Middle School Interdisciplinary Thematic Unit
Grades 6-8
Written through a generous grant from
The Foundation for America’s Blood Centers

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

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ORGANIZING IDEA:
My Blood, Your Blood – My Lifeline, Your Lifeline

America’s Blood Centers developed the learning guide and produced the video and CD-ROM that accompanies the My Blood, Your Blood Interdisciplinary Thematic Unit. The program meets current National Science Education Standards set forth by the National Research Council and the National Academy for Sciences to increase science literacy of all students. In January, 2001, David Satcher, M.D., Ph.D., Assistant Secretary for Health and Surgeon General with the Department of Health and Human Services, endorsed America’s Blood Centers new and innovative science and education program, stating, “I applaud you for providing the nation with an entertaining and educational initiative for K-12 grade students.”

RATIONALE OF AN INTERDISCIPLINARY THEMATIC UNIT:

The Manatee Community Blood Center is challenged to educate our county effectively, ultimately affecting our donor recruitment and retention. We firmly believe that education is the key in recruitment, and in dispelling fears and false notions about blood donation. Schools are clearly a center of community life, crossing lines of ethnic diversity and financial background. Likewise, blood can be considered our physiological “center of the universe” since it carries out the essential functions of transporting nutrients and molecules, regulating our internal environment, and protecting us from disease. Through the My Blood, Your Blood Interdisciplinary Thematic Unit we can reach not only the students, but also their families, teachers, and the administration to instill the value of blood donation for personal and community health. We have centered this interdisciplinary thematic unit around the science and donation of blood. It is our intent to make the lessons meaningful, exciting, and challenging for all students. The My Blood, Your Blood Interdisciplinary Thematic Unit successfully meets all the Standards and their respective Outcomes of the Florida’s System of School Improvement and Accountability. The lessons’ objectives correlate with Kaleidoscope and Mosaic, Manatee County’s K-8 Curriculum, as well as the Sunshine State Standards.

My Blood, Your Blood is an exceptional program and the catalyst needed for a more in-depth and lasting partnership between Manatee Community Blood Center and the Manatee County Public School System.

UNIT FOCUS:

This interdisciplinary thematic unit will utilize activities to educate students about the science and donation of blood.
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Welcome to the *My Blood, Your Blood* Interdisciplinary Thematic Unit. Please take the time to read through all of the content areas. You may find an activity or lesson subject in another discipline that you would like to teach in your content area.

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.

**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 with appropriate grade levels. There are three pieces suggested for the middle school level. Do a daily oral reading of one of the suggested books. This could be implemented as an opening or closing to the daily unit lesson, or during your regularly scheduled reading time slot 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 it 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.

**Journaling**

There is a list of journal writing prompts in the appendix. These may be used daily to initiate thinking, discuss as a class, or be helpful as bell work.

**Multiple Intelligence Project Ideas**

Each content area has activity suggestions in all eight learning styles. These suggestions may be useful for students needing enrichment or alternative activities.

** Modifications**

The curriculum includes strategies for ESOL, ESE, and cooperative learning modifications.

**Assessment Tools**

There is an authentic assessment product included as a culminating experience in each discipline. These products (as well as any of the other unit work) may be included in the unit culminating blood fair, “My Blood, Your Blood: My Lifeline, Your Lifeline.” This event is designed to be a showcase for student work. You may want to reserve the gymnasium and coordinate the details of “booth space” with your team.

**The Learning Guide**

The *My Blood, Your Blood Learning Guide* is a great tool for the middle school level. Please take time to familiarize yourself with its contents. You are welcome to make copies for student use.
Interdisciplinary Thematic Unit Plan
Middle School Level

Standards/Benchmarks
See each subject plan for the Standards/Objectives.

OVERVIEW

1The Big Picture: Activities/Discussions

Introductory Lesson
Safety historical video clip, introduce: Quality, Integrity, Purity, Potency, Safety in Healthcare
Life Processes
Show My Blood, Your Blood Video
Comic Book “Captain Bio”

Health/P.E.
1. Cardiovascular Fitness
   Relate blood alcohol level, carbon monoxide in blood stream of smokers
4. Blood Diseases—Hepatitis, AIDS, Malaria, Sickle Cell Anemia, STD’s
5. Health-enhancing behaviors
6. Generate an illustrated cause and effect chart on healthy versus unhealthy practices.
7. Analyze the influence of our culture, media, and technology on health issues.
8. Possible blood center guest appearance
9. Research and report on a health-related career (special emphasis on blood banking industry).

Language Arts
1. Daily journal writing
2. Research historical perspective of blood banking.
   (Skills: note taking, organization, writing process, editing, presenting)
3. Time line of inventions, discoveries, people in blood banking
4. Annotated Bibliography from research and time line
5. Possibly interview a blood center staff person on a.m. broadcasted announcements.

Math
1. Math blood facts journal: Read blood banking statistics provided in the appendix and do research to
   find more statistics. Each student keeps statistics in his/her own journal.
2. Discuss supply and demand as it relates to blood banking and county statistics.
3. Project blood needs in 2051 and create a graph.
4. Probability: Activity based on bone marrow matches
5. Blood types and frequency chart handout: conversion—decimals, fractions, percents
Primary Unit Materials

My Blood, Your Blood Video
My Blood, Your Blood Learning Guide
Curriculum appendix and brochures

Great Ideas/Improvements

The Big Picture-continued

Science
1. Teacher-directed review/summary: blood components and functions, role of specific organs relating to the circulatory system
2. Students render a scientific drawing of each blood component.
3. Use of My Blood, Your Blood Learning Guide experiments/discussions
4. Mega-animated lifeline activity (see individual lesson plan)

Social Studies
1. Current events: research on-line, newspapers, magazines for blood supply news.
3. Write and debate a new health protection law.
4. Detective game: Using a donor handout (Learning Guide page 19) and sample donor questionnaire, students determine donation eligibility.
5. World map: locating malaria high risk areas
6. Write an essay on the topic, “Why a specific donor from your role-playing activity would be a potential risk to the blood supply.” (Base the text on information from the “Detective Game.”)

Technology
1. “No waste technology” discussion
2. Introduction to blood banking industry’s high tech machines
3. Guest lecture on apheresis donation (optional)

Unit Culminating Event
Blood fair: “My Blood, Your Blood: My Lifeline, Your Lifeline” Students present their authentic products from the unit in a fair environment.

Culminating Authentic Assessment Products:

Health/P.E.– Charades representing one career, a transfusion-related illness, and a healthy or unhealthy practice.

Language Arts– Write and present a persuasive speech integrating historical perspective with ethical decision making. Use a poster as a visual aid. The topic: why one should donate blood.

Math- Statically prove the value of the blood center.

Science– Develop, illustrate and explain an alien circulatory system.

Social Studies– Mock OSHA inspection and writing a new Health Protection Law.

Technology– Invent and present a futuristic machine to facilitate the ease of blood donation.

See individual subject outlines for:
*Cooperative Learning Strategies
*Multiple Intelligence activities
*ESOL Modifications
*ESE Modifications
# Objectives

- Students will apply a reasoning strategy to list, categorize, and associate ideas and terms with the word “Blood.”
- Students will be able to relate events in history leading to the need for assurance of a safe blood supply.
- Students will identify the circulatory system as a necessary life process.

# Standards/Benchmarks

See individual plans for each discipline.

# Materials/Equipment


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## Presentation

### Anticipatory Set/“The Hook”

**List-Group-Label Strategy:**

1. **Whole Group** ~ Give the class 5 minutes for each student to brainstorm and make a list of words and ideas he/she associates with the term “blood.”
2. **Cooperative Groups** ~ In cooperative learning groups, students group lists into categories and create a label for each category. Each group will write their lists on a large piece of manila paper.
3. **Whole Group** ~ Each group will share their lists and labels with the whole class. Allow time for feedback after each group presents their chart.

### Procedures/Activities

1. **Video:** View historical clip on the development of regulations to assure a safe blood supply.

2. **Whole Group Discussion:**
   - Medical experiences ~ doctors, hospitals, immunizations, needles, blood transfusions, surgeries, etc.
   - Trust issues ~ feelings and reassurances relating to medical experiences

3. **Vocabulary:** Introduce the concepts of *quality, integrity, purity, potency, safety* as they relate to blood.

4. **Life Processes:**
   - **Video:** *My Blood, Your Blood*
   - Discuss reactions to viewing video.

5. **Comic Book:** *Captain Bio*
   - Read.
   - Discuss, relating to their own experiences with the immunization for Hepatitis B Virus.

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## Vocabulary

- quality, purity, integrity, potency, safety, cGMP

## Authentic Assessment

Organize terms and ideas from the List-Group-Label Strategy into a word search and/or crossword puzzle.

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## Great Ideas/Improvements

- [ ]
Objectives

- The students will identify healthy versus unhealthy practices.
- The students will comprehend concepts related to health promotion and disease prevention.
- The students will demonstrate the ability to access valid health information and health-promoting products and services.
- The students will analyze the influence of culture, the media, and technology on health issues.
- The students will know how to advocate for personal, family, and community health.
- The students will recognize persuasive techniques in text.
- The students will achieve and maintain a health-enhancing level of physical fitness.
- The students will use viewing strategies effectively.
- The students will use speaking strategies effectively.

Standards/Benchmarks

LA.A.2.3.3
LA.C.2.3.1; 3.3.1; 3.3.3
LA.D.2.3.6
HE.A.1.3.2; 1.3.4; 1.3.7; 2.3.1; 2.3.4; 2.3.6
HE.B.2.3.1; 2.3.2
HE.C.2.3.6
PE.B.1.3.1; 1.3.5; 1.3.8

Activities

**Verbal-Linguistic**
- Recreate TV commercial.
- Research and report: careers
- Write and present an effective persuasive speech promoting a healthy practice.
- Create a pamphlet advocating healthy practices.

**Logical-Mathematical**
- “Cardiorespiratory Fitness Lesson” - measuring, estimating, scoring, comparing and contrasting
- Collage: careers and information from other disciplines

**Visual-Spatial**
- Make a video of an interview of an MCBC employee.
- Create an illustrated chart: Healthy vs. Unhealthy Practices.
- Analyze TV commercials for healthy/unhealthy practices.

**Musical-Rhythmic**
- Create a “Blood Bank Game”
- Write an advertising jingle for a TV commercial promoting healthy habits or blood donation.

**Interpersonal**
- Interview MCBC employee
- Perform the “Epiglottis Rap” from O2 Skit.
- Role-playing—TV commercials

**Intrapersonal**
- Journal: Record daily activities and analyze time spent on personal health promotion.
- Listen to MCBC guest and take notes on personal impression.

**Bodily-Kinesthetic**
- Charades: Demonstrate career with costume.
- “Cardiorespiratory Fitness” activity

**Naturalist**
- Field trip to the blood center

Vocabulary

Acronyms: AIDS, HBV, HCV, HIV, STD
Blood diseases: AIDS, Anemia, Hemophilia, Hepatitis, Leukemia, Malaria
bacteria, career, charades, immunity, nutrition, parasites, pathogens, spirometer, sphygmomanometer, stethoscope
## Materials/Equipment


## Great Ideas/Improvements

Presentation

### Anticipatory Set/“The Hook” (See following pages)
- *The Adventures of O₂—A Real Gas of a Gas*
- *Cardiorespiratory Fitness Lesson* (cardiovascular fitness)

### Procedures/Activities

1. **Journal:** Introduce the MCBC Mission Statement. Instruct students to write their thoughts and ideas regarding this statement.
2. **Create an illustrated chart:** Cause and Effect of Healthy versus Unhealthy Practices.
   
