the students if the paper towels float away from the filter, clogs can flow through the arteries also. However, the clogs can flow closer to the heart and cause serious damage like a heart attack. **Note:** Return to the classroom.
8. Summarize the lesson by surprising the students with some healthy snacks. Ask the students to collect as many labels of food products as possible that show cholesterol content and share the labels with the class the next day. **Note:** This activity will help them become aware of the variation in cholesterol levels that exist in everyday foods and some things we eat can be harmful to the heart.

E. Assessment/Evaluation

1. Evaluate students' knowledge, responses, and participation on heart disease activity.
2. Evaluate students' responses and participation during classroom discussion on lesson comprehension about heart diseases.
3. Evaluate and observe students during demonstration.
4. Evaluate students' homework assignment.

Lesson Eight: Blood Classifications

A. Daily Objectives

1. Concept Objective(s)

a. The student will develop an understanding of the major components and functions of the parts of the circulatory system.

b. The student will understand how the circulatory system works and explain the significance of the circulatory system to the human body.

2. Lesson Content

a. Blood types (four basic types: A, B, AB, O) and transfusions

3. Skill Objective(s)

a. The student will identify and explain the four basic types of blood.

b. The student will recognize Dr. Karl Landsteiner and identify his accomplishments about blood types.

c. The student will recognize Dr. Charles Drew and his discovery of the blood bank.

B. Materials

1. dry erase board, markers, eraser
2. book: *Human Biology and Health* by Prentice Hall Science
3. transparency: "Blood Types" (Appendix J)
4. overhead projector
5. labels
6. student portfolio

C. Key Vocabulary

1. ***Transfusion*** is providing a person with blood from another person or transferring blood from one body to another.

D. Procedures/Activities

1. Begin today's lesson by letting students share their labels containing cholesterol to the class.
2. Introduce the new lesson by telling the students that an important life-saving discovery scientists have made is how to replace a person's blood if he/she is badly injured. Write the word **"transfusion"** on the dry erase board and point out that "*trans"* means **across** and *"fusion"* means **combine**. Thus, transfusion is providing a person with blood from another person. Then, inform the students when transfusions were first tried, they were not successful and patients often died because scientists did not understand that all blood was not the same. In the 1900's, Dr. Karl Landsteiner examined blood samples closely and discovered human blood types (A, B, AB, O). Dr. Karl Landsteiner's work made it possible to determine blood types and thus, paved the way for blood transfusions to be carried out safely.
3. Read lesson orally from *Human Biology and Health* pages 93 – 95 about transfusions and blood types.
4. Point out to the students that the differences in human blood are due to the presence or absence of certain molecules and antibodies. The molecules are located on the surface of the red blood cells and the antibodies are in the blood plasma. Individuals have different types and combinations of theses molecules. Not all blood types are compatible with each other. Mixing incompatible blood types leads to blood clumping, which is dangerous for individuals. The blood group that you belong to depends on what you have inherited from your parents.

5. Discuss the following questions about transfusions and blood types to the students using the transparency "Blood Types" (Appendix J).
   a. What kinds of chemicals are produced by type O blood? **(Type O blood produces anti-A and anti-B chemicals.)**
   b. If a transfusion of type A were given to a person with type O blood, what would happen? **(The A proteins in the blood would react with the anti-A chemicals. The blood would clot. The person might die.)**
   c. If you have type B blood, from whom can you safely receive a transfusion? **(From person with type B or type O blood.)**
   d. If you have type O blood, from whom can you safely receive a transfusion? **(From person with type O blood.)**
   e. Why do you think type O blood received the name "universal donor"? **(Because it can be given safely to all blood types. People with type O blood can safely donate blood to those with types A, B, AB, and O.)**
   f. Which blood type is called the universal recipient? **(Type AB, because it can safely receive all blood types without clumping or clotting occurring.)**
   g. Suppose you are a doctor and you have two patients who are in need of a transfusion. Patient 1 has type A and patient 2 has type O. Which blood type would you determine safe to give to each of your patients? **(Patient 1, blood type A, should receive type A or type O blood. Patient 2, blood type O, should receive blood type O.)**
6. Explain to the students that the problem with blood transfusions used to be that blood could not be stored for very long before it went bad. If there was not a fresh supply of a patient's blood type or a blood donor with a matching blood type standing by in an emergency, the patient was not able to have a transfusion and would die. So, Dr. Charles Richard Drew, an American doctor, decided to tackle the problem of how to make blood for transfusions available. He studied the chemistry of fresh blood and how it changed over time. With a colleague, he opened a blood collection, a blood bank, at the hospital where he worked and learned how to preserve blood as long as possible. **Note:** Schedule a visit to a local blood donating center.
7. Summarize the lesson by asking the students to find out what their blood type is or perhaps a family member and share with the class the next day.

