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Manatee Community Blood Center is pleased to provide all materials to Manatee County Public Schools.

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Welcome to the *My Blood, Your Blood* Interdisciplinary Thematic Unit, which is divided into three parts:

I. Blood as the Transportation System  
II. Components of Blood  
III. Donations of Blood

Please take a minute to look at the Unit Plan Grid. You may want to meet with other 3-5 grade-level teachers to determine what grade level at your school will do the curriculum in its entirety or how the curriculum will be divided.

**Literature**
Using a piece of literature may be helpful in drawing student interest for the unit. There is a suggested reading list in the Appendix. Daily oral readings could be implemented as an opening or closing to each lesson, or during your regularly scheduled reading time for the day. Correlate the story to the *My Blood, Your Blood* information for the day/week. The literature you choose may be loosely based on the science of blood, but should be a great discussion starter. For example, if you’ve chosen a book about a cancer patient’s experiences, be sure to discuss that cancer patients frequently have to receive platelet donations during their chemotherapy treatment schedule.

**Learning Log**
You may want to have students keep a “Learning Log” notebook throughout the unit. This could be a place for notes, brainstorming, reflection on daily literature reading, or daily journaling based on the opening question (or a question the teacher creates).

**Assessment Tools**
There is at least one opportunity for student assessment per lesson. It is up to the teacher’s discretion as to the evaluation rubrics. There is a traditional unit test included at the end of the lesson plans. Teacher feedback on the unit would also be greatly appreciated. There is an evaluation form for you to fill out following completion of the unit.

**Projects**
Included in the Appendix is a list of project ideas. These may be used as class assignments, individual student projects, or to challenge particular students with higher levels of thinking. This unit could be expanded 2-3 weeks by using the project ideas.

**Appendix**
Use the appendix to customize activities and projects to your specific classroom situation. Coordinate activities to be grade-level specific. There is also a lot of information about the Manatee Community Blood Center (referred to as MCBC) services and procedures. This may be helpful information for you to share with your students.
# Unit Plan Grid

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Objectives</th>
<th>Question</th>
<th>Activity/Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood as the Transportation System</td>
<td>1. Students will identify the circulatory organs.</td>
<td>What is the transportation system of the body?</td>
<td>Students construct a life-sized poster of the circulatory system.</td>
</tr>
<tr>
<td>Lesson #1</td>
<td>2. Students will explain how blood is the transportation system of the body.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Students will describe the functions of the heart.</td>
<td>Who has a faster heart rate - my pet or me?</td>
<td>Compare/contrast the heart rates of various animals.</td>
</tr>
<tr>
<td></td>
<td>2. Students will calculate their own heart rate.</td>
<td></td>
<td>Graph heart rate statistics.</td>
</tr>
<tr>
<td></td>
<td>3. Students will compare and contrast the heart rates of animals.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood as the Transportation System</td>
<td>1. Students will locate pulse points.</td>
<td>Where are my pulse points?</td>
<td>“Change Your Heart Rate” activity.</td>
</tr>
<tr>
<td>Lesson #3</td>
<td>2. Students will identify and compare their resting and active heart rates.</td>
<td>What makes my heart beat faster/slower?</td>
<td>Create a data chart and figure averages.</td>
</tr>
<tr>
<td></td>
<td>3. Students will find the mean of the class results.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood as the Transportation System</td>
<td>1. Students will differentiate between veins, arteries, and capillaries.</td>
<td>Are all blood vessels the same?</td>
<td>Students explore veins, arteries, and capillaries on their own tongue and eyelids.</td>
</tr>
<tr>
<td>Lesson #4</td>
<td>2. Students will use the scientific process.</td>
<td></td>
<td>Students create a picture dictionary.</td>
</tr>
<tr>
<td>Components of Blood</td>
<td>1. Students will identify the four basic components of blood: white blood cells, red blood cells, plasma, and platelets.</td>
<td>What special ingredients are in your blood?</td>
<td>Blood components cooperative group activity.</td>
</tr>
<tr>
<td>Lesson #1</td>
<td>2. Students will relate the “job” or purpose of each blood component.</td>
<td></td>
<td>“Plugged” scabbing experiment.</td>
</tr>
<tr>
<td>Components of Blood</td>
<td>1. Students will define and describe blood groups.</td>
<td>Can there be a substitute for real blood?</td>
<td>“Are You My Type?” blood typing activity.</td>
</tr>
<tr>
<td>Lesson #2</td>
<td>2. Students will list the four basic blood types: A, B, AB, O</td>
<td></td>
<td>“Blood and Gore” activity.</td>
</tr>
<tr>
<td>Components of Blood</td>
<td>Lesson #3</td>
<td>1. Students will identify the white blood cell as being the blood component that helps protect the body from disease.</td>
<td>How does blood help eliminate germs?</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------</td>
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<td>-------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Lesson #3</td>
<td>2. Students will define and describe the function of white blood cells.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Components of Blood</th>
<th>Lesson #4</th>
<th>1. Students will differentiate between myth and fact regarding HIV and AIDS.</th>
<th>What are myths?</th>
<th>Students create a healthy 3-dimensional “Microscopic Blood Sample” on a piece of tag board.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lesson #4</td>
<td>2. Students will define HIV, AIDS, and Hepatitis B.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lesson #4</td>
<td>3. Students will describe the symptoms of HIV/AIDS and Hepatitis B.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lesson #4</td>
<td>4. Students will explain how HIV and Hepatitis B are contracted.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Donations of Blood</th>
<th>Lesson #1</th>
<th>1. Students will identify the measurement of a pint and relate it to their own experience.</th>
<th>Would you donate a whole pint of blood?</th>
<th>Silent journaling: Will you donate blood? Why or why not? Students write a persuasive letter asking someone to donate blood.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lesson #1</td>
<td>2. Students will write a persuasive letter, communicating ideas and information effectively.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lesson #1</td>
<td>3. Students will make an informal decision on whether to donate blood and give supporting details.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lesson #1</td>
<td>4. The class will create an adult survey.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Donations of Blood</th>
<th>Lesson #2</th>
<th>1. Students will use problem-solving skills to answer a challenging Math question.</th>
<th>Who wants to be a hero?</th>
<th>Transform the classroom into a marketing agency!</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lesson #2</td>
<td>2. Students will role-play a blood donor recruitment scene.</td>
<td></td>
<td>Write Public Service Announcements.</td>
</tr>
<tr>
<td></td>
<td>Lesson #2</td>
<td>3. Students will produce an accurately edited final persuasive letter.</td>
<td></td>
<td>Create blood drive posters/sketches.</td>
</tr>
<tr>
<td></td>
<td>Lesson #2</td>
<td>4. Students will write a public service announcement, adapting language to the more formal situation and audience.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lesson #2</td>
<td>5. Students will brainstorm and sketch poster ideas that would be effective in recruiting blood donors.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Donations of Blood</th>
<th>Lesson #3</th>
<th>1. Students will compile, interpret, and evaluate survey results.</th>
<th>Why do some people give blood and others do not?</th>
<th>Unit culminating activity options:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lesson #3</td>
<td></td>
<td></td>
<td>1. School blood drive with student involvement (i.e., do an advertising campaign or class recruitment competition).</td>
</tr>
<tr>
<td></td>
<td>Lesson #3</td>
<td></td>
<td></td>
<td>2. Manatee Community Blood Center staff guest speaker.</td>
</tr>
</tbody>
</table>

3
The Lesson Plans: Design and Intent

Each lesson plan contains the following sections:

**Opening Question**… The premise for the lesson is encompassed in this question as a way of grabbing the student’s attention and accessing prior knowledge.

**Objectives**… What the students are expected to learn in the lesson.

**Disciplines/Standards**… The subjects, Sunshine Standards, and Kaleidoscope objectives addressed in the lesson.

**Materials**… A list of everything the teacher must have in order to facilitate the lesson.

**Sponge Activity**… The anticipatory set for the lesson. This activity should be inviting and thought-provoking for the students to prepare for the lesson.

**Teaching Procedure**… Step by step instructions on presenting the material and reinforcing student learning.

**Culminating Activity**… The final activity of the lesson. This activity summarizes the information from the lesson and should give students an opportunity to demonstrate their learning. The use of this activity as an evaluative tool is entirely up to the teacher. There should be ample opportunities for assessment in this section.

**Closing**… The time to reflect on the opening question. How will students answer the question now? They may have a different answer, or at least be able to give more explanation or supporting details to their answer.
INTRODUCTORY LESSON
(Activities to introduce the theme of My Blood, Your Blood.)

ORGANIZING IDEA:

MY BLOOD, YOUR BLOOD: MY LIFELINE, YOUR LIFELINE!

Opening question: “Blood ~ awesome or awful?”

Objectives:
1. Students will apply a reasoning strategy to list, categorize, and associate vocabulary with the term “blood.”
2. Students will demonstrate cooperative learning skills.

Disciplines / Standards: Addressed in subsequent lesson plans.

Materials:
♦ lined paper
♦ large pieces of manila paper for each cooperative group
♦ drawing paper for each student
♦ one large sheet of butcher paper
♦ pencils, markers, crayons
♦ one roll of masking tape

Procedure One: (45 – 60 minutes)
Teacher will implement the List-Group-Label reasoning strategy (see below).
Divide the class into cooperative groups consisting of three or four members each.

List-Group-Label Strategy:
1. Give the class five minutes to brainstorm and make a list of words or a web of words associated with the word “blood.”
2. In cooperative learning groups, students will group the lists into categories and create a label for each category. Each group will write their lists on a large piece of manila paper. (Assistance with category titles may be needed.)
3. Each group will share their lists and labels with the whole class, during which time the teacher will organize the lists on a large piece of butcher paper taped to the wall.
(Note: This chart will be kept posted throughout the entire thematic unit.)
Procedure Two: (30 minutes)

- Introduce the students to the class resource center. Have various resource books listed in the bibliography on display.

- Oral Reading: Read aloud to students from a piece of literature listed in the bibliography. This book could be your oral reading selection for the duration of this unit.

Procedure Three: (60 minutes)

“Illustrating Blood-Chilling Idioms”

1. Teacher will review concept of “idioms,” giving examples –
   a. “It is raining cats and dogs.”
   b. “I am as busy as a bee.”
   c. “I am as hungry as a horse.”
2. In cooperative groups, students will compose a list of idioms using “blood,” “heart,” or “red.”
   ♦ Examples:
     a. “heart-broken”
     b. “a blood-curdling scream”
     (Note: Students may look up “blood” in the dictionary for more ideas.)
3. Each student chooses one expression to illustrate.
4. Independently, students write the idiom and illustrate it on drawing paper.
5. Display drawings around the room.

Homework: (leading into “Blood as a Transportation System – Lesson 1)

♦ Brainstorming prompt: Oxygen is needed for every person to live. The blood carries the oxygen throughout the body. Brainstorm all the things that carry items from one place to another. Make a list of at least 20.

Close: Discuss opening question.
Idiomatic Expressions

Valentines Heart

Cold Blooded

Heavy Hearted

Red As A Beet

Sweetheart

Big Hearted

Blue Blooded
Idiomatic Expressions

Heartbroken

Heart to Heart

Blood Bath

Hearts and Flowers

Blood Curdling Scream

Wear your heart on your sleeve

Blood Brothers
**BLOOD AS A TRANSPORTATION SYSTEM – LESSON 1**

**Background Information:** This is a teacher-directed lesson on the circulatory system. Circulate comes from a word that means “to circle.” Blood circulates, circles, all around your body. In less than one minute your blood makes a trip all around your body.

Your blood is like a delivery service: it carries food and oxygen to your body’s cells and waste products away from cells.

An activity where students trace each other’s body and draw in major veins/arteries, as well as circulatory organs, will help teach students that blood is the body’s transportation system. Display resource books throughout the room that show the circulatory system. These visual aids will help with the posters. Suggested books: *The Human Body and How It Works* (p. 16, 17), *Your Wonderful Body* (p. 69-75), *The Visual Dictionary of the Human Anatomy* (p. 16).

**Opening Question:** What is the transportation system in your body?

(Note: For homework the night before this lesson, assign this brainstorming prompt: Oxygen is needed for every person to live. The blood carries the oxygen throughout the body. Brainstorm all the things that carry items from one place to another!)

**Objectives:**
1. The students will identify the circulatory organs.
2. The students will explain how blood is the transportation system of the body.

**Disciplines / Standards:**
- Science: *Processes of Life* ~ Standard 1-A.  
  *Nature of Science* ~ Standard 1-E.
- Health/Physical Education: *Health Literacy* ~ Standard 1-B.

**Vocabulary:** transportation, circulate, circulatory system, veins, arteries, oxygen, pulse points
My Blood, Your Blood: Gr. 3-5

Materials:
♦ resource books (see Bibliography)
♦ My Blood, Your Blood Learning Guide
♦ student copies of pages 3-4 in Learning Guide
♦ butcher paper and drawing paper
♦ markers / colored pencils / crayons
♦ glue

Sponge Activity:
♦ Have students share their brainstorming lists from the homework assignment. Teacher could elicit oral answers and/or write ideas on chart paper.
♦ Discuss the meanings of the words “circulate” and “circulation.” The following examples may be given:
  ➢ Newspaper circulation
  ➢ The teacher circulates around the room.
  ➢ Circulation of the blood through the body
♦ This discussion should lead into the following lesson on the Circulatory System.