   **Adolescence Growth Processes**
   - a. Needs of the blood—nutrients, oxygen, water
   - b. Need for exercise
   - c. Avoiding unhealthy practices (Discuss blood alcohol level, CO in blood stream from smoking, etc. May want to role play specific situations involving peer pressure.)
   - d. Health-enhancing behaviors—prevention
   - e. Classify behaviors as safe, risky, or harmful
3. **Assign as homework:** Watch a TV program to analyze the commercials and the propaganda techniques employed that have an impact on health issues.
4. **Next day:** Compare and contrast ~ Individual role play of commercials while class identifies propaganda technique. Create a “healthy” commercial.
5. **Write and present an effective persuasive speech based on a commercial.**
6. **Research sources of valid health information.**
7. **Focus: Advocate Community Health**
   - a. Brainstorm: Health-related careers with special emphasis on the blood banking industry.
   - b. Research and report: (1) A career in the blood banking industry
   - (2) Interview / film staff member from MCBC
8. **Guest appearance of an employee from MCBC relating the services provided ~ students are to take notes for subsequent discussion period.**
9. **Collage ~ Careers in health areas, focusing on blood banking**
   - (Include information from other disciplines as it relates to health, physical fitness, and blood banking.)
10. **Field trip to the blood center**

### Unit Culminating Event

**Blood Fair:** “My Blood, Your Blood: My Lifeline, Your Lifeline”

Students present their work from the unit in a fair environment.

## Authentic Assessment

- **Charades ~** (may imitate the TV show, “Whose Line is it anyway?”) Representation of 1 career, 1 illness, and a healthy/unhealthy practice.
- Create a pamphlet to encourage healthy practices in order to maximize cardiorespiratory fitness.

## Cooperative Learning Strategies

- Brainstorming
- Partners— *Cardiorespiratory Fitness*

## ESOL Modifications

- Create a pamphlet in native language describing healthy practices.
- Write a persuasive speech in native language.

## ESE Modifications

- Choice of projects
Presentation Information:

First, I introduce the concepts illustrated in the skit with demonstrations and hands-on activities whenever possible. Usually, I give a little extra credit to the performers (aka "Science Hams"). I ENLARGE the text of the skits SUBSTANTIALLY for the Science Hams (17 pts or so), so they can easily read expressively. They don't have to memorize their lines, but I ask them to practice a bit and try to speak clearly and perform with enthusiasm. I emphasize COMMUNICATING CONCEPTS through the acting rather than just hamming it up without focusing on content. There's plenty of opportunity to ham it up in these skits, and that's okay, as long as the content is central to the presentation.

After the kids have performed the skit, it's fair game for quizzes (with appropriate review of the material, of course). I have even reproduced some skits as class sets for kids to study from. For longer skits, I have occasionally let kids use the text of the skit during an open skit quiz. Naturally, I test them on plenty of more conventionally presented material as well.

Introduction to "The Adventures of O2, a Real Gas of a Gas":

I've actually given out the text of this first skit to entire classes as a study aid. It's one of the more complex skits, but the kids LOVED this skit. It describes the journey of an oxygen molecule from the nose to a cell. I use a series of transparencies on an overhead to show the anatomy, and photocopies of the anatomy that the kids can label as well, since this journey is fairly difficult to visualize in detail. I've had a few kids get a little queasy about mucous and such, but even those kids came around when their interest got sparked. There are lots of weird characters, and even an "epiglottis rap." The characters LINE UP IN ORDER in front of the class. Oxygen then goes down the line, meeting and interacting with them in the proper order.

After the students have worked with the skit, I introduce the cellular respiration chemical equation where oxygen reacts with glucose to produce energy (ATP and heat) and carbon dioxide is produced as a waste product. The kids then clearly understand that the processes of eating and breathing are LINKED in our cells. They understand more about WHY we breathe. We breathe to break sugar in our cells and that's where most of our energy comes from.
**The Adventures of O2, a Real Gas of a Gas**

**Cast in Order of Appearance:**
- O2, a real gas of a gas
- Nose Hair
- Nasal Cavity
- Epiglottis
- Trachea
- Respiratory Bronchiole
- Alveolus
- Hemoglobin
- Left Heart (left side of the heart)

*Our hero, O2, a real gas of a gas, is parked just outside a <your school’s name> science student’s nostril.*

**O2:** "Hi there, air breathing <your school’s name> science students! I'm O2, a real gas of a gas. I'm your diatomic buddy, I am. I'm a world traveler, a windrider and a blood sailor! If you only knew the strange and wacky places I've been. But now, friend student…. I'm headed up your nose!"

**Nose Hair:** "Hey there, Oxygen. You and your identical twins go streaming right past me day and night like a rushing river. I know you're a busy important molecule, but I've got me a big job too, oxydude. I'm a trapper by trade--a junk trapper. I trap yucky particles, so lungs stay cleaner. But you're welcome anytime here, oxygen. Annnnnytime!"

**O2:** "Thanks, Noble Nose Hair. Humans should appreciate you more. Good luck with those pollen grains and dust mites. Now I'm headed for that cavern over yonder called the nasal cavity."

**Nasal Cavity:** "Ahoy, O2! I'll warm you up as you zoom toward the lungs. I'm also gonna grab intruders that try to sneak in with you. My bold mucous membranes trap foul dust. Aargh! I got you, you sickening chunk of lint, you filthy little speck! My cilia will fling you down to be swallowed into oblivion."

**O2:** "Golly gee, Nasal Cavity. You sure work hard to protect this <your school’s name> kid's lungs."

**Epiglottis:** Well, howdy do! Look who the nose sucked in now! Yo baby, O2! I'd say gimmee five, but gas molecules ain't got no fingers. The lungs are callin' you buddy. It seems this <your school’s name> kid here is feelin' a little outta breath. Zoom on in and head on down!

Oxygen in! Body wins.
Food stay out! Take another route!
Safety first without a doubt:
That's what I am all about.
Yes to life. No to death.
I'm protector of your breath!
You should all say thanks a lottus
To your loyal epiglottis!
I tell the truth. I wouldn't fake ya.
I'm the guardian of your trachea.
Be grateful kids and do not gripe
'Cause I'm the lid of your windpipe.
But now that I've enlightened you.
Let's not forget about O2!

O2: "Thanks, Epiglottis, you loyal flap of cartilaginous tissue.
Without you, our <your school's name> buddy here would have choked and gagged long ago.
Keep on standing guard while I dive down past the vocal cords into the trachea and onwards to the primary bronchi."

Trachea: "Whoopee! Oxygen! Now we're cookin'! Lovvve that O2!"

O2: "Hmm! Guess I'll take the left bronchus to the left lung this time. That's the two lobed side.
Remember students: The left lung is smaller than the right. That's because you gotta make room
for that good old thumping blood pump humans call the heart. Gee . . . All these dark and
winding passageways are a bit spooky. Thank heavens this student doesn't smoke! If she did, it
would be one grungy, grody, greasy, grubby, grimy, slimy nightmare in here."

Respiratory Bronchiole: "You're almost there, O2! You can do it. Come on through. Just a little farther!"

Alveolus: "Welcome, O2! We meet again! Here's where you really get going. Diffuse through
my mysterious walls and start your next adventure. Blood! Blood! Blood! You shall dissolve in blood!"

O2: "Taxi! Taxi! Hemoglobin taxi! Oh, there you are. Care to take an O2 molecule to some starving cell?"

Hemoglobin: "Sure O2. Annnnnd . . . we're off in a red blood cell zooming through a pulmonary vein back to that thumper in the thorax."

Left Heart: "Ahoy, me hearties! It does me heart good to see you, even if I do feel a bit halfhearted about ya. If it isn't oxygen, our dearest friend, our bosom buddy! Hold tight O2! My ventricle is gonna hurl you out into the aorta, biggest artery of them all. Heavvvve ho!!!! You're cell-ward bound, O2. Good luck my friend, and give my best to the cytoplasm."

O2: "Yeehaw! Now we're movin'! I'll find me a nice hungry cell to help in no time."

Narrator: "And so, our hero, O2, after a long and adventure-filled journey, finally reaches his (or her) destination, a hungry cell."
Objectives:
To understand and determine the pulse rate;
To compare the pulse rate before and after exercise;
To use pulse rate recovery time as a measure of fitness;
To approximate a measurement of lung capacity;
To compare lung capacities of males and females, active and inactive;
To learn how to take and compare blood pressure readings.

Apparatus Needed:
Clock or watch with second hand, wet spirometer, if available, round balloons, string, meter sticks, sphygmomanometers, and stethoscopes.

Recommended Strategy:
Pulse
1. Discuss the meaning of pulse and pulse rate. Show students how to take the pulse rate in wrist, neck or temple. Time the students as they count their pulse for 30 seconds. Have the students multiply the 30 second pulse rate by two, record the number of beats in 60 seconds. Repeat two more times, and record the average in a data table.

2. Have the students work in pairs, with one taking and recording the pulse, and the other acting as subject. Have the subject stand up and sit down twice every 5 seconds for 3 minutes. Immediately take the pulse for 15 seconds, multiply by 4, and record the post-test rate. After 15 seconds, take another 15 second pulse rate, compute and record the one minute pulse rate in a data table as the 30 second recovery rate. After another 15 seconds rest, take another 15 second pulse, and record the 1 minute recovery rate. Wait 45 seconds, take a final 15 second pulse, and record the 2 minute recovery rate.

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3. Discuss student scores using analysis questions.

Lung capacity
4. Define vital capacity, the maximum volume of air that can be exhaled forcibly following the deepest possible inhalation. Also, define the lung volumes that add up to the vital capacity: tidal volume, inspiratory reserve volume, and expiratory reserve volume. As you define each term, demonstrate it with a spirometer. If a spirometer is not available, demonstrate how it would be measured by exhaling in the manner appropriate for each volume. Discuss the range of average values, and the factors which influence these values. (The average adult male vital capacity ranges between 2.8 and 5.5 L.)
5. Have students compare their vital capacities, males vs. females, athletic students vs. non-athletic. Have students inflate a round balloon with the maximum amount of air that can be exhaled after a forcible inhalation. Measure the circumference of the balloon at the widest point by wrapping a string around it and measuring the length of the string. Have each student record his/her measurement in a data table on the board, with separate columns for males, athletic and not, and for females, athletic and not.

6. Discuss the results and the analysis questions that apply.

**Blood pressure**

7. Define blood pressure, systolic and diastolic. Develop the concepts by questioning the students about the cause and function of blood pressure.

8. Show the sphygmomanometer, describe the parts, and demonstrate how to use it.

9. Have students practice taking their lab partner's blood pressure and record the results on the board.

10. Discuss hypertension, variables affecting blood pressure, average and normal values.

11. Have students plan and execute experiments affecting blood pressure or pulse rate, such as: running in place, isometric exercise, breathing into a bag, holding their breath, or submerging one hand in cold water.

**Analysis questions**

1. Account for the pulse change with exercise.
2. Why is a slower pulse rate considered better than a fast one?
3. Why would a rapid recovery rate be a sign of fitness?
4. What are some variables that determine lung capacities?
5. How could you account for the different lung vital capacities in your classmates?
6. What is normal blood pressure for your age? How does your blood pressure compare to your classmates' blood pressure? Explain.
**Activities**

**Verbal-Linguistic**
- Write a report on a topic. Examples of research topics: blood banks, biographies, inventions, environmental context (times), discoveries
- Annotated bibliography
- Learn and discuss acronyms.