E. Assessment/Evaluation

1. Evaluate students' homework assignments and place in students' portfolios.
2. Evaluate students' responses and participation during classroom discussion on lesson comprehension about transfusions and blood types.

Lesson Nine: Highway Adventures

A. Daily Objectives

1. Concept Objective(s)

   a. The student will develop an understanding of the major components and functions of the parts of the circulatory system.
   b. The student will understand how the circulatory system works and explain the significance of the circulatory system to the human body.

2. Lesson Content

   a. The Circulatory System

3. Skill Objective(s)

a. The student will work cooperatively in learning groups to accomplish goals. (TN SS Accomplishments 4.6.01B)

b. The student will summarize knowledge and comprehension about the Circulatory System.

B. Materials

1. K-W-L chart
2. markers/crayons
3. pencil
4. card game: *The Body* by Workman Publishing
5. CD: *My Amazing Human Body* by DK Interactive Learning
6. *The Human Body* by Geo Safari Electronic Learning Game
7. flash cards: *The Human Body Game* by The Mailbox Magazine
8. *The Magic School Bus Inside the Human Body* by Joanna Cole
9. worksheet: comprehension test on "The Circulatory System Unit Test" (Appendix K)
10. computer/monitor
11. timer
12. Accelerator Reader test: *The Magic School Bus Inside the Human Body* by Joanna Cole
13. student portfolio

C. Key Vocabulary

1. None

D. Procedures/Activities

1. Begin today's lesson by letting students share information about their or a family member's blood types.
2. Introduce the new lesson by have the students return to K-W-L chart that they have developed during the unit. The students will complete the last column of their chart labeled "What We Have Learned About the Circulatory System."
3. Divide the students into cooperative learning groups to participate in Circulatory System learning center games. The students will be timed for the learning center games to enable all students to engage in all centers. The following is the list of games used in this lesson; however, you may substitute the games:
   a. The Body (The Cardiovascular System)
   b. My Amazing Human Body (An interactive journey inside the body)
   c. The Human Body (Geo Safari) Card #'s 1, 2, 3, 4
   d. The Human Body Game (flash cards)
   e. *The Magic School Bus Inside the Human Body* by Joanna Cole **Note:** Students will re-read the book in their cooperative learning group and then, individually take an Accelerated Reader test.

   Note: It will take more than one day to complete the activities. To allow all students (gifted, talented, or special ed.) to be successful in learning, assign groups that perhaps consist of one high, one low, and two average academic level students.
4. Summarize the lesson by the administering the comprehension test on the Circulatory System (Appendix K).

E. Assessment/Evaluation

1. Evaluate students' knowledge, responses, and comprehension on the Circulatory System.

2. Observe students as they work in cooperative learning groups for perhaps a participation grade.
3. Evaluate students' comprehension on the Circulatory System by recording grade from Accelerated Reader test.
4. Evaluate students' comprehension skills and knowledge on the Circulatory System by administering the test "The Circulatory System Unit Test" (Appendix K) and place in students' portfolios.

VI. CULMINATING ACTIVITY (Optional)

A. Upon completion of the unit, Mr. John Raulston, the owner of the Sequatchie Valley Animal Hospital, will speak to the class about animal hearts. Mr. Raulston will display a dog's heart for the students to observe during his presentation. During the hands-on activity, the student will develop an understanding that dog's heart consists of the major components and functions like a human heart.