Teaching Procedure:
2. Read and discuss p. 3. (Save “Locate Your Pulse Points” for a later lesson.) Also read top paragraph on p. 4 and “Circulation: A Short History Lesson.”

Culminating Activity / Evaluation:
Students will make a life-sized poster of the circulatory system (p. 4 of Learning Guide). Depending on time allotment, students can either draw and cut out organs, or simply cut them out from p. 4.

Homework:
1. Take your circulatory poster home and explain to parents which organs are in the circulatory system and show them how blood is the transportation system of our bodies.
2. Bring in a paper towel tube from home.

Closing: Review the answer to the opening question.
BLOOD AS THE TRANSPORTATION SYSTEM – LESSON 2

**Background Information:** Your heart is a pump. It isn’t shaped like a valentine heart. It’s the same size and shape as your fist. It weighs slightly less than a pound. Your heart pumps blood through the body delivering oxygen and nutrients to your cells. The sound of a heartbeat comes from the opening and closing of valves as the heart pumps or beats. Between each heartbeat, your heart rests. While resting, it is filling with blood.

Students will be actively involved in this lesson. They will listen to their hearts and come up with a variety of questions about the heart. Suggestion: Read to students from a variety of resources to help answer their “wonders.”

The animal heart rate activity will lead into a discussion as to why some animals have a faster or slower heart rate. Discuss factors such as animal size, how they move, what they do all day, and how they get their food. You may want to start off the discussion with a conversation about what happens to the students’ bodies as they run around the school track or gym. What changes do they notice? (sweating, breathing faster, cramp in their side, sometimes they may hear their heart beating—definitely feel it beating faster, muscles ache, etc.) Remember to relate this discussion to the function of blood. It is delivering oxygen and nutrients from the food we eat. So, animals (including people) that require more oxygen and nutrients for their busy lifestyles will have faster heart rates. Students will display data on a graph. Choose which type of graph is most relevant for your students’ background knowledge of graphing.

**Opening Question:** Who has a faster heart rate – my pet or me?

(Note: Do a brief review of Lesson 1. Discuss what students shared with their parents about the circulatory system.)

**Objectives:**
1. Students will describe the functions of the heart.
2. Students will calculate their own heart rates.
3. Students will compare and contrast the heart rates of animals.
Disciplines / Standards:
- **Language Arts:** *Reading* ~ Standard 2-E.
- **Math:** *Algebraic Thinking* ~ Standard 1-A.
  *Data Analysis* ~ Standard 1-A.
- **Science:** *Processes of Life* ~ Standard 1-A.
  *Nature of Science* ~ Standard 1-D. Standard 3-B.

Vocabulary: pump, graph, heartbeat, stethoscope, statistics, circulatory system

Materials:
- resource books (see Bibliography)
- *My Blood, Your Blood Learning Guide*
- student copies of “Animal Heartbeats per Minute” (see following pages)
- graph paper for each student, pencils

Sponge Activity:

Teaching Procedure:
1. Ask students what questions they have about the heart. Generate a list of “I wonder…” questions orally or on a class chart.

2. Read to students about the heart and blood vessels from a resource book(s). (See suggested book list in bibliography or from your school library.) These books will answer many of the students’ “I wonder…” questions.

Culminating Activity / Evaluation:
Compare and contrast the heart rates of animals.
1. Do some predicting with students:
   - Write a list of several animals from the “Animal Heartbeats per Minute” chart on the board.

2. Ask the following questions:
   - Which animals do you think have slow heart rates / fast heart rates?
   - Why?
   - How fast?
   - How slow?
3. Distribute the “Animal Heartbeats per Minute” chart. Give students a few minutes to look over the chart and determine how their predictions compare to the statistics on the chart.

4. Instruct students to list the animals in order from slowest to fastest heart rate.

5. Have students graph these statistics (bar, line, or pictograph).

   Optional activity: Action picture of the heart cycle (p. 7 of *Learning Guide*).

**Closing:** Reevaluate the opening question.
Animal Heartbeats per Minute

<table>
<thead>
<tr>
<th>ANIMAL</th>
<th>BEATS PER MINUTE</th>
<th>ANIMAL</th>
<th>BEATS PER MINUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bat</td>
<td>750</td>
<td>Camel</td>
<td>30</td>
</tr>
<tr>
<td>Cat</td>
<td>120</td>
<td>Human Child</td>
<td>90</td>
</tr>
<tr>
<td>Chicken (Adult)</td>
<td>280</td>
<td>Cow</td>
<td>64</td>
</tr>
<tr>
<td>Dog</td>
<td>110</td>
<td>Elephant</td>
<td>35</td>
</tr>
<tr>
<td>Giraffe</td>
<td>65</td>
<td>Goat</td>
<td>90</td>
</tr>
<tr>
<td>Guinea Pig</td>
<td>280</td>
<td>Hamster</td>
<td>450</td>
</tr>
<tr>
<td>Horse</td>
<td>45</td>
<td>Human Adult</td>
<td>70</td>
</tr>
<tr>
<td>Human baby</td>
<td>120</td>
<td>Lion</td>
<td>40</td>
</tr>
<tr>
<td>Monkey</td>
<td>190</td>
<td>Mouse</td>
<td>520</td>
</tr>
<tr>
<td>Pig</td>
<td>60</td>
<td>Rabbit</td>
<td>205</td>
</tr>
<tr>
<td>Rat</td>
<td>328</td>
<td>Sheep</td>
<td>75</td>
</tr>
<tr>
<td>Skunk</td>
<td>166</td>
<td>Squirrel</td>
<td>250</td>
</tr>
</tbody>
</table>

**NOTE:**
- The students will find it very interesting to compare heartbeats between their favorite animals and themselves.
- Clapping hands at the rate of an elephant or a lion’s heartbeat is fairly achievable. Clapping for a giraffe or a goat’s is still possible. However, clapping that busy hamster’s heartbeat outpaces us!
- All animals’ heart rates vary depending on their activities. The rates given are average for that specific animal.
BLOOD AS THE TRANSPORTATION SYSTEM – LESSON 3

Background Information: In this lesson, students will locate their pulse points. A teacher reference for this is on page 3 of the Learning Guide. Remember to have them check their pulse with one of their fingers, not their thumb, as the thumb has a pulse of its own. Next, after feeling their pulse, they will make a visual pulse meter to see their pulse in action! Subsequently, they will experiment with finding their resting and active pulse rates.

A quick review of finding the mean (average) may be needed before proceeding with step 5. The “Questions to Ponder” on page 9 of the Learning Guide are good for follow-up.

Your arteries throb with every beat of your heart. This is the pulse you feel. The word pulse comes from the Latin word, “pulsus,” which means beating.

“Growing takes work, so that is why a child’s heart beats faster than an adult’s: to supply extra energy. A child’s heart rate is about 90 beats a minute. An adult’s is 70 beats per minute. An infant’s heartbeat is 120 times a minutes” (Beckelmen, Laurie Reader’s Digest: The Human Body, page 55).

Opening Questions: Where are my pulse points? What makes my heart beat faster? Slower?

Objectives:
1. Students will locate pulse points.
2. Students will identify and compare their resting and active heart rates.
3. Students will find the mean of the class results.

Disciplines / Standards:
- Math: Number Sense ~ Standard 3-C.
  Measurement ~ Standard 4-A.
  Algebraic Thinking ~ Standard 1-A, B.
  Data Analysis ~ Standard 1-A, B.

- Science: Processes of Life ~ Standard 1-A
  Nature of Science ~ Standard 1-B, C, D. Standard 3-B.

- Health/Physical Education: Health Literacy ~ Standard 1-B.

Vocabulary: pulse points, resting heart rate, active heart rate, data chart
Materials:
- *My Blood, Your Blood Learning Guide*
- straws or toothpicks (one for each student)
- clay or dough (enough for each student to place a small portion on his/her wrist)
- stopwatches

Sponge Activity:

Teaching Procedure:
1. Help students locate a pulse point on wrist or neck (using fingers, not thumb).

2. **Activity**: VISUAL PULSE METER
   
   (Material options: clay or dough, straw or toothpick)
   
   a. After finding pulse points, place a hunk of clay or dough on wrist where you can feel the pulse the strongest.
   b. Carefully push straw or toothpick into clay so it stands upright.
   c. Lay arm flat on desk. The straw should move slightly back and forth as the blood produced by each heartbeat passes through the wrist.
   d. Measure pulse rate by counting the times the straw moves in one minute.

3. Talk about different ways to find your pulse rate *per minute*; e. g., count the beat for 6 seconds and multiply by 10; for 30 seconds and multiply by 2, etc. Choose one method as a class to use in the following activity.

Culminating Activity / Evaluation:

“Change Your Heart Rate,” *My Blood, Your Blood Learning Guide*, page 9:

1. Students will set up a chart and include the following data:
   - Resting heart rate
   - Active heart rate
   - Resting rate 5 minutes after exercising

2. Discuss results. Class results may be posted.

3. Students should figure averages (mean) of each category by age or gender. Write the averages under the data chart.
4. Direct students to write statements or questions of comparison about their results as compared to the averages of another student’s data.

   - Why does your heart beat faster while exercising?
   - What other body conditions change?
   - What else happens to your body when you exercise?

**Closing:** Review opening question.


BLOOD AS THE TRANSPORTATION SYSTEM – LESSON 4

**Background Information:** With the activity, “Piping the Blood,” students will get a close-up and personal view of their own blood vessels. Page 6 of the Learning Guide has information about blood vessels. The following provides additional instruction.

There are three types of blood vessels: veins, arteries, and capillaries. Veins take blood to the heart. They carry waste that cells have released. The kidneys and lungs pick up the waste for disposal. Arteries carry oxygen-rich blood away from the heart. Arteries branch into smaller and smaller vessels called capillaries. Capillaries are our body’s smallest vessels. They are so narrow that blood cells can only flow inside them one cell at a time!

Fun fact: There are 60,000 miles of blood vessels in your body. That’s enough to stretch almost 2 1/2 times around the earth! (Source: Your Wonderful Body – National Geographic Society)


**Opening Question:** Are all blood vessels the same?

**Objectives:**

1. Students will differentiate between veins, arteries, and capillaries.

2. Students will use the scientific process.

3. Students will draw models of and define vocabulary related to circulation.

**Disciplines / Standards:**

- **Language Arts:** Reading ~ Standard 1-C. Standard 2-E.  
  Writing ~ Standard 2-A, B.  
  Listening, Viewing, and Speaking ~ Standard 1-C. Standard 2-A, B.

- **Science:** The Nature of Science ~ Standard 1-B, C, D.  
  Processes of Life ~ Standard 1-A, C.

- **The Arts:** Visual Arts – Skills and Techniques ~ Standard 1-A, B, C. 
  Visual Arts – Creation and Communication ~ Standard 1-A, B, C.
Vocabulary: blood vessels, arteries, veins, capillaries, ventricles, circulate

Materials:
♦ My Blood, Your Blood Learning Guide and video
♦ lined paper and pencils for each student
♦ small mirrors (one for each student, if possible)
♦ flashlights (one for each student, if possible)
♦ magnifying lenses (one for each student)
♦ index cards
♦ pencils, crayons / markers / colored pencils

Sponge Activity:
1. In cooperative groups of 4, brainstorm for about 5 minutes from the following prompt, recording all ideas:
   “The tubes through which the blood goes to the heart are called veins. The tubes that take blood away from the heart are called arteries. The smallest tubes that blood goes through are called capillaries. Name as many things as you can that have tubes!”
2. In whole group, share ideas.

Teaching Procedure:
Activity #1: BLOOD LINES
(In this experiment, students will view and differentiate between veins, arteries, and capillaries.)
1. Set up the mirror so you can see your face. Shine the light of the flashlight into the mirror.
2. Look at the underside of your tongue in the mirror. Use the magnifying lens to enhance the view.
3. Identify lines of various colors and sizes:
   ▪ thick blue lines – veins
   ▪ thick pink lines – arteries
   ▪ thin lines – capillaries
4. Pull down the flap of skin just below your eye. Observe the blood vessels.
5. Discuss the results.
6. Share more information with students through teacher summary information and/or resource books.
Activity #2: CREATE A PICTURE DICTIONARY

2. Share illustrations from various resource books.
3. Students create a picture dictionary using index cards or pre-cut paper.
   Include the word, definition, and an illustration.
4. Alphabetize and bind books.

*(Further extension: Students could create a picture dictionary of all vocabulary from this unit for a project or extra credit.)*

Culminating Activity / Evaluation:

- View *My Blood, Your Blood* video. (23 minutes)
- Discuss various concepts presented.

Homework: Write a riddle for each vocabulary word.

*Example:* I am too thick for oxygen and nutrients to pass through. What am I? (an artery)

Closing: Review opening question, reflecting on information gained from this lesson and video.
COMPONENTS OF BLOOD – LESSON 1

Background Information: Blood is a very complicated substance, and may be separated into four basic components: plasma, red blood cells, white blood cells, and platelets.

Blood is over one-half plasma, which is the straw-colored liquid portion of blood in which the elements are suspended and circulated throughout the body. Plasma consists mostly of salt water.

About 45% of blood is red blood cells. They contain hemoglobin (giving them the red color), which carries oxygen to body cells, and carbon dioxide and waste from body cells. As red blood cells pass through the lungs, the oxygen molecules attach to the hemoglobin. When the red blood cells travel through the blood tissues, the hemoglobin is released. Next, the red blood cells absorb the carbon dioxide released from the tissues and transport this back to the lungs. The life cycle of a red blood cell is about 120 days.