**Logical-Mathematic**
- Develop rubrics for presentations of topic.
- Enter topic with summary on timeline.
- Create a crossword puzzle or word search.

**Visual-Spatial**
- Compile illustrated glossary of vocabulary.
- Create a sculpture of a famous person found in your research.
- Make a jigsaw puzzle depicting a blood-related event.

**Musical-Rhythmic**
- Change the lyrics of a popular song to encourage blood donations.
- Write a rap about people researched.
- Compose an advertising jingle to recruit blood donations.

**Interpersonal**
- Role play research topic
- Present a press conference on blood-related topic.
- Write a TV script for decision making.
- Create a museum exhibit of artifacts (blood banking history).
- Write a letter to the Human Body.

**Intrapersonal**
- Daily journal entries
- Editorial essay on research topic: decision making
- Write a mini-book on role-playing scenario.
- Keep a journal for an ill person. Imagine his or her thoughts and priorities.

**Bodily-Kinesthetic**
- Pantomime a blood-related discovery.
- Perform a dance to illustrate the events read in the opening activity.

**Naturalist**
- Present a photo essay on blood-related technological progress.
- Create a diorama depicting original practices found in your research.
- Pretend you’re a modern archaeologist working on a “dig” of an 1800s hospital. Record what you find.

**Vocabulary**
- blood drive, volunteers, leukemia, blood bank, organ transplant, blood transfusion, Hemophilia, donation, Sickle Cell Anemia, sterile procedure

**Objectives**
- The student uses the reading process effectively.
- The student constructs meaning from a wide range of texts.
- The student uses writing processes effectively.
- The student uses listening strategies effectively.
- The student uses viewing strategies effectively.
- The student uses speaking strategies effectively.
- The student understands the power of language.
- The student understands that Science, technology, and society are interwoven and interdependent.

**Standards/Benchmarks**
- LA.A.1.3.2; LA.A.1.3.3; LA.A.1.3.4; LA.A.2.3.3
- LA.A.2.3.5; LA.A.2.3.6; LA.A.2.3.7; LA.A.2.3.8
- LA.B.1.3.1; LA.B.1.3.2; LA.B.1.3.1
- LA.C.1.3.1; LA.C.1.3.3; LA.C.1.3.4
- LA.C.2.3.1; LA.C.2.3.2
- LA.C.3.3.1; LA.C.1.3.4
- LA.D.2.3.5
- SC.H.3.3.5; SC.H.3.3.6
**Presentation**

**Anticipatory Set/“The Hook”**
Read a selection from the recommended literature. Students respond to the reading in their journals. Explain that the students will be keeping a daily journal of their thoughts, opinions, and learning during this unit, based on the suggested journal topics found in the Appendix.

**Procedures/Activities**
1. Review: note-taking, organization, writing, process, editing, proof-reading, and presentation skills.
2. Research historical perspective of blood banking (e.g., blood banks, biographies, inventors, discoveries).
3. Determine format for presentation of information.
4. Develop rubrics for presentation of information.
5. Develop parent and peer evaluation rubrics.
6. Present product or performance.
7. Create class timeline of blood banking based on students’ research.
   - Hastings Center model for ethical decision making.
   - Debate: “Should people donate blood?”
   - Role-playing activity.
10. Interview Manatee Community Blood Center guest to air on the morning school announcements.
11. Write a letter to the Human Body, following directions from “The Blood Component Corporation” on the following page.

**Unit Culminating Event**
Students present their work from the unit in a fair environment.
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 Human Body defending your position in the Blood Component Corporation. In your letter, you need to describe to the corporation the following characteristics of your component:

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). Accompanying the letter, students will need to have a photograph (labeled drawing) of their component to use as a visual aid.
Interdisciplinary Thematic Unit Plan
Middle School Level

Objectives

- The student understands the different ways numbers are represented and used in the real world.
- The student uses estimation in problem solving and computation.
- The student measures quantities in the real world and uses the measures to solve problems.
- The student estimates measurements in real-world problem situations.
- The student describes, analyzes, and generalizes a wide variety of patterns, relationships, and functions.
- The student uses expressions, equations, inequalities, graphs, and formulas to represent and interpret situations.
- The student understands and uses the tools of data analysis for managing information.
- The student identifies patterns and makes predictions from an orderly display of data using concepts of probability and statistics.

Standards/Benchmarks

<table>
<thead>
<tr>
<th>Standards/Benchmarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA.A.1.3.4</td>
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<td>MA.A.4.3.1</td>
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<td>MA.E.2.3.2</td>
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Activities

<table>
<thead>
<tr>
<th>Verbal-Linguistic</th>
<th>Logical-Mathematical</th>
<th>Visual-Spatial</th>
<th>Musical-Rhythmic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math facts journal</td>
<td>Create a graph using blood bank statistics to project needs in 2051.</td>
<td>Create a probability chart for bone marrow matches.</td>
<td>Illustrate and dance to a function chart where the rule is x^2 related to musical note values. Use symbols for notes.</td>
</tr>
<tr>
<td>Create and solve word problems using the Math facts journal.</td>
<td>Design conversion charts from the “Blood Types and Frequency” information.</td>
<td>Illustrate the Manatee Community Blood Center mission statement.</td>
<td>Create and dance to another function chart with imaginative beats and symbols.</td>
</tr>
<tr>
<td>Research and present .</td>
<td>Create a graph showing information relating to natural resources.</td>
<td>Create visual representations of data.</td>
<td></td>
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</tbody>
</table>

Interpersonal

- Determine proportions for scale drawing of human body.
- “Bone Marrow” lesson plan

Intrapersonal

- Create patterns and functions charts for blood fact sheet.
- Explain the Manatee Community Blood Center mission statement in your own words.

Bodily-Kinesthetic

- Using proportion, lay out the human body on inside floor using tape, or outside grass using spray paint (this may be used for the Mega-animated lifeline).

Naturalist

- Relate supply and demand concept to renewable natural resources in the environment. Transfer concept to renewable components in the blood banking industry.

Vocabulary

estimation, patterns, function, graphs, proportion, statistics, renewable, nonrenewable, supply and demand, projection
**Presentation**

**Anticipatory Set/“The Hook”**
Daily Journal Prompt: “Is that a fact!?” Write as many facts on the board as possible- (many bizarre and outlandish). Have student show thumbs up or thumbs down for true or false. Ask each student to find or make up a fact during the lesson. At the end of the class period, determine if facts are true or false.

**Procedures/Activities**
1. Have students keep a Math Blood Facts Journal. Any statistical data they run into during their research in any class can be included. This can be an ongoing activity through the duration of the unit, and the information will contribute to the final authentic assessment activity.
2. Have a brief discussion of supply and demand (covered more in Social Studies).
3. Hand out local statistics sheets to each student. Using these stats, discuss economic concept of supply and demand again. Project community blood needs in the year 2051. Create a graph with this and/or other year projections.
4. Conduct Probability Activity from Newton’s Apple™ “Bone Marrow” lesson plan. Make copies for each student. (May work best with student pairs or small groups.)
5. Hand out copies of “Blood Types and Frequency” chart (see Appendix). Practice conversion: decimals to fractions to percents. Have students create visual representations of the data (pie chart, graph, etc.).
7. Students create and solve word problems using their Math Blood Fact journal.
8. Play “Is that a Fact” with student facts.

**Unit Culminating Event**
Blood Fair: “My Blood, Your Blood: My Lifeline, Your Lifeline” Students present their work from the unit in a fair environment.

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**Materials/Equipment**
- Plausible/implausible facts on board
- Math Facts Journal
- Copies of “Blood Types and Frequency” chart
- Masking tape, chalk, or spray paint
- Bone Marrow Lesson Plan
- Poster board, markers, construction paper– for final project.
- My Blood, Your Blood Learning Guide
- Manatee Community Blood Center Mission Statement
- Local Statistics handout

**Great Ideas/Improvements**

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**Authentic Assessment**
Instruct the students to statistically prove the value of the blood center using visual representations of statistics.
Examples of issues the students may address:
1. The needs of the community and how they are met
2. Disease/surgeries/accidents— who uses the blood supply
Post the blood center mission statement with the visual aids.

**Cooperative Learning Strategies**
- Student 1: name a product
- Student 2: name a situation when the product would be more or less in demand. (e.g., flowers— Valentine’s Day)
- 4 students discuss answer to teacher quiz questions (number conversions/patterns and function charts)

**ESOL Modifications**
- Research natural resources in native country. Determine renewable or nonrenewable.
- Partners: peer tutor label graphs and charts in native language. Highlight key ideas and terms.

**ESE Modifications**
- Individual printed fact sheets for journal
- Read “Is that a fact” aloud, slowly, allow time for reflection.
- Choice on projects
Manatee Community Blood Center
Local Statistics
Compiled September 2001

- Manatee County’s population in the year 2000 was 250,000, with expected growth of 5% per year for the next five years.

- Manatee Community Blood Center is a not-for-profit organization totally independent of any government agency or medical facility.

- In today’s world of high tech and artificial ingredients, blood has no substitute.

- The Manatee Community Blood Center collected 21,000 units of blood in the year 2000. We need 90 units of blood a day to meet our local needs. As our community continues to grow, so will the need for blood and blood components.

- The Manatee Community Blood Center is the sole provider of blood products for Manatee County, serving Manatee Memorial Hospital and Blake Medical Center since 1949.

- Manatee Community Blood Center is a member of America’s Blood Centers. As a member, we have committed to participate in the My Blood, Your Blood program.
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.
**Bone Marrow**

**What is a bone marrow transplant and how does it work?**

_Courtesy of NEWTON’S APPLE_

Peggy finds out why bone marrow matches are so rare.
Segment length: 6:45

**Insights**

Inside your bones is a thick mass of cells called bone marrow. Every hour, a small number of stem cells in it create all other kinds of blood cells that exist in your body, including leukocytes, erythrocytes, and platelets. These cells are essential to your health - leukocytes fight infection, erythrocytes carry oxygen, and platelets help the blood clot.

When a person has a blood disease, such as aplastic anemia or leukemia, doctors may perform bone marrow transplants to re-establish a healthy blood supply. Many transplants occur after a patient has received chemotherapy or radiation treatment to destroy cancerous or other disease-causing cells. Both abnormal and normal cells are killed by these treatments, including stem cells. A bone marrow transplant starts the blood production process from scratch with normal stem cells.

An allogeneic transplant - where another person's bone marrow is given to a patient - doesn't always work because of rejection or because of graft-versus-host disease. Rejection of the donor's marrow occurs because our bodies fight off invading foreign cells. If a donor's marrow doesn't match perfectly, the recipient's immune system may identify the new cells as foreign and destroy them, leaving the patient unable to create new blood.

Graft-versus-host disease occurs because the new immune system from the donor's marrow may identify the patient's body as foreign and try to destroy it. When the donor's immune cells in the marrow attack the patient, many symptoms may result and, in severe cases, the patient could die.

Doctors decrease these risks by trying to select a patient/donor pair whose immune cells will identify each other as "self." An identical twin's cells will see the other twin's cells as self. But most patients do not have an identical twin. So doctors look at a person's human leukocyte antigens (HLA) to match donor and patient bone marrow. These are proteins present on the surface of our cells. They play a big role in telling immune cells that other cells are either foreign or "friendly" self-cells.