VII. HANDOUTS/WORKSHEETS (See Appendices)

A. Appendix A – "Circulatory System Vocabulary" *Lesson One*
B. Appendix B – "The Writing Process Steps" *Lesson Two*
C. Appendix C – "William Harvey Research Report" *Lesson Two*
D. Appendix D – "Rubric for William Harvey Research Report" *Lesson Two*
E. Appendix E – "Parts of the Heart" *Lesson Three*
F. Appendix F – "Parts of the Heart Answer Key" *Lesson Three*
G. Appendix G – "Journey Through the Heart" *Lesson Four*
H. Appendix H – "Interbody Highway System" *Lesson Four*
I. Appendix I – "The Body's Chemical Factory" *Lesson Six*
J. Appendix J – "Blood Types" *Lesson Eight*
K. Appendix K – "The Circulatory System Unit Test" *Lesson Nine*

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Appendix A
Lesson One

Name _____ Date _____

Circulatory System Vocabulary

1. The ***heart*** is a strong muscular, four-chambered organ that pumps blood through the body.
2. The ***aorta*** carries the blood from the left ventricle to all parts of the body.
3. The ***left ventricle*** sends oxygenated blood to the body and heart.
4. The ***right ventricle*** receives blood from the right atrium and sends the blood to the lungs.
5. The ***right atrium (auricle)*** receives deoxygenated blood from the body.
6. The ***left atrium (auricle)*** receives oxygenated blood from the lungs.
7. The ***pulmonary artery*** carries blood directly from the right ventricle of the heart to the lungs.
8. The ***septum*** is a dividing wall of membrane that separates the ventricles of the heart.
9. The ***upper vena cava*** is a vein that carries blood from the head and arms to the right atrium.
10. The ***lower vena cava*** is a vein that carries blood from the body (trunk) and legs to the right atrium.
11. The ***artery*** is a blood vessel that carries blood, rich with oxygen and nutrients, away from the heart.
12. The ***vein*** is a blood vessel that carries blood back to the heart for fresh oxygen from the lungs.
13. The ***capillaries*** are tiny blood vessels that carry blood between the arteries and veins.
14. The ***valves*** are membranes that control the flow of blood into and out of the heart.
15. The ***pulmonary vein*** carries blood from the lungs into the left atrium of the heart.

Appendix B
Lesson Two

Name _____ Date _____

Writing Process Steps

1. A ***biography*** is the story of a person's real life and accomplishments that is written by someone else.
2. ***Brainstorm*** is way to focus a writing topic by listing any thoughts that comes to mind about the topic.
3. A ***rough draft (prewriting)*** is the process of writing which the writer captures ideas on paper.
4. ***Self-edit*** is when the writer edits his/her own paper for grammatical and mechanical errors such as sentence fragments, punctuation, capitalization, and spelling.
5. ***Peer edit*** is when a partner edits a student's paper for grammatical and mechanical errors such as sentence fragments, punctuation, capitalization, and spelling.
6. ***Revise*** is to improve a draft by adding or taking out information, combining and reordering sentences, elaborating or changing word choices according to the purpose and audience.
7. ***Final draft (publishing)*** is sharing your final, written work with an audience.

Appendix C
Lesson Two

Name _____ Date _____

William Harvey Research Report

Brainstorming: Answer the following questions on William Harvey. Use the following questions and answers to write the four-paragraph research paper on the biography of William Harvey.

1. When and where was William Harvey born? When and how did he die?

2. Describe William Harvey's personal life.

3 Describe information about William Harvey's education.

4. What did William Harvey discover and how?

5. What enhanced William Harvey to continue researching his topic?

6. Why is William Harvey's research so important to us?

Appendix D
Lesson Two

Name _____ Date _____

Rubric for William Harvey Research Report

Criteria	Possible Points	Earned Points
Outline: Brainstorm	10	
Rough Draft	10	
Editing and Corrections	10	
Cover Page	10	
Final Draft	10	
Sentence Structure	10	
Paragraph Structure	10	
Spelling and Vocabulary	10	
Creativity	10	
Neatness	10	