The white blood cells are composed of a variety of cells that travel through the body to fight bacteria, infection, and disease. The white blood cells comprise less than 1% of whole blood, with its life cycle varying by cell type from hours to years.

Platelets make up the rest of your blood. These fragile, irregular-shaped structures move through the blood vessels, maintaining the blood vessel walls by forming clots. The clots form scabs which seal breaks such as bruises, scrapes, or cuts. Traveling through the blood vessels, if a platelet strikes a rough surface, such as what would be created by a torn blood vessel in a cut, the platelets break apart and release a chemical that forms thin protein threads. These threads wrap around the damaged area, trapping blood cells and sealing the cut in the skin with a fibrin clot. Amazingly, the clot prevents red blood cells from passing through, but allows white blood cells through to get to any infection that might have happened along the way!

Opening Question: What special ingredients are in your blood?

Objectives:
1. Students will identify the four basic components of blood:
   - Red blood cells
   - White blood cells
   - Plasma
   - Platelets

2. Students will explain the “job” or purpose of each blood component.
Disciplines / Standards:

- **Language Arts:** *Reading* ~ Standard 2-E, H.  
  *Writing* ~ Standard 1  
  *Listening, Viewing, Speaking* ~ Standard 1-A, C, D, E. Standard 2-B, A. Standard 3-B, E.

- **Math:** *Measurement* ~ Standard 1-A, C.

- **Science:** *Force & Motion* ~ Standard 1-A.  
  *Processes of Life* ~ Standard 1-A.  
  *The Nature of Science* ~ Standard 1-A, B. Standard 3-B, D.

- **Social Studies:** *History* ~ Standard 1-A.

- **Health/Physical Education:** *Health Literacy* ~ Standard 1-B.

- **The Arts:** *Visual Art* ~ Standard 1-A, B, C.

Vocabulary: blood components, red blood cells, white blood cells, plasma, platelets, scab, scientific method

Materials:
- *My Blood, Your Blood Learning Guide* and video  
- drawing paper and large sheets of lined paper  
- pencils, crayons/markers/colored pencils  
- small jar (250 ml), large bowl, and tap water  
- scissors  
- cheesecloth and rubber band

Sponge Activity:

1. Teacher: Each blood donation can save several lives because blood can be broken down into different components:
   a. **Red Blood Cells** look like donuts without holes. They carry oxygen from the lungs to the tissues. Draw a Red Blood Cell.
   b. **White Blood Cells** can be smooth or have ruffled edges and fight germs. Draw some White Blood Cells.
   c. **Platelets** act like small sponges. They link together to stop blood from leaking from capillaries and assist in clotting. Can you make a Platelet?
   d. **Plasma** is pale yellow and made up mostly of water. People who have been badly hurt in accidents or fires often receive plasma. What do you think Plasma looks like?
2. Allow time for drawing and coloring each component.
3. Encourage students to show their drawings to the class and take home to share with their families.
4. Read and display pictures of blood components from Seymour Simon’s *The Heart: Our Circulatory System*.

**Teaching Procedure:** Teacher will activate students’ schema by the following Cooperative Group Activity:

2. Distribute attached handout for illustrations. Complete the matching page.
3. Distribute a large sheet of manila paper to each group.
4. Assign groups to brainstorm a list generated from each of the following prompts:
   a. **Platelets** help your blood to clot when you bleed. They go to the cut and blend with special substances in the blood. Long, yellow threads are created which form a clot. This clot makes a plug that stops the bleeding. Finally, a scab is formed. Name all the coverings you can think of.
   b. **Red Blood Cells** resemble a small doughnut-like red disc without the hole in the middle. Name all the things you can think of whose shape is similar to that of the red blood cell.
   c. **White Blood Cells** are a variety of cells that travel through the body fighting disease and bacteria. What other things can you think of that fight diseases and germs?
   d. **Plasma** is the liquid that contains, or holds, all the blood elements. Name as many different items as you can that hold, or contain, things within them.
5. Add each group’s lists to the large butcher paper displaying the information from the opening lesson.

**Culminating Activity / Evaluation:** SCABBING EXPERIMENT

1. **Ask:** Why and how do I get scabs? (Allow time for discussion.)
2. Implement the “Scientific Method” handout using the following procedure:
   a. Fill the 250 ml (1/2 pint) jar half full with water.
   b. Cut three squares from the cheesecloth large enough to cover the mouth of the jar.
   c. Lay the cloth squares one at a time across the mouth of the jar.
   d. Position the cloth squares so that the threads crisscross, forming small openings between them.
   e. Put the rubber band over the cloth and around the neck of the jar so that the rubber band holds the cloth squares securely against the jar.
f. Set the bowl on a table.
g. Hold the jar upright over the bowl, then quickly turn the jar upside down. At first, some of the water will pour out of the jar, but most of it will stay inside.
h. Guide students through the “Conclusion”:
   So now we know…water fills the holes between the overlapped threads and stops the water from flowing out of the jar. When you cut yourself, tiny, sticky, threadlike materials in the blood cover the hole and trap the blood. This stops the bleeding. At the surface, the trapped blood and the threadlike materials dry and make a hard scab.

Closing: Answer the opening question.
Red Blood Cells

look like donuts without the holes.

Plasma

is yellow and watery. People who have been badly hurt in accidents or fires often receive plasma.

Platelets

are like a sponge. They link together to help blood clot.
DRAW A LINE FROM THE PARTS OF THE BLOOD TO WHAT THAT PART DOES TO HELP YOU.

PLATELETS  CLOT THE BLOOD

RED BLOOD CELLS  FIGHT GERMS

WHITE BLOOD CELLS  MOVES THE BLOOD

PLASMA  CARRY OXYGEN
The Scientific Method

Problem

Hypothesis

Materials

Procedure

Conclusion
The Scientific Method

Problem ____________________________________________________________

____________________________________________________________________

Hypothesis __________________________________________________________

____________________________________________________________________

Materials ____________________________________________________________

____________________________________________________________________

Procedure ____________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

Conclusion __________________________________________________________

____________________________________________________________________
COMPONENTS OF BLOOD – LESSON 2

Background Information: There is no substitute for real human blood, which is a very complicated substance. Nonetheless, there are some substances that can act like certain parts of the blood for a short period of time. There is an experimental chemical called synthetic blood. Subsequent to extensive testing, scientists have found that when added to the blood, synthetic blood can be used to replace real blood for a short time if a supply of real blood is unavailable.

When a person needs blood, the only way to get it is through a blood transfusion. During that procedure the blood is removed from one person and given to another. It is extremely important that the blood is the right type before it is transfused (transferred) from one person to another. (Please refer to page 15 in My Blood, Your Blood Learning Guide for an explanation of the four basic blood types.) If the donor’s and patient’s bloods are not compatible, the patient’s body will react to the incompatible donor cells, leading to serious complications – possibly death!

Opening Question: Can there be a substitute for real blood?

Objectives:
1. Students will define and describe blood types.
2. Students will list the four basic blood types: Type A, Type B, Type AB, Type O.

Disciplines / Standards:
- Language Arts:  Reading ~ Standard 1-B.  Writing ~ Standard 2-A, B.  Listening, Viewing, Speaking ~ Standard 1-C, D.
- The Arts:  Visual Arts ~ Standard 1-A, B.

Vocabulary: blood bank, blood type, compatibility, recipient, substitute, universal donor, universal recipient
Materials:

- My Blood, Your Blood Learning Guide
- a copy for each student of page 16 from MBYB Learning Guide
- drawing paper and pencils for each student
- handout for each student - “Does Your Blood Type Reveal Your Personality?”
- For Procedure: 5 beakers, tap water, food coloring (red, blue, purple), prepared data charts, pencils
- For Culminating Activity: measuring spoons, white corn syrup, 8 ounce measuring cup, water, toothpick, red food coloring, cornstarch, soy sauce.

Sponge Activity:

1. Distribute handout “Does Your Blood Type Reveal Your Personality?”
2. Allow 5 - 10 minutes for independent reading and reflection.
3. In Cooperative Groups, work together to identify which “type” you are.
4. Distribute drawing paper.
5. Each student will create a Concept Map / Web depicting his/her blood type each has identified as his/hers, with its respective personality traits.
6. Share with the rest of the class. (or display in the room)


2. Read the following Scenario:

   Last night, after the School Fall Festival, Daisy Donor, the Student Council President, was discovered to be missing from the school grounds. The students and staff were distraught as the local police chief searched desperately trying to find her whereabouts. In the wee hours of the morning, a man stepped forward and claimed to have Daisy. He demanded a million dollars in cash for the safe return of the popular and loved Daisy. The ransom was paid and the kidnapper brought a young lady looking very much like Daisy to the school. However, friends, family, and staff aren’t so sure that this gal is who she says she is! Your job, as scientists, is to determine whether this person claiming to be Daisy is the real one or an amazingly good imposter. How, you ask, are you supposed to determine this? Clinical tests have proven that only certain types of blood can be mixed safely with other kinds of blood. Your first task is to determine these mixtures. Then you will be given a sample of Daisy’s blood, and a sample of blood from the person who claims to be Daisy. Your only clue about the real Daisy is that she has given red cell transfusions to patients with types A, B, and AB blood. Is this young lady the real Daisy Donor or an imposter? Good luck!
4. Allow time for discussion using the questions suggested in the activity.

**Culminating Activity / Evaluation: BLOOD AND GORE**

➢ See attached copy of activity “Blood and Gore.”

**Closing:** Answer to opening question.
BLOOD AND GORE

Your blood is a very important part of your circulatory system. Blood is a living tissue composed of cellular elements and a watery fluid called plasma. **Red blood cells** travel through your body delivering oxygen to the body’s cells and removing the carbon dioxide from those same cells. The **white blood cells** travel through the body fighting disease and bacteria. The **platelets** are cellular fragments that clot the blood. These three types of cells are suspended in a straw colored liquid called **plasma**. Try this activity to mix up a batch of fake blood!

**Materials:**
- measuring spoons
- measuring cup
- white corn syrup
- tap water
- toothpick
- red food coloring
- cornstarch
- soy sauce

**Procedure:**

1. Place 2 tablespoons (30 ml) of white corn syrup into the cup.
2. Add 1 tablespoon (15 ml) of water to the cup. Stir with the toothpick.
3. Add 2 drops of red food coloring to the cup. Stir the mixture with the toothpick.
4. Add a pinch of cornstarch and several drops of soy sauce to the mixture. Again stir the mixture with the toothpick until all ingredients are completely mixed.
5. Place a small amount of this mixture on the back of your hand. **What does it look like?**

**Conclusion:**

This mixture looks a lot like blood. This recipe for fake blood is much like the one that is used for television and movies.

**Optional Activity (for more fun!):**

Mix 1 teaspoon of the fake blood mixture with 1 tablespoon of petroleum jelly using a toothpick. Transfer enough mixture to the back of one of your hands to make a spot the size of a quarter. Tear a circle slightly smaller than the size of a quarter from some tissue paper and place it on the mixture on the back of your hand to cover it. Add another small layer of the mixture to the top of the tissue paper. Then sprinkle the area with cocoa powder to cover it. What does the mixture look like? (A scab!)
A Japanese institute that does research on blood types claims there are certain personality traits that seem to match up with certain blood types. Just for fun, we’ll let you decide!

TYPE O: You want to be a leader, and when you see something you want, you keep striving until you achieve your goal. You are a trendsetter, loyal, passionate, self-confident, eloquent, romantic, and nostalgic. Your weaknesses include vanity, jealousy, and a tendency to be too competitive.

TYPE A: You like harmony, peace, and organization. You are a team player and are sensitive, patient, and affectionate. You are also very fashionable. Among your weaknesses are stubbornness and an inability to relax.

TYPE B: You’re a rugged individualist who is straightforward and likes to do things your own way. Creative, flexible, and a self-starter, you adapt easily to any situation. You are also honest, passionate, and a strong public speaker. However, your insistence on being independent can sometimes go too far and become a weakness.

TYPE AB: Cool and controlled, you’re generally well-liked and always put people at ease. You’re a natural entertainer who is tactful and fair. You are rational, a great organizer, and honest. But you’re sometimes standoffish, blunt, and have difficulty making decisions.
COMPONENTS OF BLOOD – LESSON 3

**Background Information:** White blood cells are bigger than red blood cells, but fewer in number. There is only 1 white cell for every 650 red cells. However, there are many billions of white cells cruising around your body like an army, constantly engulfing germs and protecting you from catching diseases. They do their work anywhere in the body where bacteria have gained entry. These bacteria-eating white cells are called phagocytes, from a Greek work meaning “eating cells.” When we cut or scrape our skin, blood vessels break. Blood leaks out and helps wash harmful germs from the site of the injury. The platelets help form a clot, which becomes a scab and seals up the injury. Simultaneously, the phagocytes move in and eat up any germs that may have invaded the body, while other white blood cells knock out germs by producing the disease-fighting chemicals called antibodies.

**Opening Question:** How does blood help eliminate germs?

**Objectives:**
1. Students will identify the white blood cell as being the blood component that helps protect the body from disease.
2. Students will define and describe the function of white blood cells.