Doctors will look at HLA antigens on your siblings' cells, because you have a 25 percent chance of having an HLA match with a brother or sister. Among unrelated people, only one in 20,000 people will be an acceptable match.

**Connections**

1. How would the ability to create blood in a lab affect the availability of marrow transplants?
2. In an autologous bone marrow transplant, a patient's bone marrow is extracted, then reintroduced into the body. What transplant problems might this eliminate? What new complications might occur?
Key Words

**aplastic anemia**  blood deficiency whereby reduced levels of red blood cells, platelets, and leukocytes result in a shortage of oxygen in the blood, bleeding, and infection

**chemotherapy**  using chemicals to treat disease by poisoning the disease-producing cells

**erythrocytes**  red blood cells that transport oxygen in the blood to the tissues

**leukemia**  cancer of the blood characterized by excessive production of white blood cells

**leukocytes**  white blood cells that fight off infection or destroy foreign cells

**platelets**  cells in the blood that cause it to clot after an injury

**radiation treatment**  using energy from a radiation source to eliminate disease

**stem cells**  unspecialized cells that create specialized cells

**transfusion**  transfer of blood from one person to another

Resources


Additional resources

NEWTON'S APLE Show 1012 (blood typing). GPN: (800) 228-4630. Or call your local PBS station to find out when it will be rerun.

Additional sources of information

BMT Newsletter
1985 Spruce Ave.
Highland Park, IL 60035
(708) 831-1913

National Marrow Donor Program
3433 Broadway St. NE, #400
Minneapolis, MN 55413
(800) 627-7692
Main Activity

What Are the Odds?

Find the connection between rolling dice and a genetic match.

What are the chances of getting a match at random from an unrelated donor? In this activity, you will learn about probability using a pair of dice.

Materials

- pair of dice
- paper
- pencil
- calculator

1. If you rolled a pair of dice, what chance would you have of getting matching numbers? Write down how many times you think you'd have to try before you got a match.

2. The first concept you need to know is that the probability of something happening is expressed in this simple equation:

   \[ \text{probability} = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}} \]

   In this example, you're trying to get an outcome where the two dice match. A die is a cube with six possibilities: you can roll either a 1, 2, 3, 4, 5, or 6. So with one die, your probability of rolling a 5 is:

   \[ 1 \text{ (number of probability = favorable outcomes)} \]
   \[ 6 \text{ (number of possible outcomes)} \]

3. Next, you have to figure out how your probability changes when you roll a pair of dice. First, consider what the new number of possible outcomes is. Before, there were six. Now, there are many more combinations possible. Below is a chart listing all the possible rolls for your dice, naming them Die A and Die B. We started the chart to help you figure it out. Fill in the missing numbers to complete all the possible die rolls.
4. Count how many possible outcomes you can have when rolling two dice. If we wanted to calculate our chances of rolling a 5 on either or both dice, we would have to rewrite our probability equation:

\[
\text{probability} = 3 (\text{Die } A=5, \text{ Die } B=5, \text{ or both}=5)
\]

(fill in your count from above)

5. Now use what you've learned and the chart you've completed to calculate the chances of rolling matching die.

Questions

1. The HLA proteins are determined by genes on chromosome 6. Each parent has two of these chromosomes, and these four HLA types are almost always different. You inherited one HLA type from each parent, as did your siblings. What is the probability that one of your siblings inherited the same HLA types that you did?

Try This

2. There are four different blood types: O, A, B, and AB. Try to find out the blood type for everyone in your family, including yourself. To whom could you donate blood? Who could donate blood to you?

Try This

3. Create a simple model showing how your blood cells are suspended in plasma, making blood. Fill a glass jar with corn syrup to represent plasma and add tea leaves, bits of confetti, and pepper
to act as blood cells. Put the lid on tightly and shake the jar to get an idea of how blood cells travel in plasma through your system. What happens when you let the "blood" sit for a while? Does the heart's pumping action do more than just transport blood?

Die A Die B Die A Die B Die A Die B Die A Die B Die A Die B Die A

1 1 2 1 3 1 4 1 5 1 6 1
1 2 2 2 3 2 4
1 3 2 3 3 3
1 4 2 4 3
1 5 2 5
1 6 2

Tapes of this episode of Newton's Apple and others are available from:

3M Innovation

GPN/University of Nebraska
PO Box 80669
Lincoln, NE 68501-0669

Email:
gpn@unl.edu
Web: gpn.unl.edu

For information on other Newton's Apple resources for home and school, please call 1-800-588-NEWTON!
### Objectives

- The student understands that all matter has observable, measurable properties.
- The student understands the interaction of matter and energy.
- The student describes patterns of structure and function in living things.
- The student understands the competitive, interdependent, cyclic nature of living things in the environment.
- The student understands the consequences of using limited natural resources.
- The student uses the scientific processes and habits to solve problems.

### Standards/Benchmarks

- SC.A.1.3.1
- SC.B.2.3.1
- SC.F.1.3.1; SC.F.1.3.2; SC.F.1.3.3; SC.F.1.3.4; SC.F.1.3.5; SC.F.1.3.6
- SC.G.1.3.1
- SC.G.2.3.1
- SC.H.1.3.1; SC.H.1.3.4; SC.H.1.3.5

### Activities

#### Verbal-Linguistic

- Take notes during lecture.
- Write a tongue twister with some of the scientific words learned in this unit.
- Write a creative story following a red blood cell through the circulatory system.

#### Logical-Mathematic

- Design a board game: Divide into groups, have copied segment of Learning Guide and use that information for the game. Share with other groups.
- Experiments from the Learning Guide

#### Visual-Spatial

- Make a model of a drop of blood or a specific blood component.

#### Musical-Rhythmic

- Make up song titles in groups to fill a juke box at the blood center (blood-related vocabulary).
- Make up a cheer to remember the phases of mitosis or function of each blood component.

#### Interpersonal

- “Mistaken Identity” activity in Learning Guide p.16
- Work with a partner to measure each other’s blood pressure (Learning Guide p. 16)
- Find out the blood type for everyone in your family, including yourself. To whom could you donate blood? Who could donate blood to you? Create a visual representation to show your results.

#### Intrapersonal

- Write a one-page reflection on your experience in “Mega-Animated Lifeline.”

#### Bodily-Kinesthetic

- Mega-Animated lifeline (see lesson plan)
- Experiments from the Learning Guide

#### Naturalist

- Scientific drawing of blood components
- Independent student study: volunteer to help with a blood drive in any organization. Create a photo essay of the experience.

### Vocabulary


components, mitosis, scientific method
Materials/Equipment

The My Blood, Your Blood Learning Guide is the primary resource for activities, literature, and discussions in Science. Also see the appendix for blood center and donation literature.

- pencils, colored pencils, markers, drawing paper, paint,
- poster boards, glass jar, corn syrup, tea leaves, pepper, confetti

Great Ideas/Improvements

Presentation

Anticipatory Set/“The Hook”
Create a simple model showing how your blood cells are suspended in plasma, making blood: Fill a glass jar with corn syrup to represent plasma and add tea leaves, bits of confetti, and pepper to represent blood cells. Put the lid on tightly and shake the jar to get an idea of how blood cells travel in plasma through your system. What happens when you let the “blood” sit for a while? Does the heart’s pumping action do more than just transport blood?

Procedures/Activities

1. Teacher-directed review/summary of blood components and functions, and role of specific organs relating to the circulatory system.
2. Students render a scientific drawing of each blood component based on lecture and additional research.
4. Mega-Animated Lifeline (see individual lesson plan).

8th grade lesson suggestion:
1. Discuss/explain mitosis as it relates to stem cell production of blood cells in the bone marrow.
2. Use “Phases of Mitosis” activity as a mnemonic device for remembering the phases of mitosis.

Unit Culminating Event

Students present their work from the unit in a fair environment.

Authentic Assessment/Product

Develop, illustrate and explain an alien circulatory system.
Required components:
1. Pump, transportation system, fluid components
2. Label and describe the alien’s circulation process.

Suggested teacher prompts:
1. What does the alien need to sustain its biological life processes?
2. How are those needs met within the alien’s body?

Cooperative Learning Strategies

1. Mega-Animated Lifeline: Brainstorm, in assigned character groups, how to portray the cells’ functions.
2. Team note taking: Write out action of the cells.
3. True/False: 4 students
   Question– review components; student number called (1-4); T=thumbs up/F=thumbs down.
4. Team blackboards: Question is asked– think time for team– answer on team blackboard.

ESOL Modifications
- Native country-specific beats of songs, relating to heart rhythm
- Make a poster showing components, organs, and functions in native language.

ESSE Modifications
- Individuals receive charts showing components, organs, and functions.
- Co-operative learning: hands-on activities– drawings, symbols, organs.
Phases of Mitosis
by Chia-Robert Ho
Used by Permission

Duration: 15-20 minutes

Description: Mnemonic device for remembering the phases of mitosis.

Goals: California Science Standard for 7th grade - Life Science
Model the usage of a mnemonic device for the memorizing and understanding of mitosis.

Objectives: Students will be able to:
1. memorize the phases of mitosis with more ease.
2. model this strategy in creation of their own mnemonic device for the phases of mitosis.

Materials: None specified.

Procedure:
Beginning of class:
Prepare the students for the presentation and ask them to relate the presentation to phases of mitosis.

The Mitosis Story
1. In any type of a skit there is a setting and characters. In this skit, the setting is in a pro-wrestling ring and the characters are the pro-wrestlers and a little girl.
2. At the beginning someone has to enter (INTERPHASE) the ring for the match to start.
3. Now, we know that all pro-wrestlers (PROPHASE) like to put on some sort of an outfit. In this match, our pro-wrestlers dress up like a big X (a condensed chromosome).
4. After the first X-like pro-wrestler appears, it magically replicates. Now, we have two identical X-shaped pro-wrestlers in the ring. These two wrestlers face each other in the middle (METAPHASE) of the ring and this sets the stage for a fight.
5. As the two wrestlers are ready to fight, a little girl named Ana comes running into the ring to stop the fight (ANAPHASE). She had learned that civilized people should not fight; so, she intends to break up the fight. Ana brings out several lengths of cords, ropes them around the wrestlers, and starts pulling them apart.
6. After a bit of struggle, she pulls the X-shaped wrestlers apart. She is pretty happy about what she did and she calls her mom to tell her about what she did. Now everyone knows what a telephone (TELOPHASE) looks like - Two circles connect in the center (draw this on the board for the students).
7. After the phone call, Ana is really tired and wants to go home. She gets on her bicycle (CYTOKINESIS) and rides home (the 2 wheels of the bicycle are apart. like the new divided cells).

Assessment:
1. Ask the students to relate the skit to the phases of mitosis. They will need to describe the steps of mitosis in their journals.
2. The students can write their own skit for mitosis or create one for meiosis.
**Objectives**
- Students will understand patterns of structures and functions.
- Students will respond critically to fiction.
- Students will enrich personal viewpoints and/or experiences.

**Standards/Benchmarks**
- L.A.E.2.3.8.
- S.C.F.1.3.1.

**Materials/Equipment**
  very large outline of body on floor, designated organ areas, construction paper symbols, 2-sided tape

**Presentation**

**Anticipatory Set/“The Hook”**
1. Read Edgar Allan Poe’s The Tell Tale Heart.
2. Find own heartbeats at pressure points (see Learning Guide, p.3).