Grade _____

Appendix E
Lesson Three

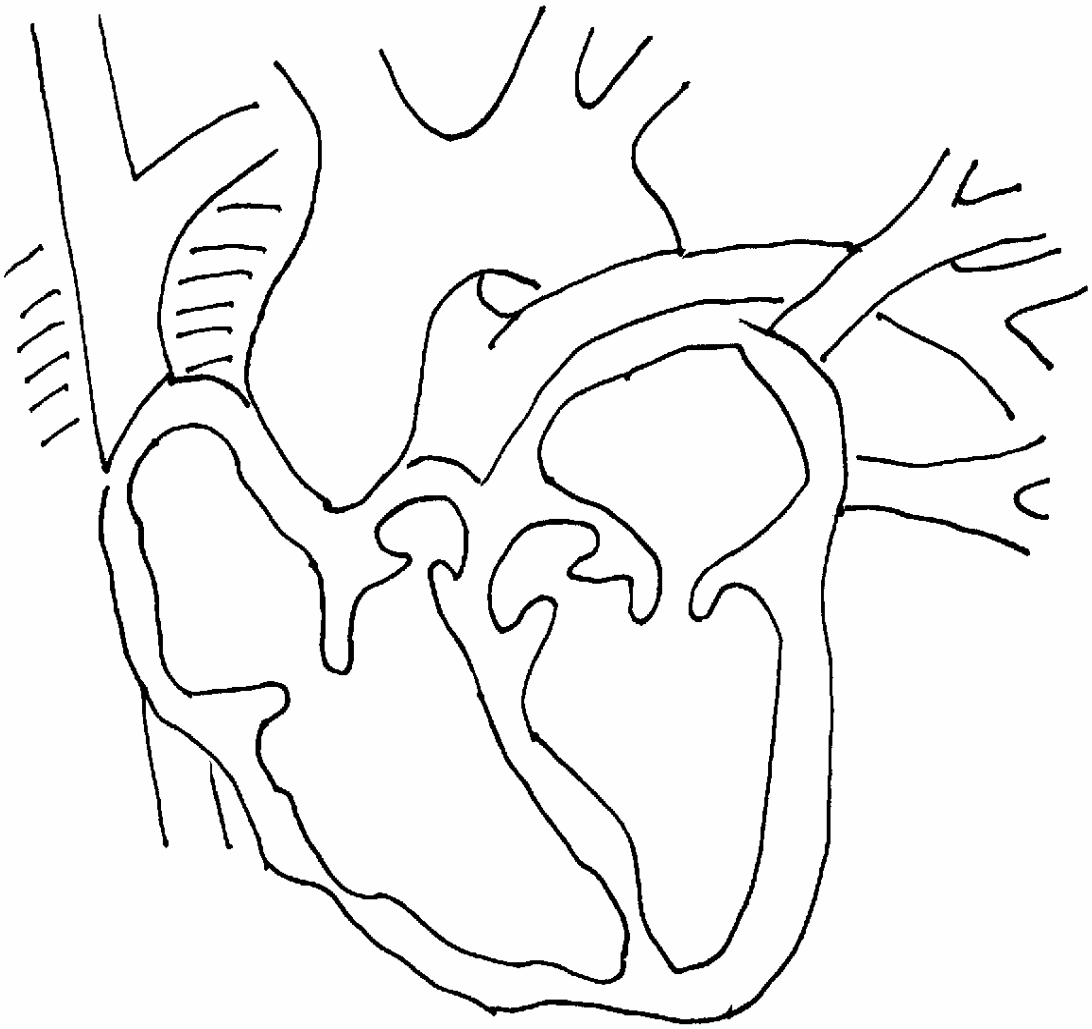
Name _____ Date _____

PARTS OF THE HEART

Label the parts of the heart using the word bank below. Write the definitions for each word.