**Disciplines / Standards:**
- **Language Arts:** *Reading* ~ Standard 1-B, C. Standard 2-E, H.  
  *Writing* ~ Standard 2-A, C.  
  *Listening, Viewing, Speaking* ~ Standard 1-A, C, D.
- **Math:** *Number Sense, Concepts, and Operations* ~ Standard 3-A, B, C.
- **Science:** *Processes of Life* ~ Standard 1-A, D.  
  *The Nature of Science* ~ Standard 1-E. Standard 2-A.
- **The Arts:** *Visual Art* ~ Standard 1-A, B, C.  
  *Creation and Communication* ~ Standard 1-A, B, C.

**Vocabulary:** antibody, blood pathogens, eliminate, phagocytosis, prevention

**Materials:**
- *My Blood, Your Blood Learning Guide*
- Lined paper and pencils for each student
- hole punch
- string, strapping tape, crayons, and/or markers, scissors
- copy of “Phagocytosis Flip Book” pictures for each student (*Learning Guide* p. 21)
**Sponge Activity:**
1. Say: “If you could be any blood component, which component would you be, and why?”
2. Allow 10 minutes for independent journaling, followed by sharing with the whole class.

**Teaching Procedure:**  PREVENTION – FIGHTING BLOOD PATHOGENS

2. *Students may refer to the “Glossary/Vocabulary” sheet in the Appendix for some of the terms being used.*

**Culminating Activity / Evaluation:**  PHAGOCYTOSIS IN ACTION

2. Instruct the students to take the books home to share with their families.

**Closing:**  Review and discuss opening question.
COMPONENTS OF BLOOD – LESSON 4

Subtitled ~ FOREIGN COMPONENTS OF BLOOD: DISEASES

Background Information: All healthcare facilities, whether they are hospitals, medical clinics, emergency rooms, nursing homes, laboratories, or blood banks, run the risk of nosocomial infections—those infections received at or brought to the healthcare facility. An infection is an illness caused by an infectious agent or material contaminated by an infectious agent. As regulated by OSHA, all blood centers must be familiar with the facts on infectious diseases associated with blood and blood products. Healthcare workers are at risk for exposure to the agents of hepatitis and AIDS because the work environment brings them in contact with blood and body fluids. The Center for Disease Control recommends, and OSHA mandates, Universal Precautions as the approach to infection control. Universal Precautions presumes the blood and body fluids of all persons to be potentially infectious. Because many people who carry bloodborne infections have no symptoms and may be unaware they have an infectious disease, you must assume that all human blood, human body fluids, and specimens are infectious. This method of infection control is also called Standard Precaution. Protection against contact with blood and body fluids is to be employed without regard to a patient’s or donor’s bloodborne infection status.

Any exposure to bloodborne pathogens can lead to disease or death. Potentially infectious materials are fluids including semen; vaginal secretions; cerebrospinal, synovial, pleural, pericardial peritoneal, and amniotic fluids; breast milk; saliva; urine; vomit; any body fluid that visibly contains blood; and other body fluids.

OSHA defines bloodborne pathogens as pathogenic microorganisms present in human blood that can cause disease in humans. Bloodborne diseases that you could be exposed to include non-A hepatitis, non-B hepatitis, hepatitis B and C, as well as syphilis, malaria, and human immunodeficiency virus (HIV). The most significant diseases are hepatitis B (HBV) and C (HCV), and HIV. Concerns about HIV are valid; however, the greater threat for healthcare workers is the risk of infections by the hepatitis B virus, which is easier to get than AIDS and is just as deadly. Each year, at least 200,000 people become infected with hepatitis B virus in the United States, and 4,000 – 5,000 people die of hepatitis B-related illnesses!

Hepatitis means “inflammation of the liver.” Hepatitis B virus (HBV) is the major infectious bloodborne hazard healthcare workers face on the job. It infects approximately 8,700 healthcare workers a year, resulting in more than 400 hospitalizations and 200 deaths! HBV may severely damage your liver, leading to cirrhosis, liver cancer, or chronic liver disease - and almost certain death. OSHA mandates that the hepatitis B vaccination series must be made available to all employees who have occupational exposure to blood.

(Note: Please refer to the pamphlet, “Help Erase Hepatitis B: Find Out How to Reduce Your Risk,” for further information on this highly important topic.)
The human immunodeficiency virus (HIV) attacks the body’s immune system, causing the disease known as AIDS, or Acquired Immune Deficiency Syndrome. A person infected with HIV may carry the virus without developing symptoms for several years. They may suffer from flu-like symptoms, fever, diarrhea, and fatigue, and will eventually develop AIDS. They may also develop AIDS-related illnesses, including neurological problems, cancer, and other opportunistic infections. HIV is transmitted primarily through sexual contact, but may also be transmitted through contact with blood and some body fluids. HIV is not transmitted by touching, feeding, or working around people who carry the disease. Currently, there is no vaccine to prevent HIV infections.

HIV lives in blood and to travel it has to go from one person’s body directly into another person’s body. To help dispel some myths regarding AIDS, this is how you cannot get AIDS:

- From being coughed or sneezed on by someone who has HIV/AIDS.
- From being hugged, kissed, or touched by someone who has HIV/AIDS.
- By living with or visiting someone who has HIV/AIDS.
- By sharing food with someone who has HIV/AIDS.

When a student asks a sensitive question about AIDS, direct the question to the rest of the class. If another student offers an incorrect answer, give the basic facts. You may want to recommend that the student ask his/her parents if there are any further questions.

For further background information, please refer to the books by Anna Forbes (see Bibliography).

**Opening Question:** What are myths?

**Objectives:**

1. Students will differentiate between myth and fact regarding HIV and AIDS.
2. Students will define HIV, AIDS, and Hepatitis B.
3. Students will describe the symptoms of HIV/AIDS and Hepatitis B.
4. Students will explain how HIV and Hepatitis B are contracted.

**Disciplines / Standards:**

- **Language Arts:** *Reading* ~ Standard 1-A. Standard 2-A, F, G, H.  
  *Writing* ~ Standard 1-A, B, C. Standard 2-A, F.  
  *Listening, Viewing, Speaking* ~ Standard 1-A, D. Standard 3-A, C, D.

- **Math:** *Geometry and Spatial Sense* ~ Standard 1-A.

- **Science:** *Processes of Life* ~ Standard 1-D.  
  *The Nature of Science* ~ Standard 1-E. Standard 3-B.
Health/Physical Education:

- Health Literacy ~ Standard 1-F. Standard 2-A, B.
- Responsible Health Behavior ~ Standard 1-A, E. Standard 2-A, B.
- Advocate and Promote Healthy Living ~ Standard 1-A, B.

The Arts:

- Visual Arts – Skills and Techniques ~ Standard 1-A, B, C.
  Standard 2-A, B, C.

Vocabulary: AIDS, bloodborne pathogens, Hepatitis B, HIV, microscopic, myth, vaccination

Materials:

- My Blood, Your Blood Learning Guide
- Books from “The AIDS Awareness Library” by Anna Forbes: Living in a World with AIDS, Myths and Facts About AIDS, and What is AIDS?
- For Culminating Activity: sheet of tagboard for each student, pencils, crayons, markers, colored pencils, scissors, various materials for creating and shaping 3-D objects (e.g., construction paper, pipe cleaners, colored tissue paper, yarn, cotton balls, and whatever else you have on hand!).

Sponge Activity:

1. Draw a T-Chart on the board with the headings: Myth and Fact.
2. As a class, determine the characteristics of each term. Teacher writes answer in the appropriate column.
3. Draw a second T-Chart on the board next to the first one.
4. Ask students for a few examples of myths and facts, and write each example in the correct column.

Teaching Procedure: ORAL READING:

1. Read the short story, Living With AIDS by Anna Forbes.
   (Note: Use your discretion near the end of the book when the sensitive issue of sexual transmission is discussed.)
2. Facilitate an open discussion following the reading.
3. Directed Teaching: Present information and facts on HIV/AIDS and Hepatitis B Virus (HBV) utilizing the three books by Anna Forbes and the background information from the pamphlet, “Help Erase Hepatitis B.”
4. Establish myths and facts about HIV / AIDS and create a new T-chart.
Culminating Activity / Evaluation:  MODEL: MICROSCOPIC BLOOD SAMPLE

1. Instruct students to create a 3-dimensional healthy “Microscopic Blood Sample” out of any medium they choose, using a piece of tagboard as the plasma.

2. Whatever is used, remember to do the following:
   a. Label the artwork with the appropriate cell name.
   b. Label all the blood components discussed in class.
   c. Make sure that the material you use to represent each structure resembles that structure in shape.
   d. Write a paragraph that clearly defines the function of each blood component.

Closing:  Review answer to opening question.
DONATIONS OF BLOOD ~ LESSON 1

Background Information: General donation requirements in Manatee County ~
Donors must be at least 17 years old, weigh at least 105 pounds, and be in good general health.
Florida has no upper age limit. Florida law prohibits anyone to be paid for a blood donation.
All donors are volunteers and go through an extensive interview process and mini-physical
before being accepted to give blood. Every unit of blood that is collected is sent to the
laboratory for many safety tests. A donor is also instructed to call the blood center if he/she
develops any sickness within 72 hours (3 days) of donation (including colds and flu). All of
these procedures help us to ensure a safe blood supply in Manatee County. The Manatee
Community Blood Center (as with any blood bank in the USA) is heavily regulated by the FDA
and OSHA. We must comply with their high standards and be certified for every blood
collection and laboratory process we use.

The amount of blood collected is one pint. Adults have 8-12 pints of blood in their body and the
stem cells (in the bone marrow) are constantly manufacturing more blood cells to replace
donated and old cells.

Please refer to the brochure included in the Appendix, “Your Blood Donation at Manatee
Community Blood Center.” This has step-by-step information about the process of donating
blood.

Other information you may want to include in your discussion/preparation for the persuasive
writing assignment in this lesson:

♦ People may donate whole blood every 56 days and platelets every 2 weeks.
(See apheresis brochure in the appendix to distinguish between different types of
donations.)
♦ The #1 reason people give for not donating blood is because they were never asked.
Some people are also misinformed. For example, it is impossible to receive any
diseases from donating blood. All needles, bags, band-aids, and wraps are new and
sterile. All materials are thrown away after contact with one donor.
♦ One donation saves up to 3 lives in Manatee County! The Manatee Community
Blood Center laboratory divides whole blood into three components: red blood
cells, platelets, and plasma. Doctors usually prescribe a component of blood for
transfusion (only in rare circumstances will someone receive “whole blood” – blood
that is not divided).
♦ There is no substitute for human blood. In order to have blood available for
surgeries and emergencies, blood must be donated on a daily basis. Red blood cells
only last for 42 days, platelets expire in 5 days, and fresh frozen plasma is good for
up to 1 year. Remember, one serious car accident can use 20, 30 or more units of
blood components.
♦ In order to keep up with the high demand of blood products in Manatee County,
Manatee Community Blood Center has three bloodmobiles that visit schools,
businesses, churches, special events, and various organizations every day.
♦ It doesn’t matter what color you are, how much money you have, or where you live, your blood is needed and valuable. All human beings share one of the four types of blood: O, A, B, or AB.

**Opening Question:** Would you donate a whole pint of blood?

**Objectives:**
1. Students will identify the measurement of a pint and relate it to their own experience.
2. Students will write a persuasive letter, communicating ideas and information effectively.
3. Students will make an informal decision on whether to donate blood and give supporting details.
4. The class will create an adult survey.

**Disciplines / Standards:**
- Language Arts: Writing ~ Standard 1-A, B.
- Math: Measurement ~ Standard 4-B.
- Social Studies: Economics ~ Standard 1-A, B.

**Vocabulary:** blood donor, bloodmobile, donation, persuasive letter, survey, volunteer

**Materials:**
- Instant pudding (1 box)
- 2 cups milk
- measuring cup, wire whisk, and small glass container (at least 2-cup capacity)
- chalk, chalkboard
- paper, pencils

**Sponge Activity:**
- Demonstrate the amount of 1 pint (the amount in one blood donation).
  1. Stir 2 cups of cold milk into pudding in medium bowl. Beat at least 2 minutes until completely dissolved.
  2. Pour into a glass container to demonstrate a measurement of 1 pint.
  3. Ask students: “What other containers or snacks do you see in pint amounts?” (Examples: strawberries, ice cream, yogurt, salsa, milk)
  4. Introduce the pint as the amount in a volunteer blood donation.
Teaching Procedure:
1. Ask: “What do you think it means to be a volunteer blood donor?”
   “Who do you know that donates blood?”
   “Why do you think they give?”

2. Teacher explanation of the blood donation process.
   (Note: Use the information in the Background Information section. If you are a blood donor, please include your own experience.)

3. Silent journaling: Pretend that you’ve been asked to donate blood (and you were allowed to give). The bloodmobile is at your school. What would you say? Will you donate? Why or why not? Write for 5 -10 minutes. Do not worry about spelling or punctuation. (There is no right answer, just be sure to explain why you will or will not give blood.)

4. Ask if a few students will share their journaling.

5. Class Project: Write and conduct a survey to find out the reasons adults do and don’t give blood. Together, brainstorm questions students could ask their relatives and older family friends. Organize into a survey. Ask a student to copy from the board for you. Teacher (or student) type up the survey, copy 3 times for each student, and hold to distribute with the next lesson (when the next activity is complete). You’ll give instructions for the survey then, but let the students know they will be conducting the survey soon.
   (Note: The surveys will be done with anyone 17 years or older.)