**Procedures/Activities**
1. Referring to diagram, MBYB Learning Guide p. 3, and past knowledge about the jobs of blood components and the effects of smoking, alcohol, and drug use/abuse on the circulatory system, discuss the functions of the different organs and how they relate to the circulatory system (see functions in “Cast of Characters”).
2. Assign “Cast of Characters,” allowing each group to determine the actions of his/her “character” based on function.
3. Prepare symbols to carry.
4. Locate positions on human body outline on floor—use math ratios.
5. Determine the blood flow; respond to the beat (stay to right coming and going, like street traffic).
6. Go as a group to all parts of the body (group of components).
7. Interact with different component groups according to function.

**Vocabulary**
bones, heart, healthy lifestyle, kidneys, liver, lungs, spleen, stomach, wounds

**Authentic Assessment**
Performance at unit culminating activity: My Blood, Your Blood; My Life line, Your Life line

**Great Ideas/Improvements**
**Mega-Animated Lifeline: Cast of Characters**

<table>
<thead>
<tr>
<th>NAME</th>
<th>DRESS IN</th>
<th>CONSTRUCTION PAPER SYMBOLS</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Blood Cells</td>
<td>Red</td>
<td>Red, oxygen Purple, CO₂</td>
<td>Pick up nutrients in stomach; exchange O and CO₂ in lungs and cells.</td>
</tr>
<tr>
<td>Water</td>
<td>Blue</td>
<td>Grey waste can, H₂O</td>
<td>Takes waste to kidneys, eventually acts old and tired. Goes to liver; new cell comes from bones.</td>
</tr>
<tr>
<td>White Blood Cells</td>
<td>White</td>
<td>White blood cell</td>
<td>Fight diseases.</td>
</tr>
<tr>
<td>Platelets</td>
<td>Yellow</td>
<td>With 2-sided tape</td>
<td>Stick to wounds.</td>
</tr>
<tr>
<td>Smoke (nicotine)</td>
<td>Black</td>
<td>Carbon monoxide</td>
<td>Enters through lungs; sneaks into group; pretends to cause damage.</td>
</tr>
<tr>
<td>Alcohol/Drugs</td>
<td>Black</td>
<td>Skull &amp; crossbones</td>
<td>Attacks and kills brain cells; constricts blood supply (forces group single file); makes heart beat very fast; goes to liver.</td>
</tr>
<tr>
<td>Germs, virus, bacteria</td>
<td>Multicolor</td>
<td>Design own symbols</td>
<td>Enter through stomach, wounds, lungs; pretend to attack, fight white cells; some escape, go to liver, die.</td>
</tr>
<tr>
<td>Healthy vitamins and minerals</td>
<td>Food colors</td>
<td>Pictures of healthy foods; building blocks</td>
<td>Enter through stomach; go to cells; sit and build.</td>
</tr>
<tr>
<td>Messenger</td>
<td>Choice</td>
<td>High &amp; low water level signs from kidney, keep &amp; remove signs from heart</td>
<td>Travels with messages from kidney to brain.</td>
</tr>
</tbody>
</table>

**OTHERS:**
- Assorted cells ~ Choice of colors ~ Stand by outlined figure and exchange O for CO₂ and waste.
- Narrator / Sports Caster ~ Describes action occurring.
ORGANS: *(Note: Place several students in designated areas.)*

- **Heart ~** Using hand drum, begin with regular beats; for alcohol and drugs, beat very fast; “shake up” components to send them on their way.

- **Lungs ~** Collects CO₂; distributes O₂; CO sneaks in and goes into blood groups; germs enter, sneaking into blood stream.

- **Liver ~** Captures old blood cells, drugs, alcohol; kills any bacteria.

- **Spleen ~** Kills bacteria.

- **Kidneys ~** Removes waste, monitors water level to brain:
  ➤ Low water level – don’t remove any waste.
  ➤ High water level – take some waste out of part of body – blood cells enter here.

- **Bones ~** Dressed in white, stand in bone shape.

- **Wounds ~** Gory looking – appear on edge of body outline; stopped by platelets sticking all over them.

- **Stomach ~** Essential vitamins and minerals enter with building blocks – some germs enter here.
Interdisciplinary Thematic Unit Plan
Middle School Level

Objectives

- The student understands that Science, Technology, and society are interwoven and interdependent.
- The student understands historical chronology and historical perspective.
- The student understands the world in spatial terms.
- The student understands the role of the citizen in American Democracy.
- The student understands ways scarcity requires individuals and institutions to make choices about how to use resources.
- The student uses speaking strategies effectively.
- The student uses listening strategies effectively.
- The student writes to communicate ideas and information effectively.
- The student uses the writing process effectively.

Standards/Benchmarks

<table>
<thead>
<tr>
<th>SC.H.3.3.1</th>
<th>SS.A.1.3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS.B.1.3.1</td>
<td>SS.C.2.3.6; SS.C.2.3.7</td>
</tr>
<tr>
<td>SS.D.1.3.1</td>
<td>L.A.B.2.3.1; L.A.B.2.3.3</td>
</tr>
<tr>
<td>L.A.B.1.3.1; L.A.B.1.3.2; L.A.B.1.3.3</td>
<td></td>
</tr>
<tr>
<td>L.A.C.3.3.2; L.A.C.3.3.3</td>
<td></td>
</tr>
<tr>
<td>L.A.C.1.3.4</td>
<td></td>
</tr>
</tbody>
</table>

Activities

**Verbal-Linguistic**
- Research
- Summarizing
- Information sharing

**Logical-Mathematical**
- Timeline of cGMP’s
- Write and logically justify a new Health Protection Law.

**Visual-Spatial**
- Poster on current event (re: blood)
- Map-making (ref. Malaria-Risk Countries handout)
- Make a video of the OSHA inspection assessment activity.

**Musical-Rhythmic**
- Write and perform a political jingle or campaign song in support of your new law.
- Create an “Alphabet Soup” song based on acronyms.

**Interpersonal**
- Debate Health Protection law.

**Intrapersonal**
- Research/Vocabulary Mastery
- Write an essay: why a specific donor would be a potential risk to the blood supply.
- Ethical decision-making (Learning Guide p 22.)

**Bodily-Kinesthetic**
- Mock OSHA Inspection

**Naturalist**
- Portray an environment filled with hazards and their sources from current event information.
- Create a Circulatory System travel brochure.

Vocabulary

Acronyms: AABB, ABC, CBER, CDC, CFR, CLIA, FDA, cGMP, OSHA, SOP

ethics, conflict resolution, debate, economics, integrity, deferral, suitability, (blood) donor
**Materials/Equipment**

Video camera, VCR, Video clip of history of cGMPs, Learning Guide, excerpts from CFR Title 21 (downloaded from the Internet), handouts: “Sample Donor History Questionnaire,” “Malaria-Risk Countries,” “A Day in the Life of Bogus Blood Bank” skit, OSHA inspection materials, websites (see bibliography).

**Great Ideas/Improvements**

**Presentation**

**Anticipatory Set/“The Hook”**

Daily journal prompt

Lesson Plan: Supply and Demand: Finite Resources, Infinite Needs

Introduction of regulatory agencies: FDA, CBER, AABB, OSHA, CLIA (see Appendix)

**Procedures/Activities**

1. Current Events: From a variety of sources, discuss articles on Bio-Medical Waste, Blood Supply, Blood Banking, Mad Cow Disease, etc. from an ethical perspective.
2. Review the history of the FDA regulations development of the cGMPs regarding a safe blood supply from the video clip. Make an historical timeline of FDA regulations.
3. Ask: Who mandates the qualifications of donors? (The FDA through the CFR)
4. Introduce concept of Supply and Demand
5. Write a new Health Protection Law.
6. Debate the practicality, ethics, and integrity of your new law.
7. Map Making Activity:
   a. Study the handout, “Malaria-Risk Countries”
   b. Create a map of the areas that denote donor deferral
8. Write an essay: Use an ethical perspective, review all you have learned from the above activities to write an essay disclosing why a specific donor would be a potential risk to the blood supply. (Use Learning Guide p. 22)

**Unit Culminating Event**


Students present their work from the unit in a fair environment.

**Authentic Assessment/Product**

Mock OSHA inspection: (use video tape)

1. Assign roles, read through, and act out the skit, “A Day in the Life of Bogus Blood Bank.”
2. Identify cGMP and safety violations.
3. Answer questions orally or in writing.
4. Discuss.

**Cooperative Learning Strategies**

2. Partners– Brainstorm “potential risks” to the blood supply.
   - Student 1: names risk, student 2: counters with a safe guard.
   - Student 1: says an acronym; student 2: identifies the acronym.

**ESOL Modifications**

- Vocabulary-- word wall
- Partners-- Peer tutor
- Cooperative learning
- Discuss government regulations of native country. Locate native country on a map.

**ESE Modifications**

- Cooperative learning
- Graphic organizers
- Copy of regulator agencies-- make a chart of potential risks.
- Choice of projects
Sample Donor History Questionnaire

*Note: Strictly for use in role-playing activity*
(Not a complete listing of interview questions for blood donation)

1. Have you ever donated or attempted to donate blood using a different (or another) name here or anywhere else?
2. In the past 8 weeks, have you given blood, plasma, or platelets here or anywhere else?
3. Have you for any reason been deferred or refused as a blood donor or told not to donate blood?
4. Are you feeling well and healthy today?
5. In the past 12 months have you been under a doctor’s care or had a major illness or surgery?
6. Have you ever had chest pain, heart disease, recent or severe respiratory disease?
7. Have you ever had cancer, a blood disease, or a bleeding problem?
8. Have you ever had yellow jaundice, liver disease, viral hepatitis, or a positive test for hepatitis?
9. Have you ever had malaria, Chagas’ disease, or babesiosis?
10. In the past 4 weeks have you taken any pills or medications?
11. In the past 4 weeks have you had any shots or vaccinations?
12. In the past 12 months have you been given rabies shots?
13. In the past 3 years have you been outside the United States or Canada?
14. In the past 12 months have you had close contact with a person with yellow jaundice or viral hepatitis, or have you been given hepatitis B Immune Globulin (HBIG)?
15. In the past 12 months have you received blood or had an organ or tissue transplant or graft?
16. In the past 12 months have you had a tattoo applied, ear or skin piercing, acupuncture, accidental needle stick, or come in contact with someone else’s blood?
17. Have you ever used a needle, even once, to take drugs that were not prescribed for you by a doctor?
18. Do you have AIDS or have you had a positive test for the AIDS virus?
19. Were you born in, have you lived in, or have you traveled to any African country since 1977?
Supply and Demand: Finite Resources, Infinite Needs
by Chris Lorrain
Used by Permission

Subject Area(s) : Social Studies

General Topic(s) or Theme(s) :
• ethics
• conflict resolution
• debate
• economics

Objectives :
1. To engage students with a problem that requires cooperation, dialogue, handling different needs and interests, listening, resource, management, etc.
2. To encourage students to consider process and outcome.
3. To cause students to question how conflicts over finite resources arise, and debate (discuss) whether they can be resolved satisfactorily.

Materials :
• a number of objects greater than/equal to the number of students in the class, preferably a variety of candy, pencils, knick-knacks, and one or two slightly pricier items
• a blackboard and chalk
• a clock/timer
• a table that can hold the objects

Introductory questions to stimulate discussion :
1. When you and your friends or family have competing interests, how are they usually resolved?
2. What is more important in resolving a conflict, the outcome or the process?
3. Is it possible to resolve a conflict so that everyone is satisfied with the outcome?