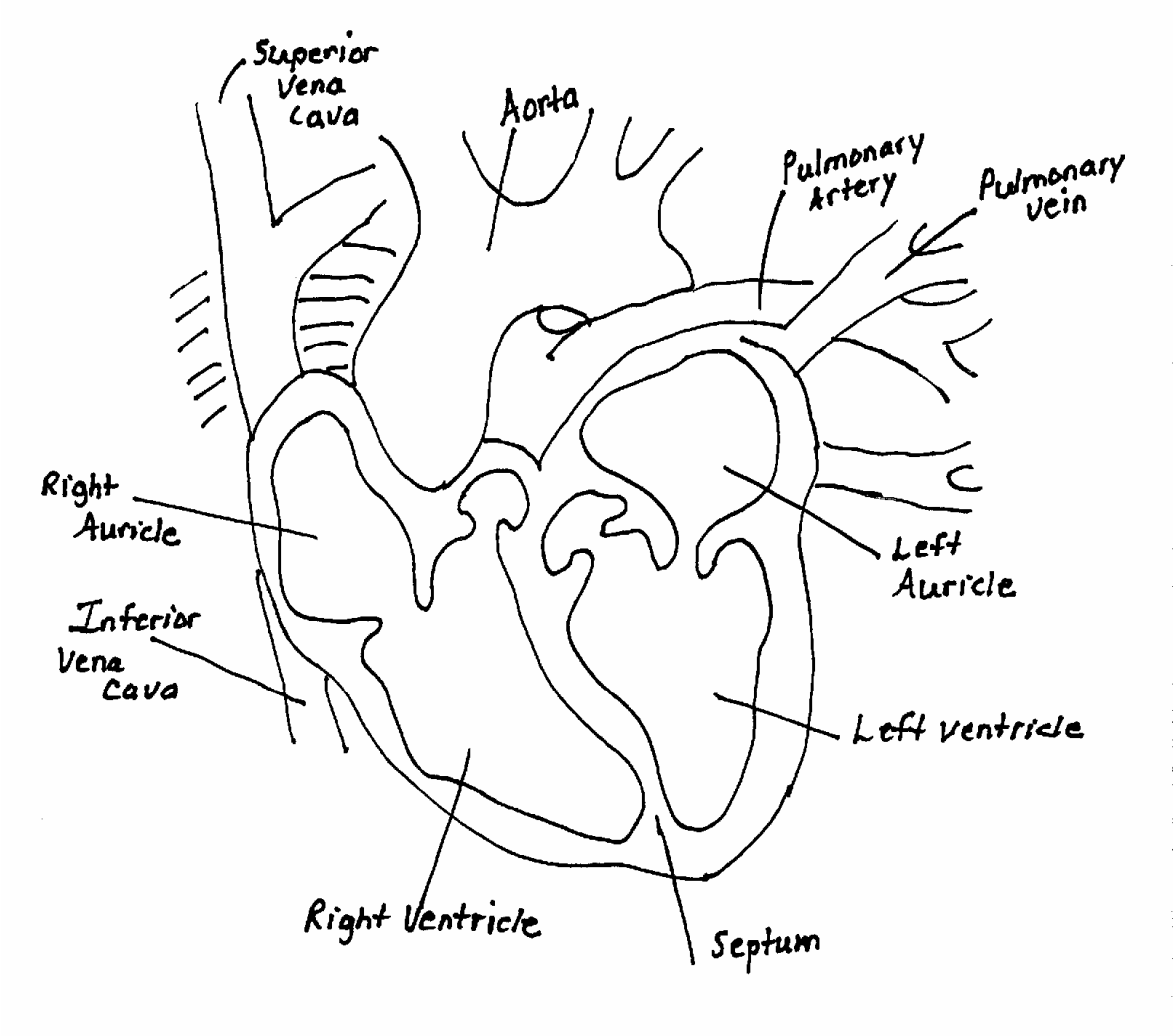
right atrium/auricle	**surperior vena cava**	**left atrium/auricle**
pulmonary vein	**aorta**	**pulmonary artery**
left ventricle	**right ventricle**	**inferior vena cava septum**