Culminating Activity / Evaluation:

Students write a persuasive letter asking someone to donate blood. This letter will be given to everyone after they complete the survey. Students should address the letter to “Relative or Family Friend.” Use the attached graphic organizer to help students with brainstorming/prewriting. Additionally, have the students reread their journaling from the above activity to get some ideas. Use a writing process that you and your class know. Below is an example:

1. Prewriting: Brainstorm using the graphic organizer provided.
2. Rough Draft: “Sloppy copy.”
3. Revising: Focus on content.
4. Editing: Proofread for grammar, punctuation, spelling, etc.

➢ You may want students to pair up for this writing assignment, or at least for the revising/editing portion.
➢ Younger grade levels may want to have the parts of a letter outlined on the board for student reference.

Closing: How would you now answer the opening question?
“Satellites” Graphic Organizer
Main idea or request.
(example) “Please donate blood.”
Sample Survey

(Teacher, please decide: Will the students ask the questions orally and take down the notes themselves? Or, will the students hand the survey to an adult to fill out on their own? This may depend on your grade level. If students are taking notes from their interviews, they could use their own paper to record the answers. This would give them more space to write.)

1. Have you ever given blood? Yes or No
   (If yes, go on to the next questions. If no, skip to question #7)

   **If your answer to #1 was “Yes”:**

   2. Do you give blood on a regular basis? Yes or No
      If yes, how often? Once a year Twice a year Four times a year Every 56 days

   3. Why did you give blood for the first time?

   4. Why do you still give blood?

   5. How does it feel to give blood?

   6. Where do you go to give blood?

   **If your answer to #1 was “No”:**

   7. Why do you not give blood?

   8. Have you ever been asked to give blood?

   9. What would it take to make you want to give blood?
DONATIONS OF BLOOD – LESSON 2

**Background Information:** This lesson focuses on authentic learning experiences. The products of the lesson may be used in the community with very little planning on the teacher’s part. Please consider the possibilities, and enjoy these lessons right along with your students!

Anyone can write a public service announcement at no cost. So, why not have your students write one? There is no guarantee that any public service announcement will be published, but the experience will be exciting and educational.

Several media options are listed below. The Public Service Announcement worksheet (attached) should help guide the students in the writing process. We’ve also included a sample. Feel free to add more of your own ideas. It is best to fax the public service announcement, then follow up with a phone call to ensure receipt. You may want to introduce yourself as a Manatee County teacher, and stress that your students wrote the announcement as part of this unit on blood.

<table>
<thead>
<tr>
<th>Media</th>
<th>Phone Number</th>
<th>Fax Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Bradenton Herald</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Manatee Tribune</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV Channel 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your school’s morning announcements</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Poster project notes ~**

Students are asked to make posters in a variety of learning situations. Why not make the posters useful in the community? There is always a need for blood. Everyday the Manatee Community Blood Center works to recruit new donors, as well as reminding previous donors to give again. The blood center is open 6 days a week (various hours, and closed on Sundays) for donors to give. It takes a lot of people to supply our county with a day’s supply of blood.

The posters your students design may be displayed in any approved location in the county. You or your students could contact doctor’s offices, a hospital, the school or public library, your school business partner(s), or student’s parents’ work places. These places may be willing to hang up some posters about blood donation. If none of these options are appealing, call the blood center’s Marketing Department (746-7195). We distribute blood drive posters daily throughout the county (for our bloodmobile drives), and could possibly incorporate your posters in a special drive.

**Opening Question:** Who wants to be a hero?
Objectives:
1. Students will use problem-solving skills to answer a challenge Math question.
2. Students will role-play a blood donor recruitment scene.
3. Students will produce an accurately edited final persuasive letter.
4. Students will write a public service announcement, adapting language to the more formal situation and audience.
5. Students will brainstorm and sketch poster ideas that would be effective in recruiting blood donors.

Disciplines / Standards:
- Language Arts: Language ~ Standard 1-B.
  Writing ~ Standard 1-B, C. Standard 2-C.
- Math: Number Sense, Concepts, and Operations ~ Standard 3-A, B, C.
- The Arts: Theatre Applications to Life ~ Standard 1-A.

Vocabulary: hero, marketing, marketing agency, media, misconceptions, public service announcement (PSA), recruitment, role-play, slogan, transfusion

Materials:
- chalk, chalkboard
- drawing paper for each student
- markers / crayons / colored pencils
- copied public service announcement worksheets for each student
- lined paper and pencils for each student
- persuasive letters from Lesson 1

Sponge Activity:
Brain-Teaser:
People can donate blood every 56 days. If someone gave blood every 56 days, how many pints would he or she have given in 5 years? 10 years?

Work together as a class. How many different ways can this problem be solved? Be open to different student approaches.
Teaching Procedure:

1. Role Play:
   ♦ Scene: A student has been in a bad car accident and needs a blood transfusion (define word if necessary). One student is a blood donor recruiter and must convince the teacher to give blood. Pretend that the teacher and injured student have the same blood type.  
   (Note: Teacher, play “devil’s advocate” – give lots of excuses and communicate a lot of misconceptions; e.g., “I’ll get AIDS if I give…too many other things to do…it will hurt…somebody else will give…etc. Give the recruiter or class an opportunity to respond to your misconceptions.)

2. Continue and finish work on the persuasive letters. Have students turn in the final draft of the letter. Teacher, make 3 copies to give back to them with 3 copies of the survey.

3. Give instructions on conducting survey: (You may want to model this.)
   a. Survey 3 people 17 years old or older. Do not ask strangers; instead, ask parents, grandparents, family friends, or other relatives. It doesn’t matter if they give blood or not.
   b. After the survey has been completed and returned to you, give them a copy of your letter.

Culminating Activities / Evaluation:

1. Transform your classroom into a Marketing Agency ~ (Set the stage.)
   ♦ You have been hired by the Manatee Community Blood Center and our local hospitals to recruit volunteer blood donors. Discuss the terms “marketing” and “agency.” (If a student’s parent works in marketing you may consider having him/her visit the classroom.) Discuss the variety of work that might be done. Make a list of the many ways people advertise.

2. Write a Public Service Announcement: ~
   ♦ Introduce public service announcements (press release) as one way of advertising. This is an authentic activity. Finished products may be submitted upon teacher approval.

   Authentic Public Service Announcement Suggestions:
   1. Advertise an upcoming blood drive at your school.
   2. Relate the truth about donating blood.
   3. “Where to go to donate blood,” or, “Introducing the Manatee Community Blood Center.”
   4. Explain: Why give blood.
NOTE: PSA’s can be used for educational purposes as well as for announcing a specific event. It is imperative, however, that if you desire to submit a PSA to the media on behalf of the Blood Center, that the Director of Marketing at the Manatee Community Blood Center first reads and approves the PSA. Please call 746-7195, or fax the PSA to MCBC at 748-1711, Attention: Director of Marketing. Thank you for being attentive to this matter.

♦ See Sample Press Release handouts. Distribute “incorrect version” for proofreading exercise first!

♦ Students work in cooperative groups to write. Pass out the appropriate worksheet with the media form field filled in. Discuss the form and length of a public service announcement. Teacher may choose between several options. Two or more groups may have the same media assignment. Be sure every student has a job in the group (e.g., Leader, Recorder, Speaker, etc.).

Note: Students should use their own paper for the first draft.

♦ Instruct each group to share his/her work with the class.

Homework or Additional Classwork:

➢ Design a Poster ~

♦ Have students design a poster to be displayed in the community (in a teacher-determined location). The purpose is to recruit blood donors. You may want to choose a theme or slogan with your class; e.g., “Wanted: Blood Donors,” “Be a Hero – Donate Blood.”

♦ Students should do several sketches on blank copy paper, with the final work being done on poster paper at home. Determine due date.

Closing: Review opening question.
Public Service Announcement

Media ____________________________

_____________________________

_____________________________

_____________________________

_____________________________

_____________________________

_____________________________

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_____________________________

_____________________________

Names ____________________________

_____________________________

_____________________________

_____________________________

_____________________________

School ____________________________

Teacher ____________________________

Grade ____________

If this PSA will be sent to the media, please first contact the Director of Marketing at Manatee Community Blood Center for approval. Thank you!
FOR IMMEDIATE RELEASE
Contact: Elaine Ackel, Marketing Director, 746-7195
Date: May 21, 1995

Blood Center Makes Urgent Appeal For Blood

Manatee Community Blood Center is facing a blood shortage and is calling on the community for help. “The area hospitals have been giving us much larger orders for blood than we normally see this time of year,” said Barbie Goodman, Technical Director. Because of this, the blood supply at the Blood Center has fallen below minimum levels. Diana Davis, Executive Director at the Blood Center commented, “All we need is one disaster and we could find ourselves in a very difficult situation.” Manatee Community Blood Center is the sole supplier of blood for both hospitals in Manatee County, and relies entirely on the generous blood donations of those who live and work in this community. If you are an eligible blood donor or would like to become a life saver, please come to the Blood Center at 216 Manatee Avenue East; the Satellite Blood Center in room 481, Blake Hospital, 2020 59th Street West; or visit one of our bloodmobile locations. All donors must present a photo ID and know their Social Security Number. Call 746-7195 for more information.
FOR IMMEDIATE RELEASE
Contact: elaine ackel, marketing director, 746-7195
Date: May 21 1995

Blood Center Makes Urgent Appeal For Blood

Manatee Community Blood Center is facing a blood shortage and is calling on the community for help. “The area hospitals have been giving us much larger orders for blood than we normally see this time of year” said Barbie Goodman, Technical Director. Because of this, the blood supply at the Blood Center has fallen below minimum levels diana davis executive Director at the Blood Center commented, all we need is one disaster and we could find ourselves in very difficult situation. manatee community blood center is the sole supplier of blood for both hospitals in manatee county and relies entirely on the generous blood donation of those who live and work in this community. if you are an eligible blood donor or would like to become a life saver, please come to the Blood Center at 216 manatee avenue east, the Satellite Blood Center in room 481, blake hospital, 2020 59th street west, or visit one of our bloodmobile locations. All donors must present a photo ID and know their Social Security Number call 746-7195 for more information
DONATIONS OF BLOOD – LESSON 3

Opening Question: Why do some people give blood, and others do not?

Objectives:
1. Students will compile, interpret, and evaluate survey results.

(Note: More detailed objectives must be based on the class’s level and teacher’s planning on how deep to go with the data analysis.)

Disciplines / Standards:
- Language Arts: Listening, Viewing, Speaking ~ Standard 1-D, E. Standard 2-B.

Materials:
- Paper, pencils
- completed surveys
- chalkboard or overhead projector with survey copied onto transparency

(If applicable: Appointment with a staff member from MCBC and prepared questions for this person.)

Sponge Activity:
- Ask a student to survey the teacher in front of the class. Have the student fill out the survey as you answer each item.

Teaching Procedure: Compile and interpret data from surveys.

1. Students should spread out surveys from Lesson 2 on their desks. By show of hands, record on the board or overhead projector (make a transparency of your class’s survey) the results of the survey. Group subjective answers by myth (fear) or fact (in a T-chart).
2. Ask interpretive questions of the class:
   - What patterns do you see in the answers?
   - Are certain groups of people more or less likely to donate blood?
   - The national average of people who donate blood is 5%. How do your survey results compare with this figure?

   For Yes/No answers, determine math expressions to interpret your data (e.g., 16/75 of those surveyed have given blood). Practice reducing fractions when possible.

   **Extra challenges:**
   - Change fractions to percentages.
   - Create graphs of results.

3. From the survey results, discuss what students learned about people’s feelings toward blood donation.

   Are there misconceptions and fears that the students could dispel with the knowledge they now have from this unit?

**UNIT CULMINATING ACTIVITY OPTIONS:**

1. Students who have experienced My Blood, Your Blood are equipped to be today’s blood donor recruiters!
   - Does your school currently sponsor a blood drive? If so, speak with the blood drive sponsor about being involved. If not, call the Manatee Community Blood Center to set up a new blood drive.

   - Do an advertising campaign to recruit donors. Organize a grade-level competition to bring in the most donors. Or, create a school-wide competition! Call the Marketing Department at Manatee Community Blood Center for ideas, support, or a pizza party to honor a winning class.

   *Note: Manatee Community Blood Center believes that the school is a natural community center. By partnering with you for blood drives, we could really make a difference together!*

2. Invite Manatee Community Blood Center staff for a special demonstration and question/answer session. We have an Educator and Registered Nurses on staff who would be happy to schedule a visit. Please call the Blood Center (746-7195) and ask for the Education Coordinator.
Circle the answer. Be sure to read all answers before choosing.

1. What cells cause your blood to clot and form a scab?
   a. white blood cells
   b. red blood cells
   c. platelets
   d. veins

2. The heart is a
   a. pump
   b. muscle
   c. organ
   d. all of the above

3. Which type of blood vessel carries blood away from the heart?
   a. veins
   b. arteries
   c. capillaries
   d. vessels

4. Where are blood cells made?
   a. bone marrow
   b. heart
   c. oxygen
   d. spleen

Use the words from the word bank to fill in the blanks.

<table>
<thead>
<tr>
<th>oxygen</th>
<th>carbon dioxide</th>
<th>nutrients</th>
<th>waste</th>
</tr>
</thead>
</table>

Red blood cells deliver (5) _______________ and (6) ____________________ to cells everywhere in your body.