Introduction Activity :
I strongly urge the teacher to read *Getting to Yes*, an excellent 'quick read' about principled negotiation, conflict-resolution, etc.

Body :
Inform the students that they are going to have a finite amount of time to decide on the distribution of some items amongst themselves. There are some 'rules' that need to be stipulated:
Each person gets only one item.

- All items stay on the table until everyone has been linked to one item [this is especially important with food; it is a disaster if half-way through the negotiations, someone decides they wanted two Twizzlers - and they are half-eaten!].
- If they have not distributed one item/person by the end of the allotted time, no one gets anything.
- Everyone must be satisfied with his/her item. Each person will be polled by the teacher when each thinks the/she has resolved the problem; if anyone expresses dissatisfaction, he/she must return to the negotiations.
- Items which might logically be split up [i.e., a pair of Twinkies] may be split up, but no one may have more than one complete item. If, for example, Joe will only concede the ruler if he gets one of the Twinkies, he cannot have the one Twinkie and an entire other item. He could have one Twinkie and half of the Coca-Cola®.
- No fighting or name-calling [I do allow a certain amount of voice-raising, voiced frustration, rolling of eyes, etc.].

When everyone understands the rules, begin by laying out the items for the class to study. Then - turn them loose! How they go about the process is up to them; usually, a leader or two emerges. The rest of the experiment, the teacher is the 'fly on the wall' - make no suggestions or comments. Remind them of the rules, as needed, and of the time left. If they succeed with the experiment, poll each person as to his/her satisfaction with his/her item. If anyone voices dissatisfaction, he/she must re-enter negotiations. If no one voices dissatisfaction, distribute the items.

### Conclusion Activity:

Based on what was observed, a host of questions can be produced. It's a good idea to take notes as the students negotiate. Some things to focus on:

- Who became the leader? How?
- To what extent were people more concerned with 'getting something' as opposed to 'getting the thing'?
- What was it about the process they used that was informative for them?
- Who spoke up? Who didn't?
- What kinds of horse-trading went on?
- Who seemed more concerned with making sure everyone got something?
- Who seemed more concerned with making sure they got something?
- Did anyone seem to give in for the sake of the outcome?
- Were people cowed into taking certain objects?

These - and your own notes, etc. - should produce a slew of issues to discuss, not only on the process the students used, but alternatives they didn't consider. A short paper assignment, asking students to assess what happened and why, especially if it is a follow-up to a reading provided to them on conflict resolution-type approaches, is an excellent way to bring individual closure to the exercise.

### Evaluation Activity:

As previously mentioned, a short paper assignment, asking students to assess what happened and why, especially if it is a follow-up to a reading provided to them on conflict resolution-type approaches, adds to the thoughtfulness one hopes comes from such an experience.
## Malaria Risk – Countries

Revised 9/08/01

Note: For the following references, "Travel" is being in the area six months or less and "Residence" is being in the area for greater than 6 months. For certain countries, noted with an asterisk (*), this list is more restrictive than the Centers for Disease Control and Prevention (CDC) recommendations for travelers (Yellow Book).

<table>
<thead>
<tr>
<th>Country</th>
<th>Malaria Risk</th>
<th>Area of Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>Yes</td>
<td>All, except no risk at altitudes higher than 2000 m (6561ft)</td>
</tr>
<tr>
<td>Albania</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>*Algeria</td>
<td>Yes</td>
<td>Malaria risk is limited to one small focus in Sahara Region in Ibrir (Illizi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dept)</td>
</tr>
<tr>
<td>Andorra</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Angola</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Anguilla (U.K.)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Antigua and Barbuda</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Argentina</td>
<td>Yes</td>
<td>Rural areas near Bolivian border, ie, Salta and Jujuy Provinces and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>along border with Paraguay, i.e., Misiones and Corrientes Provinces.</td>
</tr>
<tr>
<td>Armenia</td>
<td>Yes</td>
<td>Risk limited to western border areas: Masis, Ararat, and Artashat regions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in Ararat District</td>
</tr>
<tr>
<td>Aruba (see Neth. Antilles)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>*Azerbaijan (E. Europe)</td>
<td>Yes</td>
<td>Rural lowlands with highest risk in areas between Kura and Araks Rivers</td>
</tr>
<tr>
<td>Azores (Portugal)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Bahamas</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Bahrain</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Bangladesh</td>
<td>Yes</td>
<td>All areas except no risk in city of Dhaka.</td>
</tr>
<tr>
<td>Barbados</td>
<td>No</td>
<td></td>
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<tr>
<td>Belarus</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Belize (Br. Honduras)</td>
<td>Yes</td>
<td>All, except no risk in Belize City</td>
</tr>
<tr>
<td>Benin (Dahomey)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Bermuda (U.K.)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Bhutan</td>
<td>Yes</td>
<td>Rural areas in districts bordering India.</td>
</tr>
<tr>
<td>Bolivia</td>
<td>Yes</td>
<td>Risk in areas below 2500 m (8202 ft) in the following departments: Beni,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chuquisaca, Cochabamba, La Paz, Pando, Santa Cruz, &amp; Tarj.</td>
</tr>
<tr>
<td>Bosnia/Herzegovina</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Botswana</td>
<td>Yes</td>
<td>Northern part of country (north of 21°S).</td>
</tr>
<tr>
<td>Br. Honduras (see Belize)</td>
<td>Yes</td>
<td>States of Acre, Rondonia, Amapa, Amazonas, Roraima, and Tocantins. Parts of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>states of Maranhao (western part), Mato Grosso (northern part), and Para</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(except Belem City). There is also transmission in urban areas, including</td>
</tr>
<tr>
<td></td>
<td></td>
<td>large cities such as Porto Velho, Boa Vista, Macapa, Manaus,</td>
</tr>
<tr>
<td>Country</td>
<td>Risk</td>
<td>Notes</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Brazil, cont.</td>
<td></td>
<td>Santarem, and Maraba. <em>Lwe 8/16/01.</em> (Travelers who will only visit coastal states from the to the Uruguay border and Iguassu Falls, Rio De Janeiro and Buenos Aires are not at risk).</td>
</tr>
<tr>
<td>British Protectorate</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Brunei Darussalam</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Bulgaria</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Burkina Faso (Upper Volta)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Burma (Myanmar)</td>
<td>Yes</td>
<td>Rural only. No risk in cities of Rangoon (Yangon) and Mandalay. <em>Lwe 8/16/01.</em></td>
</tr>
<tr>
<td>Burundi</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Cambodia</td>
<td>Yes</td>
<td>All areas, except no risk in Phom Penh. There is risk at the temple complex at Angkor Wat. <em>Lwe 8/16/01.</em></td>
</tr>
<tr>
<td>Cameroon</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Canary Islands (Spain)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Cape Verde</td>
<td>Yes</td>
<td>Limited to Island of São Tiago only <em>Lwe 8/16/01.</em></td>
</tr>
<tr>
<td>Caribbean Islands</td>
<td>Yes</td>
<td>Risk in Labadee <em>Lwe 8/16/01</em>; no risk in Anguilla, Turks, Caco Island, American West Indies</td>
</tr>
<tr>
<td>Cayman Islands (U.K.)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Central African Republic</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Chad</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>Yes</td>
<td>Rural areas only of the following provinces: Hainan, Yunnan, Fujian, Guangdong, Guangxi, Guizhou, Sichuan, Xizang (in the Zangbo River valley only), Anhui, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Shanghai, and Zhejiang. Travelers to cities and popular tourist areas, including Yangtze River cruises, are not at risk. <em>Lwe 8/16/01.</em> The following cities are non-endemic: Wuhun, Guilan, Beizing, Xian, Chong qung, Ghuandong, Shanghai, Hong Kong. Urban areas: No risk</td>
</tr>
<tr>
<td>Christmas Island (Australia)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Colombia</td>
<td>Yes</td>
<td>Risk in all rural areas, except no risk at altitudes higher than 800 meters (2,624 ft). <em>Lwe 8/16/01.</em> No risk in Bogota and vicinity, Cartagena, Manizoles (city) Caldas (state). No risk on Cambean coast. <em>Lwe 8/16/01.</em></td>
</tr>
<tr>
<td>Comoros</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Congo</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Cook Island (New Zealand)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>Yes</td>
<td>Provinces of Alajuela, Limon, Guanacaste, and Heredia. No risk in Limon City. <em>Lwe 8/16/01.</em></td>
</tr>
<tr>
<td>Côte d’Ivoire (Ivory Coast)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Croatia</td>
<td>No</td>
<td></td>
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<tr>
<td>Cuba</td>
<td>No</td>
<td></td>
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<tr>
<td>Cyprus</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Dahomey (see Benin)</td>
<td></td>
<td></td>
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<tr>
<td>Democratic Republic of Congo</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Congo (formerly Zaire)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td>Malaria Risk</td>
<td></td>
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<tr>
<td>-------------------------</td>
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<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Diego Garcia</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Djibouti</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Dominica</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>East Timor</td>
<td>Yes</td>
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<td>Eastern Europe</td>
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<td>Gibraltar (U.K.)</td>
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<td>Gilbert Islands (see Kiribati)</td>
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<tr>
<td>Guyana</td>
<td>Yes</td>
<td>Risk in all interior regions including Rupununi and North-West Regions and areas along Pomeroon river; sporadic cases have also been reported along the coastal region. <em>Lwe 8/16/01</em></td>
</tr>
<tr>
<td>Haiti</td>
<td>Yes</td>
<td>Malaria: Rural areas (including all islands, Roatán &amp; LaCeiba) and other Bay islands. <em>Lwe 8/16/01</em> Juticalpa is endemic. Tequigalpa is OK.</td>
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<td>Honduras</td>
<td>Yes</td>
<td>All areas, including the cities of Delhi, Bombay, except no risk at altitudes higher than 2,000 m (6,561 ft) <em>Lwe 8/16/01</em> in Himechel, Prades, Jammu and Kashmir, and Sikkim. Bangalore and Putta Parthia are at risk.</td>
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<tr>
<td>Hong Kong (U.K.)</td>
<td>No</td>
<td>Rurual only, except high risk in all areas of Irian Jaya (Papua) <em>Lwe 8/16/01</em> (western half of island of New Guinea). No risk in cities of Java and Sumatra and no risk for the main resort areas of Java and Bali. There is risk at the temple complex of Borobudur. <em>Lwe 8/16/01</em></td>
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<td>Indonesia</td>
<td>Yes</td>
<td>Risk in rural areas only in the provinces of Sistan-Baluchestan, the tropical part of Kerman, Hormozgan, and parts of Bushehr, Fars, Ilam, Kohgiluyeh-Boyar, Lorestan, and Chahar Mahal-Bakhtiar, and the north of Khuzestan.</td>
</tr>
<tr>
<td>Iran, Islamic Republic of</td>
<td>Yes</td>
<td>All of northern region; provinces of Duhok, Erbil, Ninawa, Sulaimaniya, Tāmim, Basra provinces. <em>Lwe 8/16/01</em></td>
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<tr>
<td>Iraq</td>
<td>Yes</td>
<td>All areas (including game parks) except no risk in Nairobi and areas above 2500 meters (8,202 ft) <em>Lwe 9/19/01</em></td>
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<td>Ireland</td>
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<td>Kampuchea, Democratic (see Cambodia)</td>
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<td>Kenya</td>
<td>Yes</td>
<td>Limited risk in some southern areas. <em>Lwe 9/16/01</em></td>
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<td>Kiribati (formerly Gilbert Islands)</td>
<td>No</td>
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<td>Korea, Democratic People's Republic of (North)</td>
<td>Yes</td>
<td>Risk limited to demilitarized zone (DMZ) and to rural areas in the northern parts of Kyonggi and Kangwon provinces. <em>Lwe 8/16/01</em>. No risk in Seoul or areas south of Seoul (south of 37.7° North)</td>
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<tr>
<td>&quot;Korea, Republic of (South)</td>
<td>Yes</td>
<td>Note: Defer travelers for 24 months. See SOP 113.0</td>
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<td>Kosovo</td>
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<td>See Yugoslavia</td>
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<td>Note</td>
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<td>-------------------------------------------</td>
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<tr>
<td>Lao People's Democratic Republic (Laos)</td>
<td>Yes</td>
<td>All areas, except no risk in city of Vientiane.</td>
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<td>La Reunion Is.</td>
<td>No</td>
<td>Note: near Africa</td>
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<td>Macao (Portugal)</td>
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<td>Macedonia, Former Yugoslav Republic of</td>
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<td>Madagascar</td>
<td>Yes</td>
<td>All; highest risk in coastal areas.</td>
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<td>Madeira (Portugal)</td>
<td>No</td>
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<td>Malawi</td>
<td>Yes</td>
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<tr>
<td>Malaysia</td>
<td>Yes</td>
<td>In peninsular Malaysia and Sarawak (NW Borneo) malaria is limited to remote areas. Urban and coastal areas are malaria free. Sabah (NE Borneo) has malaria throughout. Malaria transmission in Malaysia (except Sabah) is largely confined to rural areas not visited by most travelers.</td>
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<tr>
<td>Maldives</td>
<td>No</td>
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<td>Mali</td>
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<td>Martinique (France)</td>
<td>No</td>
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<tr>
<td>Mauritania</td>
<td>Yes</td>
<td>All areas, except no risk in northern region; ie, Dakhlet-Nouadhibou, Inchiri, Adrar and Tinis-Zemour.</td>
</tr>
<tr>
<td>Mauritius</td>
<td>Yes</td>
<td>Rural areas only, except no risk on Rodriguez Island.</td>
</tr>
<tr>
<td>Mayotte (French territorial collectivity)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>Yes</td>
<td>Malaria: Rural areas of the following states are at risk for malaria: Oaxaca, Chiapas, Guerrero, Campeche, Quintana Roo, Sinaloa, Michoacan, Nayarit, Tabasco. In addition, risk exists in the state of Jalisco (in its mountainous northern area only). Risk also exists in an area between 24° N and 28° N latitude, and 106° W and 110° W longitude. This area, which is rarely visited by tourists, includes parts of the states of Sonora, Chihuahua, and Durango. Major resort areas on the Pacific and Gulf coasts are not at risk. However, the small resort towns of Huatulco and Ixtapa ARE at risk. Chicken Itza is endemic. Costa Maya (a new Tourist Port near Cozumel) IS endemic. None of the towns directly across from the US border at risk. The following cities are not at risk for malaria transmission: Acapulco, Aguascalientes, Cabo San Lucas, Cancun, Chihuaha, Cuidad Acuna, Ciudad Juarez, Ciudad Obregón, Ciudad Victoria, Cozumel.</td>
</tr>
</tbody>
</table>
# Malaria Risk – Countries