Appendix F
Lesson Three

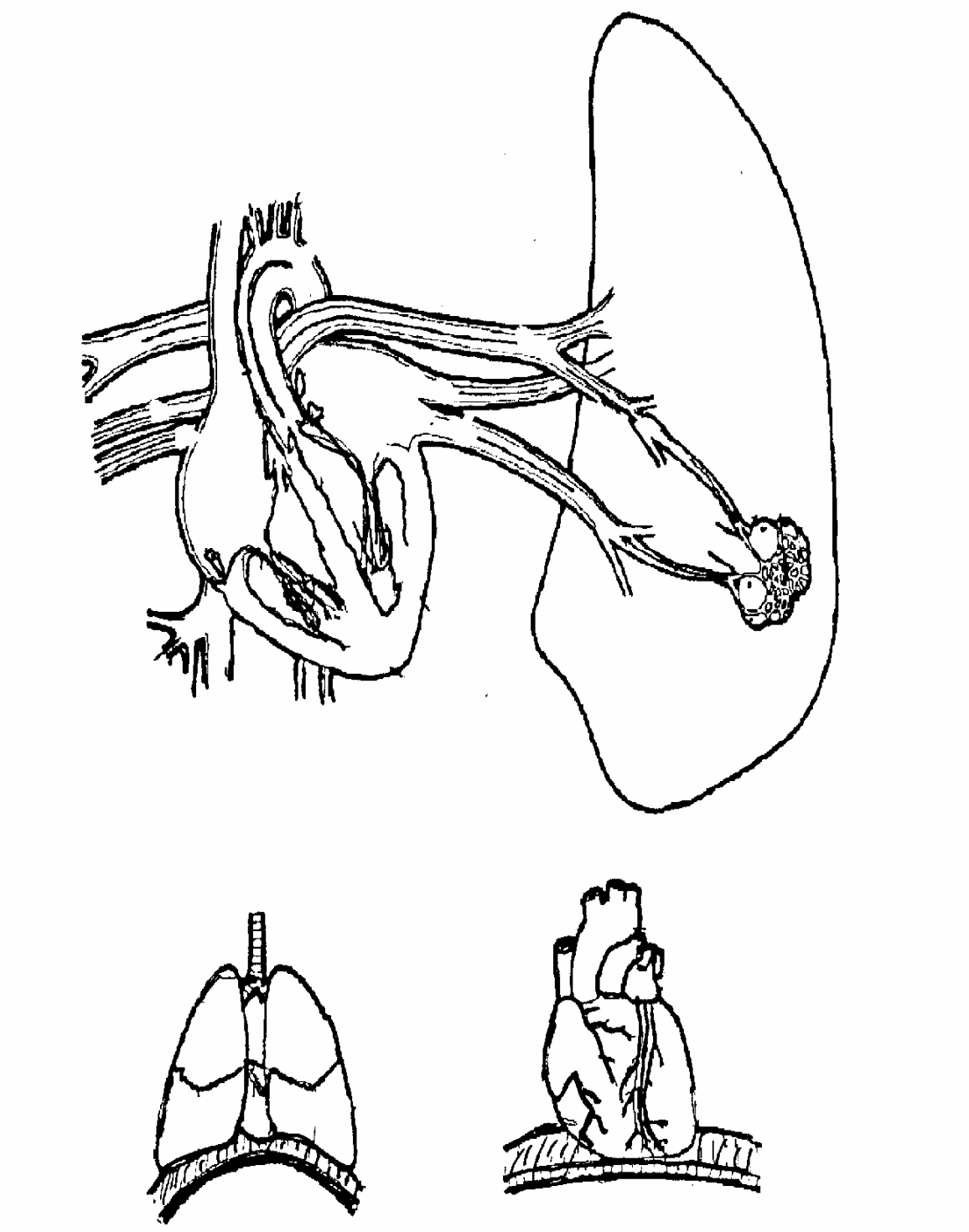


"Parts of the Heart" Answer Key

1. The ***aorta*** carries the blood from the left ventricle to all parts of the body.
2. The ***left ventricle*** sends oxygenated blood to the body and heart.
3. The ***right ventricle*** receives blood from the right atrium and sends the blood to the lungs.
4. The ***right atrium (auricle)*** receives deoxygenated blood from the body.
5. The ***left atrium (auricle)*** receives oxygenated blood from the lungs.
6. The ***pulmonary artery*** carries blood directly from the right ventricle of the heart to the lungs.
7. The ***septum*** is a dividing wall of membrane that separates the ventricles of the heart.
8. The ***superior (upper) vena cava*** is a vein that carries blood from the head and arms to the right atrium.
9. The ***inferior (lower) vena cava*** is a vein that carries blood from the body (trunk) and legs to the right atrium.
10. The ***pulmonary vein*** carries blood from the lungs into the left atrium of the heart.



Appendix G
Lesson Four



Name _____ Date _____

Interbody Highway System

Capillaries, arteries, and veins are the blood vessels that form the fantastic highway system in your body.

Write ***capillary***, ***artery***, or ***vein*** in the blank lines that best describes the type of blood vessel.

1. _____ carries blood away from the heart.
2. _____ carries blood back to the heart.
3. _____ is the tiniest blood vessel in the body.
4. _____ carries oxygen-rich blood to all parts of the body.
5. _____ connects the veins and arteries.

Your blood is the vehicle that travels this highway. It transports oxygen, carbon dioxide, food, and waste. Your blood also fights infection and clots to prevent excessive blood loss.

Create a crossword puzzle using the following information.

Across:

2. Red blood cells are made in _____ marrow.
3. Blood plasma is a clear liquid that is 90% _____.
4. Platelets prevent blood loss by forming a _____.
6. Hemoglobin carries _____ to the cells and takes carbon dioxide away from the cells.

Down:

1. White cells fight against _____ when you get a cut.
2. Hemoglobin gives blood its red _____.
3. Hemoglobin is part of the _____ blood cells.

Name _____ Date _____

THE BODY'S CHEMICAL FACTORY

Directions: Circle the letter that is the correct answer for each question.