They pick up (7) ____________________ and (8) ____________________ for your body to get rid of.
Answer the following questions.

9-12.
Name the four components of blood.

_________________________  __________________________

_________________________  __________________________

13. What is the name of the liquid part of your blood? It is made up mostly of water. ________________

14. What is the job of the white blood cells? ________________________________

__________________________________

15. What is a blood donor? ________________________________

__________________________________

Give 2 examples of a fact and 2 examples of a myth about blood.

<table>
<thead>
<tr>
<th>Blood Facts</th>
<th>Blood Myths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ___________</td>
<td>1. ___________</td>
</tr>
<tr>
<td>_______________</td>
<td>_______________</td>
</tr>
<tr>
<td>2. ___________</td>
<td>2. ___________</td>
</tr>
<tr>
<td>_______________</td>
<td>_______________</td>
</tr>
</tbody>
</table>
Teacher Evaluation of *My Blood, Your Blood* Interdisciplinary Thematic Unit  
Upper Elementary Version

Name: ___________________ Date: _______________

School: ____________________

*The thematic unit plans were written with the help of a grant from The Foundation for America’s Blood Centers. This national organization is interested in sharing the unit plans with blood centers across the country. Please take a few minutes to evaluate our work and mail to: Manatee Community Blood Center, Inc., 216 Manatee Ave. East, Bradenton, FL 34208.*

*Please circle yes or no for each question.*

1. Was the lesson plan layout user-friendly? Yes  No
2. Were the explanations of procedures clear and succinct? Yes  No
3. Was the background information included in the lesson plans sufficient and helpful? Yes  No
4. Were the visual aids (video, poster, Learning Guide) helpful and appropriate? Yes  No
5. Was there enough material for you to adapt the unit for your students’ particular needs? Yes  No
6. Were the required materials for this unit easily accessible to you? Yes  No
7. Were the student assessments appropriate and adequate? Yes  No
8. Will you use this curriculum again? Yes  No

9. Did you use the project ideas? Yes  No
   If yes, how did you use them and how did the students respond? ________________________________

10. Were there any pieces that seemed to be missing in the curriculum? Please explain.

11. Is there anything else that would be helpful to include in the Appendix? Please explain.

12. Approximately how many hours did you spend on the *My Blood, Your Blood* curriculum? _______

13. Please write a few sentences on your students’ response to the curriculum. ________________________

*Please use the back of this paper for additional comments/suggestions.*

Appendix
MISSION STATEMENT

Manatee Community Blood Center, Inc.

The mission of Manatee Community Blood Center is to maintain the highest standards of delivery of an adequate blood supply to meet the needs of our community and others.
Project Ideas

1. Create a three-dimensional model of blood.
2. Create a picture dictionary of all vocabulary words.
3. Book report: Read about someone who was instrumental in discovering an area of blood science. Write a report.
4. Keep a scrapbook of current newspaper/magazine articles relevant to the unit.
5. Create a game on the science of blood.
6. Create your own “Fun Facts” book about blood. Do research in the library, on the Internet, and/or visit the blood center to learn more.
8. Create a mobile: a “Blood Mobile” (using string and a hanger or pieces of wood).
9. Create a Class Book. Have students compose and illustrate their own chants, poems, or stories based on the information they have learned in this unit. Bind the pages together with metal rings, staples, or yarn. Share it with other classes.
10. Compose shapely poems. Students draw and cut out a blood drop or other unit-related shape. Compose a poem or list of related words to write onto the shape. Display.
11. Create an advertising campaign to recruit new blood donors. Write and include a slogan. Put all ideas on poster board to present to the class. (Don’t limit yourself! You can advertise anywhere—minimum of three forms of media required. Examples: a newspaper ad, specially designed baseball caps, or park benches!)
12. Sponsor a blood drive at your school, or assist your school’s current blood drive sponsor. Design and implement a blood donor recruitment campaign for your school. Call the blood center for help (746-7195).
13. Sponsor a blood drive at your church or other organization. Design and implement a blood donor recruitment campaign for that organization. Call the blood center for help (746-7195).
14. Read a biography, autobiography, or approved fiction book describing a person’s experience with a disease that may have required a blood transfusion (e.g., cancer, AIDS, sickle-cell anemia, Hepatitis B). You may also find a book about someone who was in a very serious accident and needed to receive blood products to save his/her life. Write a book report.
15. Write a play or story about how volunteer blood donors saved someone’s life.
16. Create a video TV commercial to recruit new blood donors.
17. Design a set of stamps commemorating blood donation.
18. Create and illustrate the adventure of a cartoon or superhero blood donor or blood lab technician.
19. Create a mural, bulletin board, or 3-D display about blood.
20. Organize a debate with a friend about donating blood. Present it to your class.
21. Teach a lesson to the class on some new information about the science of blood. For example, do research on the history or new technology in blood banking.
22. Create a circulatory system travel brochure.
Other Related Activities

1. Vocabulary/Spelling class work and/or homework.
2. Current Events: Encourage students to bring in newspaper or magazine articles that are appropriate and relevant. Share orally and/or keep a class scrapbook.
3. Math Fact Cards: Write facts about blood on index cards. Each of these facts will include a number. When lining up for lunch, recess, etc., pass out these cards. Challenge the class to line up as quickly as possible in order from lowest fact card number to highest. This should be done silently. Students should hold their card in front of them so others can read them and assess where they should go. On the way out, each student can read his or her fact to you as you collect the card. (Reference sheet included- See Math Facts.)
4. Create blood word searches or crossword puzzles.
5. Write blood-related poems.
6. Create blood Math word problems (these could be extra challenging).
7. Write and/or act out a drama to depict various roles of the blood components (each actor is assigned the role of one blood component).
8. Design an interactive bulletin board.

Review Games

1. I have, who has…
   This is a vocabulary review game.
   **Materials:** Index cards
   **Teacher Prep:** Begin by writing, “Who has…” on an index card, then one of the definitions from the vocabulary list. On the next card, write the vocabulary word that would define the 1st person’s card. On the other side, write a new definition beginning with “Who has…” Continue in this manner until all definitions and vocabulary words are on cards.
   **Game:** Pass out one card to each student. If there are extra cards, give two to several students. The game begins with the person who received the initial “Who has…” card (the one you made that has no vocabulary word on the back). That person stands up and says “Who has…” The next person who has the answer stands up and says “I have…” then reads the other side, “Who has…” This continues until all cards have been read. Students enjoy being timed, which motivates them to improve their time with each game.

2. Musical Chairs
   **Materials:** Music, index cards
   **Teacher Prep:** Write one question about the unit on each card. Make as many cards/questions as students in your class. Number each question on the card. Create an answer key.
   **Game:** Begin by telling students to number a sheet of paper from 1 to (the number of cards you made). Explain to the students that there will be a numbered card on each desk. When the music is playing, students circulate around the room with a pencil and the numbered paper in an orderly fashion. When the music stops, they sit down at the nearest desk. They flip the question card over, read, and answer on their own paper next to the corresponding number. Allow approximately 1 minute, then restart the music. Students get up, circulate, and repeat the whole process. Repeat as time allows, then direct students to return to their own seats. Review the questions and answers together.
3. **Fly Swatter Game**  
**Materials:** Vocabulary definitions, fact cards, two fly swatters, resource books or pre-made list of questions.  
**Teacher Prep:** Fill the board with vocabulary unit concepts and words relating to blood.  
**Game:** Divide class into two teams. Place each team in line behind a line or piece of tape back from the board. Give each person in the front of the line a fly swatter. Read a question or fact with a missing word. For example: Which blood component is a germ-fighter?

4. **The Blood Component Corporation**  
**Description:** As a blood component, you are an employee of the Blood Component Corporation. Due to recent cost increases, the Human Body has to fire workers. You need to write a letter to the Blood Component Corporation defending your position in the company. In your letter, you need to describe to the corporation the following characteristics of your component and explain why you are important to the Blood Component Corporation.  
1. Tell what the name of your component is and where you are located.  
2. Identify where you work in the body.  
3. Describe how you work in the body. What are your functions?  
4. Tell the corporation how you perform these functions.  
5. Tell the corporation why you are important and why they should not fire you.  
6. Explain what might happen to the body if the corporation fires you.  
Students will read their letters to the Blood Component Committee (the rest of the class). Along with the letter, students will need to have a photograph (labeled drawing) of their component to use as a visual aid.

5. **Games modeled after popular game shows such as “Jeopardy”, “Who Wants to be a Millionaire (blood donor)?”**
How blood gets from the donor to the person who needs it!

1. First, the donor gives the blood.

2. Then, the blood is sent off to be tested.

3. Next, the blood is separated into different components until needed.
   - Red Blood Cells
   - Platelets
   - Plasma

4. The blood is then delivered to a hospital's blood bank.

5. Then, the blood is used for those who need it.
Outline of the Heart

1. Veins
2. Left Atrium
3. Left Ventricle
4. Right Atrium
5. Right Ventricle
6. To Body
7. From Body

Oxygen-Poor
Oxygen-Rich
Outline of the Heart
The Inside of a Bone

This is the cartilage.

This is the spongy part of a bone, it also has the red bone marrow.

This is the compact bone.

This is yellow bone marrow.
It Takes All Types To Save Lives

<table>
<thead>
<tr>
<th>ABO Group &amp; RH Type</th>
<th>How Many People Have It</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>O+</td>
<td>1 in 3</td>
<td>This is the most common blood type. 37.2% of hospital patients in Florida need O positive blood. Therefore O positive donors are needed every day.</td>
</tr>
<tr>
<td>O-</td>
<td>1 in 15</td>
<td>This is a fairly rare blood type, occurring in only 7% of the population. O negative is known as the <em>Universal Donor</em>; it is the only blood type that may be safely transfused into persons of any other type. O negative is especially needed for emergencies when there is little time to type and cross-match blood.</td>
</tr>
<tr>
<td>A+</td>
<td>1 in 3</td>
<td>Because this is a fairly common blood type, A positive is in great demand. 34% of the population has A positive blood.</td>
</tr>
<tr>
<td>A-</td>
<td>1 in 16</td>
<td>This is a very rare blood type. Only 6% have this blood type, so A negative donors are always needed.</td>
</tr>
<tr>
<td>B+</td>
<td>1 in 12</td>
<td>This is a fairly rare blood type. Only 8% of the population has this blood type, so donors are always needed.</td>
</tr>
<tr>
<td>B-</td>
<td>1 in 67</td>
<td>This is a very rare blood type. Only 1% has this type. It is important to always have B negative blood donations.</td>
</tr>
<tr>
<td>AB+</td>
<td>1 in 29</td>
<td>This is a rare blood type, occurring only in 3% of the population. Persons with AB positive blood are known as <em>Universal Receivers</em>, as they may receive blood from persons with other blood types. Due to their rare nature, AB positive donors are always needed.</td>
</tr>
<tr>
<td>AB-</td>
<td>1 in 167</td>
<td>This is the rarest blood type. Only $\frac{1}{2}$% of persons has AB negative blood. Since this blood type is so rare, donors are especially needed. Donors may be called and asked to give, as shortages are common.</td>
</tr>
</tbody>
</table>
# Blood Types and Frequency

<table>
<thead>
<tr>
<th>Blood type and Rh factor</th>
<th>How many people have it</th>
</tr>
</thead>
<tbody>
<tr>
<td>O positive</td>
<td>40 out of 100</td>
</tr>
<tr>
<td>O negative</td>
<td>7 out of 100</td>
</tr>
<tr>
<td>A positive</td>
<td>34 out of 100</td>
</tr>
<tr>
<td>A negative</td>
<td>6 out of 100</td>
</tr>
<tr>
<td>B positive</td>
<td>8 out of 100</td>
</tr>
<tr>
<td>B negative</td>
<td>1 out of 100</td>
</tr>
<tr>
<td>AB positive</td>
<td>3 out of 100</td>
</tr>
<tr>
<td>AB negative</td>
<td>1 out of 200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If you have…</th>
<th>You can receive…</th>
</tr>
</thead>
<tbody>
<tr>
<td>O positive</td>
<td>O+, O-</td>
</tr>
<tr>
<td>O negative</td>
<td>O-</td>
</tr>
<tr>
<td>A positive</td>
<td>A+, A-, O+, O-</td>
</tr>
<tr>
<td>A negative</td>
<td>A-, O-</td>
</tr>
<tr>
<td>B positive</td>
<td>B+, B-, O+, O-</td>
</tr>
<tr>
<td>B negative</td>
<td>B-, O-</td>
</tr>
<tr>
<td>AB positive</td>
<td>All types, + or -</td>
</tr>
<tr>
<td>AB negative</td>
<td>AB-, A-, B-, O-</td>
</tr>
</tbody>
</table>
What Good Is a Blood Donor?

A blood donor is good for...

People who go through windshields and red lights.
Someone with cancer, anemia, or leukemia.
People who undergo surgery.
Barefoot kids who aren’t careful.
People who are nearly out of life because they are out of blood.
A little girl who does not know she has leukemia-- or why.
A newborn boy who needs the gift of life.
People who need open heart surgery.
People who need a liver, lung, heart, or kidney transplant.
New babies who are struggling to live.
New mothers needing a transfusion.
Little kids who are poisoned or fall on something sharp.
People who fool around with something that explodes or shatters.
People who suffer from burns.
Tree climbers and daredevils.
People in the wrong place at the wrong time.
People who are in a lot worse shape than most people.