<table>
<thead>
<tr>
<th>Country (continued)</th>
<th>Risk Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curernavaca, travel from Mexico City to Cuernavaca, Ensenada, Gomez Palacio, Guadalajara, Guatemala Guaymas, Hermosillo, Irapuato (state of Gunnaguato), La Paz (on Baja peninsula), Lazaro Cardenas (village in risk state), Matamoros (the border town), Mazatlán, Merida, Mexicali, Mexico City, Monterrey, Morelia, Nogales (the border town), Nuevo Laredo, Oaxaca, Piedras Negras (the border town), Puebla, Puerta Penasco, Puerto Vallarta, Quadsadmantene, Queretaro, Rocky Point, Saitillo, San Felipe (on Baja peninsula), San Luis Potosi, Reynosa, Santa Ana, Sonota, Tampico, Tangier, Taxco, Tecomen, Colima (state), Tijuana, Torreon, Toluca, and Veracruz, Yucatan, Zacatecas (there are 4 towns with this name, clarify which state in Mexico [one state is endemic]).</td>
<td>No</td>
</tr>
<tr>
<td>Micronesia (Federated States of), includes Yap Islands, Pohnpei, Chuuk, and Kosrae.</td>
<td>No</td>
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<td>Moldova</td>
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<tr>
<td>Monaco</td>
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<tr>
<td>Mongolia</td>
<td>No</td>
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<tr>
<td>Montenegro</td>
<td>See Yugoslavia</td>
</tr>
<tr>
<td>Montserrat (U.K.)</td>
<td>No</td>
</tr>
<tr>
<td>Morocco</td>
<td>Yes</td>
</tr>
<tr>
<td>Very limited risk in rural areas of Khouribga Province. The cities of Tangier, Rabat, Casablanca, Marrakech, and Fez do not have risk.</td>
<td></td>
</tr>
<tr>
<td>Mozambique</td>
<td>Yes</td>
</tr>
<tr>
<td>Myanmar (formerly Buma)</td>
<td>Yes</td>
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<tr>
<td>Rural areas only. The cities of Yangon (formerly Rangoon) and Mandalay are not at risk.</td>
<td></td>
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<tr>
<td>Namibia</td>
<td>Yes</td>
</tr>
<tr>
<td>Risk in the northern regions and in Omaheke and Otjozondjupa and along the Kavango and Kunene rivers.</td>
<td></td>
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<td>Nauru</td>
<td>No</td>
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<tr>
<td>Nepal</td>
<td>Yes</td>
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<tr>
<td>Rural area in the Terai and Hill districts. No risk at altitudes higher than 1,200 m (3,937 ft).</td>
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<td>Netherlands Antilles</td>
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<td>New Caledonia and Dependencies (France)</td>
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<td>New Zealand</td>
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<tr>
<td>Nicaragua</td>
<td>Yes</td>
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<tr>
<td>Malaria: Rural areas only; however, risk exists in outskirts of Managua.</td>
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<td>Niger</td>
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<td>Nigeria</td>
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<td>Niue (New Zealand)</td>
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<td>Northern Mariana Islands (U.S.)</td>
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<td>Norway</td>
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<td>Risk</td>
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<td>Papua New Guinea</td>
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<td>Saint Pierre &amp; Miquelon (France)</td>
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<td>Sao Tome &amp; Principe</td>
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<td>Union of Soviet Socialist Republics (former)</td>
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<td>Northern Ireland, Channel Islands and the Isle</td>
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<tr>
<td>Wallis and Futuna Islands</td>
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</tr>
<tr>
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<tr>
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<tr>
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</tr>
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<tr>
<td>Zambia</td>
<td>Yes</td>
</tr>
<tr>
<td>Zimbabwe (Rhodesia)</td>
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</table>
A Day in the Life of Bogus Blood Bank
Skit by Jeanie M. Olach


Moderator: Finally! The day we've all been waiting for has arrived. Bogus Blood Bank is having an OSHA inspection. The OSHA Compliance Officer, Connie Compliance, has just arrived. Connie is escorted into the Conference Room by Nick Nitpick, Bogus's QA Director. After meeting with the Management Team, Connie restates the purpose of her inspection, discloses what areas she would like to cover, and requests preliminary lot release records and other documents that she would like to see for Bubbly Blood, the product that Bogus has submitted its application for, to gain approval to market the product in the state of Florida.

After analyzing the first set of documents, Connie Compliance is now in the Donor Services department of the blood center, asking staff questions as Nick Nitpick guides her on the inspection visit.

Connie Compliance: Good morning, Cassie Calibrate. Lovely shirt you are wearing - does Bogus Blood Bank supply you with personal protective equipment?

Cassie Calibrate: Sure, but those lab coats make me feel so hot; and the gloves - well, they are such a bother to put on. Besides, if I get anything on the lab coat I have to wash it here, according to some SOP.

Connie Compliance: Hmmmm... Would you please tell me about the blood that you’re weighing?

Cassie Calibrate: Well, this is a fresh unit we just drew, and we’re going to be testing it in batches of Bubbly Blood.

Connie Compliance: I see. What revised lot release record or SOP are you using?

Cassie Calibrate: Revised Lot Release? SOP? Nah. We just write how much we weigh right here in red on the issued Lot Release Form, and then toss the bag over the counter to the Lab. Yeah, supposedly there’s some safety committee, or some other thing, to change the procedures, but it takes forever. My boss has been after me to cut costs. It’s a whole lot cheaper to keep the lab coats hanging on the hooks, and the gloves in the
boxes, than to keep changing gloves every time we work with a new lot. So, I'm even getting an award from my boss for considering the budget as I experiment with this new blood. Pretty cool, huh?

Connie Compliance: Yeah. (Makes some notes.) Did you say that you were already using this blood in batches of Bubbly Blood?

Cassie Calibrate: Yup. This is for the third batch that we're going to make. We already used this new stuff in the two lots we made last week.

Moderator: Connie Compliance nods her head, makes a few more notes, and thanks Cassie Calibrate for her time. Nick Nitpick leads the way to the next area Connie Compliance has asked to see - the Lab. As they enter the component preparation area, they see Marvin Maintenance, the handy man around the blood bank, painting the wall with fresh, white paint.

Connie Compliance: Hi, I'm Connie Compliance, an inspector with OSHA. Are you painting inside the component preparation area of the lab today?

Marvin Maintenance: Yeah, we really wanted to make it look nice for you, you know? My supervisor is going to kill me, though, because I didn't get this done before you showed up.

Connie Compliance: Aren't you manufacturing Bubbly Blood today? Or do you have a work order for painting inside, without ventilation, during the blood center's busy time of the day?

Marvin Maintenance: (Shrugs) A work order? I've been here for six years, and nobody has ever said anything about a work order. This place is always busy and always making Bubbly Blood. You should have seen what they did last month. They had to remake tons of that stuff, because they didn't do it right. Look, I just do my job. I don't criticize them, and they don't criticize me. (Winks.) You know?

Connie Compliance: Did you say that they reprocessed several lots of Bubbly Blood last month?

Marvin Maintenance: Yeah. That's what I heard. Shhh. (Leans forward and whispers confidentially.) You didn't hear it from me, though.
Moderator: Just then, Vincent Validate, the Lab Component Technician, comes in, opens the top on a new piece of processing equipment nearby, and begins adding units of various blood components. Nick Nitpick introduces Connie Compliance to Vincent Validate.

Connie Compliance: Vincent Validate, are you making a shipment of Bubbly Blood today?

Vincent Validate: Yup. Once you dump everything in, then you turn on the equipment and it runs by itself. This new technology is awesome - just look at this machine! It sure seems to know what it is doing without any help from me!!

Connie Compliance: Do you usually have someone double-check your addition of materials?

Vincent Validate: Nah. There is no one else. I'm the only technician on the first shift.

Connie Compliance: Gosh, that is quite a responsibility you have. (Looking at the new machine) Did you say that the equipment runs by itself? Do you check it periodically?