1. The body's largest internal organ is
   (a) the stomach (b) the liver (c) the gall bladder

2. About how much does the liver weigh?
   (a) 4 ½ ounces (b) 14 ounces (c) 4 ½ pounds

3. An organ located to the left of the stomach is
   (a) spleen (b) kidney (c) stomach

4. The liver acts like a
   (a) warehouse (b) pump (c) both a and b

5. An organ that stores blood and helps filter foreign substances from the blood is
   (a) kidney (b) spleen (c) heart

6. Another word for spleen is
   (a) small intestine (b) colon (c) cemetery

6. The liver filters out old blood
   (a) enzymes (b) nutrients (c) cells

7. The liver stores nutrients such as
   (a) sugars (b) minerals (c) both a and b

8. The large, reddish-brown organ that makes bile and helps the body absorb food is
   (a) large intestine (b) lung (c) liver

9. The liver processes most of the nutrients that are absorbed from the
   (a) stomach (b) small intestine (d) large intestine

10. Draw a cartoon that tells why alcohol is bad for your liver.

Appendix J
Lesson Eight

Blood Types

Appendix J
Lesson Eight

Blood Types

Blood Types	Red Blood Cells' Proteins	Plasma Clumping Chemicals	Blood Type(s) Transfusions Acceptable
A	**A** **A** **A** **A**	**Anti B**	**A and O**
B	**B** **B** **B** **B**	**Anti A**	**B and O**
AB	**A** **B** **B** **A** **A** **B** **B** **A**	**None**	**A, B, AB, and O**
O	**O**	**Anti A** **Anti B**	**O**

Name _____ Date _____

THE CIRCULATORY SYSTEM UNIT TEST

A. Write the vocabulary on the blank line with the correct definition. Use the word bank below. (2 points each)

heart	septum	valves	blood
aorta	right atrium	left atrium	kidney
lower vena cava	left ventricle	right ventricle	
upper vena cava	pulmonary artery	pulmonary vein	

_____1. Carries blood from the lungs into the left atrium of the heart

_____2. Membranes that control the flow of blood into and out of the heart

_____3. A vein that carries blood from the body and legs to the right atrium

_____4. A dividing wall of membrane that separates the ventricles of the heart

_____5. A vein that carries blood from the head and arms to the right atrium

_____6. Carries blood directly from the right ventricle of the heart to the lungs

_____7. Receives oxygenated blood from the lungs

_____8. Receives blood from the right atrium and sends blood to the lungs

_____9. Receives deoxygenated blood from the body

_____10. Carries the blood from the left ventricle to all parts of the body

_____11. Sends oxygenated blood to the body and heart

_____12. A strong muscular, four-chambered organ that pumps blood through the body

_____13. An organ that removes or filters waste products from the blood

_____14. The red liquid in the veins, arteries, and capillaries that carries oxygen and nutrients to all parts of the human body

B. Write **vein, artery,** or **capillary** in front of the statement that best describes the type of blood vessel. (2 points each)

12. _____carries blood away from the heart.

2. _____carries blood back to the heart.

3. _____is the tiniest blood vessel.

4. _____carries oxygen-rich blood.

5. _____connects the veins and arteries.

C. Answer the following questions. (4 points)

12. What are the four main components of the blood?

2. What helps form blood clots to stop the flow of blood when a blood vessel is cut?

3. What cells contain hemoglobin?

4. What cells fight against bacteria, viruses, and other microscopic organisms?

5. What is the yellowish fluid portion of the blood?

6. How do platelets help the body?

7. Describe how to measure your heart rate (pulse).

8. Explain the function of the liver and spleen.

9. Explain how cholesterol is harmful to the human body.

10. What is a heart attack?

11. Identify the 4 basic blood types?

12. Define transfusion.

D. Underline the correct answers. (1 points each)

1. Tissues are made up (a. cells b. wax c. paste).

2. Nutrients are (a. food b. cells c. animals).

3. The blood is made up (a. red and white cells b. black and brown cells c. blue cells).

4. White cells in the blood help fight (a. overheating b. infection c. coldness).

5. Red corpuscles carry (a. oxygen b. powder c. ashes).

E. Draw a heart below and label the following parts: **aorta, arteries, veins, left ventricle, right ventricle, right atrium, left atrium,** and **septum.** (9 points)

BONUS: WHAT IS YOUR BLOOD TYPE? (5 points)