You Can Be a Blood Donor!
Dear Parents:

<Later this month / This week / Next week>, our <specify grade level> grade students will be studying the human circulatory system and learning how different components of blood are essential to life. This area’s non-profit community blood provider, Manatee Community Blood Center, brought us this exciting unit, called *My Blood, Your Blood*.

Our students will see a video, participate in discussion, and work with related study materials. There’s also a *My Blood, Your Blood* Web site you and your child may enjoy visiting: [http://www.mybloodyourblood.org](http://www.mybloodyourblood.org).

Along with its terrific science content, the *My Blood, Your Blood* program carries an important community service message: adults who volunteer to donate blood can help save the lives of children and other people who have been in accidents, are seriously ill, or need surgery.

Our class work is reinforcing the science aspect of *My Blood, Your Blood*. To give the children first-hand experience with the community service message, our school is sponsoring a blood drive from <time> to <time>, <day>, <date>, in the <place>. Your child will invite you to participate, and I encourage you to get involved—as a donor, volunteer or cookie baker, or by inviting your adult (17 and older) family members, friends, neighbors and co-workers to donate at our blood drive.

It takes 70 blood donations every day to meet the needs of patients in Blake Medical Center and Manatee Memorial Hospital, served by Manatee Community Blood Center. Our school’s goal is <##> donations—enough to meet the community’s blood needs for <describe period of time>.

<Describe local situation—are donations or usage rising or falling? --will this drive help because it’s right before or after a major holiday or in January?> --other special needs?>

Volunteer blood donors must be at least 17 years old, weigh 105 pounds, and be in good health. If you have specific questions about whether you’re eligible to donate blood, you may call Manatee Community Blood Center at 746-7195. A pledge slip is attached to this letter. Please complete and return it to your child’s teacher. If you are not able to donate, please indicate that on the pledge form and return it. Manatee Community Blood Center is hosting a <describe event—ice cream party, pizza party or other reward> for the class that returns the most pledge slips.

Sincerely,

<Name>
Principal
PLEDGE SLIP

<Name of School> Blood Drive

<time> to <time>, <day>, <date>

<place>

Please print and check all boxes that apply:

I, ________________________________, will volunteer to help save lives by:

☐ Giving blood.

☐ Calling five friends/relatives and asking them to give blood.

☐ Bringing refreshments for blood donors or the winning classroom.

I, ________________________________, am unable to volunteer at this time.

Signature: ____________________________

Phone Number: ____________________________
AMAZING FACTS ABOUT BLOOD

♦ Stacked one upon another in a single column, the red blood cells in our bodies would tower thirty thousand miles high!

♦ The President of the United States of America designated January as National Blood Donor Month.

♦ Former President Ronald Reagan received 12 units of blood after the assassination attempt. He was transfused with 8 units of red blood cells, 3 units of plasma, and 1 unit of platelets.

♦ Former President Jimmy Carter is a multi-gallon blood donor.

♦ Platelets must be used within five days of collection, so donations are especially needed around 3-day weekends.

♦ People who have been in car accidents and have lost a lot of blood can need transfusions of 50 units or more of red blood cells.

♦ Giving blood will not decrease your strength because the blood is replaced very quickly.

♦ Sickle-cell disease is an inherited disease that affects more than 80,000 people in the United States, 98% of whom are of African descent. Some patients with complications from severe sickle-cell disease receive blood transfusions every month.

♦ If you began donating blood at age 17 and donated every 56 days until you reached 76 years old, you would have donated 48 gallons of blood.

♦ A newborn baby has about 1 cup of blood in his or her body.

♦ The average liver transplant patient needs 40 pints of red blood cells, 30 pints of platelets, 20 bags of cryoprecipitate, and 25 pints of fresh frozen plasma.

♦ The average heart surgery uses six pints of red blood cells and six pints of platelets.

♦ An average adult man has about 10 to 12 pints (5 to 6 L) of blood. An average woman has about 8 to 10 (4 to 5 L). The heart circulates this blood more than 1,000 times a day.

♦ If all the body’s blood vessels were laid end to end, they would stretch 60,000 miles (96,000 km). That’s about two and a half times around the world.

♦ The largest arteries and veins are about 1 inch (2.5 cm) across. The smallest capillaries are much finer than human hair.
MATH FUN FACTS

♦ Your heart beats over 100,000 times a day.
♦ Your heart beats about 42,000,000 times every year.
♦ There are about 60,000 miles of blood vessels in our bodies.
♦ Each day, your heart pumps enough blood to fill 70 bathtubs.
♦ 1,835 gallons of blood are pumped through our bodies each day.
♦ The blood travels through 60,000 miles of blood vessels every 20 seconds.
♦ There are 150,000,000,000 red blood cells in one ounce of blood.
♦ There are approximately 2.4 trillion red blood cells in one pint of blood.
♦ Each red blood cell lives about 120 days.
♦ A red blood cell measures .003 of an inch across.
♦ A person must be at least 17 years old to donate blood.
♦ Red blood cells are produced at a rate of 3,000,000 per second.
♦ A human heart can beat for 100 years or more.
♦ In every drop of blood, there are 250,000 red blood cells.
♦ A child’s average heart rate is 90 beats per minute.
♦ An adult’s average heart rate is 70 beats per minute.
♦ An infant’s average heart rate is 120 times per minute.
♦ Blood has 4 main components.
♦ Your heart weighs about 10 ounces.
♦ The heart has 4 chambers.
♦ It is estimated that one red blood cell makes 40,000 journeys around the body monthly!
♦ Every 3 seconds someone needs a blood transfusion.
♦ Blood makes up about 8% of a person’s body weight.
♦ 23,000,000 units of blood components are transfused nationwide each year.
♦ 60% of the U.S. population is eligible to give blood, but only 5% do.
♦ Approximately 55% of blood is plasma.
♦ The heart pumps 4,300 gallons of blood per day.
♦ An adult has about 35,000,000,000 (35 billion) red blood cells. Each cell lives about 4 months. Before it wears out, it makes about 160,000 trips to and from the heart.
<table>
<thead>
<tr>
<th>Name</th>
<th>Homeroom Teacher</th>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>AABB</td>
<td>American Association of Blood Banking</td>
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<tr>
<td>ABC</td>
<td>America’s Blood Centers</td>
</tr>
<tr>
<td>AHCA</td>
<td>Agency for Health Care Administration (State of FL)</td>
</tr>
<tr>
<td>AIDS</td>
<td>Acquired Immunodeficiency Syndrome</td>
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<tr>
<td>BBP</td>
<td>Bloodborne Pathogen</td>
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<tr>
<td>BMW</td>
<td>BioMedical Waste</td>
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<tr>
<td>CBER</td>
<td>Center for Biologics Evaluation and Research</td>
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<tr>
<td>CCBC</td>
<td>Council of Community Blood Centers</td>
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<tr>
<td>CDC</td>
<td>Centers for Disease Control</td>
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<tr>
<td>CDCP</td>
<td>Centers for Disease Control and Prevention</td>
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<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
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<tr>
<td>CLIA</td>
<td>Clinical Laboratory Improvement Amendment</td>
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<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
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<tr>
<td>FBS</td>
<td>Florida Blood Services (St. Petersburg)</td>
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<tr>
<td>FDA</td>
<td>Food and Drug Administration</td>
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<tr>
<td>FD&amp;C Act</td>
<td>Federal Food, Drug, and Cosmetic Act (1938)</td>
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<tr>
<td>GMP</td>
<td>Good Manufacturing Practices (cGMP – current GMP)</td>
</tr>
<tr>
<td>HAZCOM</td>
<td>Hazardous Communication</td>
</tr>
<tr>
<td>HBV</td>
<td>Hepatitis B Virus</td>
</tr>
<tr>
<td>HCFA</td>
<td>Health Care Finance Administration (State of FL)</td>
</tr>
<tr>
<td>HCV</td>
<td>Hepatitis C Virus</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<tr>
<td>23. <strong>MCBC</strong></td>
<td>Manatee Community Blood Center, Inc.</td>
</tr>
<tr>
<td>24. <strong>MSDS</strong></td>
<td>Material Safety Data Sheet</td>
</tr>
<tr>
<td>25. <strong>NIST</strong></td>
<td>National Institute of Standards and Technology</td>
</tr>
<tr>
<td>26. <strong>OSHA</strong></td>
<td>Occupational Safety and Health Administration</td>
</tr>
<tr>
<td>27. <strong>PDI</strong></td>
<td>Post Donor Information</td>
</tr>
<tr>
<td>28. <strong>PPE</strong></td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>29. <strong>QA</strong></td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>30. <strong>QC</strong></td>
<td>Quality Control</td>
</tr>
<tr>
<td>31. <strong>SOP</strong></td>
<td>Standard Operating Procedure</td>
</tr>
<tr>
<td>32. <strong>STD</strong></td>
<td>Sexually Transmitted Disease</td>
</tr>
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</table>
ACRONYMS

1. **AABB**  
   **American Association of Blood Banking**  
   *The licensing agency that writes The Standards of Blood Banking, published every 2 years, providing standards for blood banking. Also facilitates educational programs, i.e., teleconferences, resources, and national meetings.*

2. **ABC**  
   **America’s Blood Centers**  
   *An organization composed of leaders and top scientists of community blood centers that gives member blood centers influence on an equal par with the American Red Cross.*

3. **AHCA**  
   **Agency for Health Care Administration**  
   *(State of FL)*  
   *As the major planning, financing, and regulatory agency for Florida’s largest industry, AHCA is guided by its mission to be champion of accessible, affordable, quality health care for all Floridians. The agency is an aggressive, responsible, and impartial regulator of all healthcare facilities, practitioners, and health insurers. Furthermore, it is responsible for statewide management of Florida licensure and the federal CLIA certification program.*

4. **BBP**  
   **Bloodborne Pathogen**  
   *The Bloodborne Pathogen Standard instructs the employer to determine exposure risks of personnel, implement a bloodborne pathogen program, provide hepatitis B vaccine, and train employees in safe practices for working with infectious material.*

5. **BMW**  
   **BioMedical Waste**  
   *Biomedical waste is any solid or liquid waste which may present a threat of infection to humans, including nonliquid tissue, body parts, blood, blood products, and body fluids from humans and other primates; laboratory and veterinary wastes which contain human disease-causing agents; and discarded sharps (needles). Every blood bank/center is required to have a written plan for handling biomedical waste (BMW).*

6. **CBER**  
   **Center for Biologics Evaluation and Research**  
   *Within the FDA, the Center for Biologics Evaluation and Research through the office of Compliance is responsible for ensuring compliance with the GMP regulations. This is also the section to which applications for licenses, and error and accident reports are made.*

7. **CCBC**  
   **Council of Community Blood Centers**  
   *The Council of Community Blood Centers has become the agency known as America’s Blood Centers (ABC).*
8. CDC  Centers for Disease Control

The Centers for Disease Control and Prevention is recognized as the lead federal agency for protecting the health and safety of people – at home and abroad, providing credible information to enhance health decisions, and promoting health through strong partnerships. The CDC is the authoritative reference on countries in which malaria is endemic – a major factor in considering donor suitability. CDC’s mission is to promote health and quality of life by preventing and controlling disease, injury, and disability. This mission is accomplished by working with partners throughout the nation and world to monitor health, detect and investigate health problems, conduct research to enhance prevention, develop and advocate sound public health policies, implement prevention strategies, promote healthy behaviors, foster safe and healthful environments, and provide leadership and training.

9. CDCP  Centers for Disease Control and Prevention

See explanation above for CDC.

10. CFR  Code of Federal Regulations

The CFR is a FDA publication of general and permanent rules and regulations that govern blood operations, laboratories, and other medical functions throughout the United States. The Code is divided into 50 titles which represent broad areas subject to Federal regulation. The blood banking industry must be in compliance with Title 21 – Food and Drugs, Subchapters C-Drugs, F-Biologics, H-Medical Devices.

11. CLIA  Clinical Laboratory Improvement Amendment

Congress passed the Clinical Laboratory Improvement Amendment in 1988 establishing quality standards for all laboratory testing to ensure the accuracy, reliability, and timeliness of patient test results regardless of where the test was performed. The final CLIA regulations were published on February 28, 1992.

12. EPA  Environmental Protection Agency

As a Federal agency, the EPA’s mission is to protect human health and to safeguard the natural environment – air, water, and land – upon which life depends. Included in EPA’s purpose is to ensure that all Americans are protected from significant risks to human health and the environment where they live, learn, and work. Additionally, the EPA ensures that Federal laws protecting human health and the environment are enforced fairly and effectively.

13. FBS  Florida Blood Services (St. Petersburg)

FBS is a blood center that collects, tests, prepares, and distributes blood and blood products. This is where MCBC sends blood for testing.
14. FDA  
**Food and Drug Administration**  
*The FDA is the regulatory agency that establishes and enforces minimum requirements that are legally binding in the manufacture and distribution of products. All drugs and related products are required to be proven safe prior to marketing.*

15. FD&C Act  
**Federal Food, Drug, and Cosmetic Act (1938)**  
*Congress passed the Federal Food, Drug, and Cosmetic Act in 1938, requiring all new drugs and related products (includes blood components) to be proven safe prior to marketing.*

16. GMP  
**Good Manufacturing Practices (cGMP – current GMP)**  
*Contained within the CFR, published by the FDA, are the regulations known as Good Manufacturing Practices. They are legal requirements for all blood establishments. Think of the cGMPs as “road maps” to guide blood bankers to do their jobs better – to do things right the first time and to engineer quality into processes.*

17. HAZCOM  
**Hazardous Communication**  
*The Hazardous Communication Standard requires an established list of hazardous chemical substances in the workplace, a library of Material Safety Data Sheets, ensuring proper labeling of all containers, and establishing workplace safety practices.*

18. HCFA  
**Health Care Finance Administration (State of FL)**  
*HCFA is a federal agency within the U. S. Department of Health and Human services. As a regulatory agency, it has established requirements for laboratories to follow a quality assurance program. In the stewardship of their health care programs, they lead the nation’s health care system toward improved health for all.*

19. MCBC  
**Manatee Community Blood Center, Inc.**  
*A nonprofit organization dedicated to maintaining the highest standards of delivery of an adequate blood supply to meet the needs of our community and others. MCBC provides all blood products for Manatee County.*

20. MSDS  
**Material Safety Data Sheet**  
*This hazard communication tool gives details on chemical and physical dangers, safety procedures, and emergency response procedures. Employers must have one for every chemical and hazardous product in the workplace. An MSDS provides additional information that cannot easily be put on the label.*
21. NIST
National Institute of Standards and Technology
This organization has all kinds of measurement standards available for purchase. It is the most common source of measuring standards used for calibration on measuring devices, such as scales, blood pressure cuffs, and centrifuges.

22. OSHA
Occupational Safety and Health Administration
Within the U.S. Department of Labor, the Occupational Safety and Health Act established for the first time a national policy for safety and health. The mission of OSHA is to save lives, prevent injuries, and protect the health of America’s workers through:
- developing mandatory job safety and health Standards and enforcing them;
- maintaining a reporting and recordkeeping system to monitor job-related injuries and illnesses;
- encouraging employers and employees to reduce workplace hazards and implement or improve safety and health programs;
- establishing training programs to increase the number and competence of occupational safety and health personnel.

23. PDI
Post Donor Information
This is information the blood center receives about a donor after his/her donation. This information may come from the donor, doctor’s office, a third party, or other health care professionals. Evaluation of the information determines the acceptability of the current product or past products and/or the future eligibility of the donor. The process also allows for market withdrawal of unsuitable products in current inventory, or notification of recipients and/or consignees of past donations determined unsuitable, based on the new information received.

24. PPE
Personal Protective Equipment
PPE – gloves, goggles, face shields, and lab coats – are worn while performing tasks known to cause the employee to come in contact with a chemical or biohazard to reduce or eliminate the risk of injury and infection.

25. QA
Quality Assurance
QA involves the actions, planned and performed, to provide confidence that all systems and elements that influence the quality of a product are working as expected individually and collectively.

26. QC
Quality Control
QC is the component of quality assurance involving sampling and testing to determine the accuracy and reliability of an establishment’s personnel, equipment, reagents, and operations in manufacturing.
27. SOP

**Standard Operating Procedure**

SOPs are a group of standard operating procedures detailing the specific policies of a blood or tissue bank, and the procedures used by the staff/personnel. This includes, but is not limited to, procedures to: assess donor suitability, process, quarantine, release to inventory, label, store, distribute and recall cells or tissues. The SOPs explain how to follow the cGMPs!
Glossary/Vocabulary

See the Glossary in the back cover of the *My Blood, Your Blood Learning Guide* for additional definitions.

1. **advertisement** To make public announcement of, especially to promote sales; to make known.

2. **A.I.D.S.** “Acquired Immunodeficiency Syndrome,” a disease that makes the immune system weak.

3. **altruism** Unselfish concern for the welfare of others; selflessness.

4. **alveoli** The tiny “bubbles” inside your lungs that fill with air as you breathe in.

5. **anemia** A deficiency in the oxygen-carrying material of the blood, measured by concentrations of hemoglobin and red blood cell counts.

6. **aorta** The large blood vessel that leads away from the heart.

7. **apheresis** A special kind of blood donation that separates the blood into its parts. Blood is drawn from a donor, separated, and the unneeded parts are then returned to the donor.

8. **arteries** Blood vessels that carry blood away from the heart to the rest of the body.

9. **autologous donation** Blood that is given that will be used by the person who gave it. This is done for a planned surgery.

10. **bacteria** Tiny one-celled beings; some are helpful in the body and others make people sick.

11. **blood** A fluid that circulates through the heart, arteries, veins, and capillaries. It carries nutrients and oxygen to the tissues, and takes away waste materials and carbon dioxide.

12. **blood bank** A place where blood is collected, processed, and stored for future use in transfusion.

13. **blood drive** An event in which blood is collected from a group of people.

14. **blood donor** A person who allows blood to be taken from his/her body into a plastic bag. This blood is then given to someone else.

15. **blood pressure** The pressure of the blood within the arteries; this is caused by the pumping of the heart.

16. **blood transfusion** Taking blood from one person and giving it to another person.
17. **blood type**  Human beings have one of four blood types, or groups: A, B, O, or AB.

18. **blood vessel**  A tube-like structure that carries blood throughout the body.

19. **bone marrow**  The tissue inside bones that makes blood cells and stores fat.

20. **bloodmobile**  A motor vehicle equipped for collecting blood from donors.

21. **canteen**  A temporary or mobile place to eat. The snack area at a blood bank or on a bloodmobile is called a canteen.

22. **capillaries**  The smallest blood vessels in the body. The oxygen and carbon dioxide exchange happens in the capillaries.

23. **carbon dioxide**  Gas that our cells give off as a waste product. It is removed from the body by our lungs when we exhale.

24. **cardiac**  Anything to do with the heart.

25. **cell**  The smallest part of a living thing. It consists of one or more nuclei, cytoplasm, various organelles, and other matter.

26. **centrifuge**  A machine made up primarily of a compartment spun about a central axis to separate materials of different density. This machine is used at the blood bank to separate blood components.

27. **circulation**  The movement of blood in the body.

28. **circulatory system**  The system in the body that carries nutrients and oxygen to the cells and carries waste away. The blood, heart, and blood vessels make up the circulatory system.

29. **component**  A part or ingredient of something.

30. **deferral**  To put off until a future time; postpone.

31. **directed donation**  Blood that is given for someone in particular. This can be done before a surgery.

32. **donation**  The act of giving something; a gift or contribution.

33. **erythrocyte**  A red blood cell.

34. **fibrin**  A part of a blood clot. It is like a net made by the blood components.

35. **germs**  Very tiny living things, some of which are harmful if they attack the body’s cells.
36. **heart**  Body part that acts like a pump, constantly pushing blood throughout the body. It is the center of the circulatory system.

37. **hemoglobin**  This is what makes red blood cells red. It carries the oxygen.

38. **hemophilia**  A hereditary plasma-coagulation (clotting) disorder characterized by excessive, sometimes spontaneous bleeding.

39. **hepatitis**  Inflammation of the liver, caused by infection or toxic agents, characterized by jaundice, and usually accompanied by fever.

40. **HIV**  Human Immunodeficiency Virus is a bloodborne virus that is usually transmitted by blood and body fluids (through sexual contacts, sharing needles, or mother to newborn) and may lead to AIDS (Acquired Immunodeficiency Syndrome).

41. **immunity**  A resistance to a germ that causes disease.

42. **leukocyte**  A white blood cell.

43. **liquid gold**  Plasma donations from the apheresis process are commonly called “liquid gold” because of its golden color and its valuable use for cancer patients.

44. **malaria**  An infectious disease characterized by cycles of chills, fever, and sweating, transmitted by the bite of the infected female anopheles mosquito.

45. **nucleus**  The center of a cell. It contains all of the cell’s information and instructions.

46. **nutrient**  Something that nourishes or promotes growth or development.

47. **oxygen**  Gas in our air that we need to breathe in order to live. Our body’s cells use it to make energy.

48. **pathogen**  Bacteria, virus, or other disease-causing organism.

49. **platelets**  Sticky parts of the blood that help to stop bleeding from a cut or any other wound by creating a scab.

50. **plasma**  The pale yellow liquid part of the blood that is made up mostly of water. It also contains salt, sugar, and proteins.

51. **pulse**  Throbbing caused by the regular pumping of the heart.

52. **pulse points**  The places you can easily feel your pulse: wrist and neck.

53. **recipient**  One that receives or gets something.
54. **recruit**  To find new members, workers, or volunteers.

55. **red blood cells**  A part of blood that carries oxygen to body cells and picks up carbon dioxide.

56. **scab**  The crust-like material that covers a healing wound.

57. **scientific method**  The process necessary for proper scientific investigation. The basic steps include: identifying the problem, creating a hypothesis, listing materials, writing a procedure, and documenting a conclusion.

58. **sickle-cell anemia**  A hereditary anemia characterized by the presence of oxygen-deficient sickle shaped cells, episodic pain, and leg ulcers.

59. **sphygmomanometer**  A medical instrument used for measuring blood pressure.

60. **spirometer**  An instrument for measuring the volume of air entering and leaving the lungs.

61. **spleen**  A body organ that filters out old blood cells and stores blood.

62. **stem cells**  Cells that can produce a variety of other cells.

63. **sterile**  Free from bacteria or other germs.

64. **stethoscope**  A tool used to measure blood pressure, heart rate, and lung sounds.

65. **universal donor**  A person of blood type O. Type O blood can be given to people of any type of blood. This is especially important in emergency cases when there is not time for blood typing.

66. **universal recipient**  A person of blood type AB. This person can receive any type of blood.

67. **vaccination**  A shot given in order to protect against a specific disease.

68. **veins**  Blood vessels that carry blood back to the heart from everywhere in the body.

69. **ventricles**  Small chambers in the heart that move the blood into and out of the main blood vessels.

70. **virus**  A specific pathogen or germ.

71. **white blood cells**  The parts of the blood that attack and get rid of germs that have entered the body.
BIBLIOGRAPHY

Recommended
Grade Levels


**INTERNET RESOURCES**

www.aabb.org

www.access.gpo.gov/su_docs/aces/fr-cont.html (Federal Register)

www.americasblood.org

www.encyclopedia.com/articles
American Heart Association
Comprehensive heart disease resource includes risk factors and prevention info, A-Z guide to heart and stroke, and scientific and technical data.
http://www.americanheart.org/


The Circulatory System
The Circulatory System: Click here to hear a heartbeat. The Circulatory System has two major subdivisions- the cardiovascular system and the lymphatic system. The cardiovascular system can be compared to a muscular pump equipped with one-way valves
http://library.advanced.org/3007/circulatory.html

The Circulatory System
The Circulatory System: view this heart for a bigger and better view. The circulatory system, also known as the cardiovascular system, is composed of the heart and blood vessels.
http://www.msms.doe.k12.ms.us/biology/anatomy/circulatory/circulatory.html

Circulatory System Theme Page
The primary focus of the Community Learning Network (CLN) is to help K-12 teachers integrate Information Technology into their classrooms. This CLN menu page provides links to Science curricular resources and instructional materials (lesson plans).
http://www.cln.org/themes/circulatory.html

COHIS - Cardiovascular Diseases
Community Outreach Health Information System discusses congestive heart failure, hypertension, anemia and other circulatory and blood conditions.
http://www.bu.edu/cohis/cardvasc/cvd.htm

CuriousHeart.com
Read a complete description of the heart's processes, functions, and various muscles. Includes details about the circulatory system.
http://www.curiousheart.com/

The Franklin Institute Online: “Lifeblood”  http://sln.fi.edu/biosci/blood/blood.html
**Harvey, William - Britannica Online**
Learn about the English physician who discovered the functional nature of the circulatory system and the heart. Includes related articles.
http://www.britannica.com/eb/article?eu=109216

**The Heart and the Circulatory System**
*Access Excellence Classic Collection The Heart and the Circulatory System* by Roger E. Phillips, Jr. Human heart, frontal view (Carolina Biological Supply Company.) Introduction: Imagine that you are living in the year 1535…
http://www.accessexcellence.com/AE/AEC/CC/heart_background.html

**Heart: An Online Exploration**
Go on a virtual exploration of the heart, examining its structure, function, and development.
http://sln.fi.edu/biosci/heart.html

**Hess, Walter Rudolf - MSN Encarta**
Chronicles the physiologist's research on the circulatory and nervous systems.
http://encarta.msn.com/find/Concise.asp?ti=0B4B6000

**Laura Nagy Lesson Plan**
Lesson Title: Circulatory System Subject Area: Science Grade Level: Fifth Grade Objectives: The student will practice using the Internet to find information while following hyperlinks. The student will search the web for information.
http://www.arches.uga.edu/~jpritche/lnagy.html

**MSN Encarta - Circulatory System**
Find out how the arteries, veins, capillaries, heart and lungs all work together to keep oxygenated blood flowing through the body.
http://encarta.msn.com/find/Concise.asp?ti=03C3E000

**ProTeacher! Heart and circulatory system lesson plans for elementary school teachers in grades K-5 including activities.**
ProTeacher! Heart and circulatory system lesson plans for elementary school teachers in grades K-5 including activities, facts about the heart, how it pumps blood, arteries, veins, classroom and teaching ideas.
http://www.proteacher.com/110074.shtml

**RECOMMENDED READING**

K-5

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