Vincent Validate: Nah, I don't have to do that anymore. A few months ago, they replaced the computer chip or something inside the equipment, and it runs much faster now. It doesn't break down like it used to, either, so now it only takes four hours, instead of six, to do a run.

Connie Compliance: I see. Has the equipment or process been validated?

Vincent Validate: Validated? What's that? Nobody ever tells me anything! (Mutters under his breath and looks down) Darn! I forgot to turn the dial to 2.5. I'm always forgetting something. My wife says I'd forget my head if it wasn't screwed on right. Terry Tech is the second-shift technician. She'll be in tonight if you want to ask her about that validation thing.

Connie Compliance: Okay. I will. Aren't you going to record the dial setting you're using, or let your supervisor know?

Vincent Validate: Nah, it's close enough. My supervisor trusts me. I've been here for three years, so I know what I'm doing.
Connie Compliance: Oh, and what about that blood spill that leaked from one of the bags as you tossed it into the centrifuge? What will you use to clean it up?

Vincent Validate: Hmmm...I guess I'll just grab a few paper towels to wipe it up and bury them in the trash can before anyone else sees it!

Moderator: Connie Compliance makes a few more notes, thanks Vincent Validate for his time, and then asks Nick Nitpick, her escort, if she can see the QC laboratory. Once inside the labeling/shipping area of the lab, Connie Compliance strikes up a conversation with Lucy Q. See, a lab technologist.

Connie Compliance: Can you describe the final steps of the Lot Release that you use for Bubbly Blood?

Lucy Q. See: Sure. We usually run HIV and Hepatitis assays on our XYZ Analyzer, but the analyzer from the lab next door was down, so we loaned them our XYZ Analyzer.

Connie Compliance: I see. Do they run the tests for you then?

Lucy Q. See: No. Luckily, we had our old QRS Analyzer in storage, so we pulled it out and started using it. We hadn't yet used it for this product though, so we had to tweak the method a lot to finally get it to work.

Connie Compliance: So have you been trained on the new method?

Lucy Q. See: (Looking puzzled) What new method? We're just using a different piece of equipment. Besides, (in a hushed tone) my supervisor poked her head in with her famous last words, "Don't forget the fudge factor of the day is -28 to get the controls to work!" And see this extension cord? Well, I can't help the fact that Marvin Maintenance hasn't come around to cover up the frayed wires hanging out. He says he has been out running from one hardware store to another trying to find those things you call Ground Surge Protectors. We all have bets on who is going to be first to get an electrical shock each time we plug in another piece of equipment!

Connie Compliance: Have you seen the safety training video on "Shocking Experiences"?

Lucy Q. See: (Scratches her head) I don't have the foggiest idea. I don't even remember if I went through any safety training, never mind seeing a video. And do you mean we have to
revalidate the method if we’re just using another piece of equipment? I don’t even know if we still have a calibration group. The comptroller has been going crazy cutting costs until we pass this inspection and get “Bubbly Blood” on the market. Just the other day they asked if we could replace our QA Director and dismiss the Safety Officer, replacing them both with a temporary, and let the temporary go as soon as we passed the inspection. Either that or hire a consulting firm to release Bubbly Blood. Can you believe that? They’d probably close the plant if they could – then we’d really save money!

**Moderator:** Connie Compliance feverishly takes notes, nods her head, thanks Lucy Q. See, and walks with Nick Nitpick into the lobby of Bogus Blood Bank. Connie Compliance asks Nick Nitpick for additional, specific documents and records that she would like to see. She then asks Nick Nitpick if she can meet with senior managers again today, after she has reviewed the documents.

**Your Turn!**

**Questions:**

1. What safety violations did you hear occurring?
2. What cGMP violations were apparent to you?
3. What do you think the subject matter of this afternoon’s meeting with the senior managers is going to be?
4. If you had to pick the worst safety violator, who would you pick and why?
5. Who would you consider to be the worst GMP violator, and why?
6. What do you think the outcome of this inspection will be?
7. If you were the OSHA Compliance Officer, how would you have handled each situation?
Important Information:

*What you need to know to pass an OSHA Inspection*

- Prepare for an inspection ~
  1. Is a warrant needed?
  2. Have equipment to dupe test and photos.
  3. Know of previous OSHA inspections.
  4. Examine credentials of the OSHA Compliance Officer.
  5. Maintenance worker(s) is part of the team.
  6. “Trade Secrets” and confidentiality are to be preserved.
  7. Take the requested documents to the C. E. O.
  8. NEVER ADMIT GUILT!

- What OSHA says you need to do ~
  1. CLEARLY WRITTEN RULES
  2. COMMUNICATE THEM
  3. ATTEMPT TO IDENTIFY (unsafe people or unsafe items)
  4. ENFORCE

- Workplace Violence Warning Signs ~
  1. Veiled Threats
  2. Aggressive Behavior
  3. Conflicts
  4. Weapons
  5. Approving Violence
  6. Desperation
  7. Drug / Alcohol Abuse
  8. Behavior Changes
25 STEPS
TO A SUCCESSFUL
OSHA INSPECTION

1. Select a company representative.
2. Be polite; inspect credentials of the Compliance Officer; ask why.
3. Ask for a warrant if it is company policy.
4. If there is a warrant it will state time limits and ground rules.
5. Discuss ground rules with the C. O.
6. Treat the C.O. with respect but remember he/she is your guest.
7. Do not get too friendly.
8. The opening conference should take about an hour.
9. The C.O. will ask for records ~ you have the right to ask why and refuse if not relevant.
10. State with the inspector at all times.
11. Don’t admit guilt.
12. Be aware of what the C.O. takes notes on.
13. The C.O. can not give employees orders.
14. The C. O. may point out what are believed to be violations ~ never agree that a standard has been violated.
15. Do not engage in idle chit-chat.
16. Do not hesitate to disagree ~ OSHA is not a building code.
17. Few OSHA inspectors are experts on all OSHA requirements.
18. Do not conduct demonstrations for OSHA’s benefit.
19. Employee interviews must not interfere with work.
20. Employees do not have to participate in interviews or tests if they object.
22. Be present during all management interviews.
23. Make note of everything that happens ~ take pictures and tests when they do.
25. Recap and detail dates, names, times, notes, pictures, and recordings.
GOTCHA!

Gotcha! Employees are not cited or fined by OSHA for failure to comply; their employers are!

Gotcha! If a container which should have a label does not, OSHA will generally cite for both no identification label and no warning label. Each citation can carry up to $7,000 in penalties, making that missing label worth a potential $14,000 fine!

Gotcha! Damaged, taped, ungrounded, and misused extension cords are subject to destruction, on the spot, by the inspector! (Power strips with fuses or breakers are not extension cords.)

Gotcha! If an employee is caught not using PPE or using it improperly, that action is covered under 132(f)(3)(iii) and would require retraining before the employee is allowed to return to work, as required by 132(f)(2).

Gotcha! Because .38(a)(1) refers to “fires and other emergencies,” an emergency action plan should consider both interior and exterior actions.

Gotcha! Over-recording (recording incidents which are not recordable) is just as citable as under-recording.
Objectives

- Students will use the reading process effectively.
- Students will construct meaning from a wide range of texts.
- Students will use writing processes effectively.
- Students will create a travel brochure of the human circulatory system.

Standards/Benchmarks

<table>
<thead>
<tr>
<th></th>
<th>LA.A.1.3.1</th>
<th>LA.A.1.3.2</th>
<th>LA.A.1.3.4</th>
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<td>VA.B.1.3.2</td>
<td>VA.B.1.3.4</td>
<td></td>
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</tbody>
</table>

Vocabulary

circulatory system, circulation, blood vessels, carbon dioxide, oxygen, atrium, ventricle, aorta, pulmonary artery, brochure

Presentation

Anticipatory Set/“The Hook”

1. Activate students’ schema and prior knowledge through a whole class discussion about traveling and the importance of travel brochures.
2. Explore print or online resources about the circulatory system with students.
3. Discuss: What would it be like to travel through the human circulatory system as a drop of blood?

Procedures/Activities

1. Direct students to form cooperative groups and inform them that they are going to create a brochure describing a trip through the human circulatory system.
2. In their cooperative groups, students will organize the information from the anticipatory set using a graphic organizer:
   a. List the functions of the human circulatory system.
   b. Trace a drop of blood as it journeys through the 60,000 miles of blood vessels (enough to stretch 2 1/2 times around the earth!).
   c. Locate and label the parts of a heart on a diagram. (Use “Outline of the Heart” in Appendix.)
   d. Identify and describe the function of the different types of blood vessels.
   e. Describe the trip as the heart pumps the blood to the lungs, releasing carbon dioxide and picking up oxygen, then returning to the heart to begin the cycle again.
   f. Explain how the heart beats and provides the impetus for the blood to circulate.
3. Instruct each group to create its brochure.
4. Have each group present its travel brochure to the class.

Authentic Assessment

Create a Circulatory System Travel Brochure.
**Objectives/Standards:**
- The student uses the reading process effectively.
- The student uses listening strategies effectively.
- The student uses speaking strategies effectively.
- The student understands the power of language.
- The student uses viewing strategies effectively.
- The student understands and applies media, techniques, and processes.
- The student creates and communicates a range of subject matter, symbols, and ideas using knowledge of structures and functions of visual arts.

**Benchmarks**
- LA.A.1.3.1; LA.A.1.3.2; LA.A.1.3.3
- LA.C.1.3.4
- LA.C.3.3.3
- LA.D.2.3.1; LA.D.2.3.3; LA.D.2.3.5
- LA.C.2.3.2
- VA.A.1.3.3; VA.A.1.3.4
- VA.B.1.3.2; VA.B.1.3.4

### Activities

**Verbal-Linguistic**
- Daily journal
- KWL (know, want to know, learn) chart about MCBC technology
- Compile a list of interview questions for MCBC guest.
- Write two column notes on guest lecturer.
- Research Bernoulli’s fluid equation.
- Write an explanation of “No Waste Technology.”

**Logical-Mathematic**
- Research and explain: gear ratio, simple machines, and Bernoulli’s fluid equation. Relate Bernoulli’s equation to aerodynamics of flight.

**Visual-Spatial**
- Draw a blueprint of your machine.
- Illustrate Bernoulli’s blood pressure machine.
- Draw “DaVinci-like” sketches of possible inventions.
- Create a poster showing “No Waste Technology.”

**Musical-Rhythmic**
- Create a human machine: each individual part of the machine makes a distinctive sound. The sounds should blend to make a “machine song.”

**Interpersonal**
- As a group, develop scenarios of possible needs met by a futuristic machine.
- Brainstorm reasons for calling platelets “liquid gold.”

**Intrapersonal**
- Write the technological description of your invented machine.
- Summarize the purpose of each machine in the blood center.
- Keep a journal as if you were Leonardo Da Vinci.

**Bodily-Kinesthetic**
- Create a human machine: join together with a small group. Each person is a moving part of a machine. Work together to move around the room.

**Naturalist**
- Depict the effect of a technological advance on nature (e.g., strip mining, atomic bomb nuclear devices). Explain the ethical use of that invention.

### Vocabulary
apheresis, centrifuge, components, “liquid gold”
Cobe® Spectra™
Cobe® Trima™
**Presentation**

**Anticipatory Set/“The Hook”**
Use a container of Italian salad dressing to show mixed components (shaken), then let it settle to show separation of the components. **Discuss:** If a blood donation were left alone in the refrigerator, the components would separate themselves. The blood center has centrifuge machines that spin the blood. This speeds up the process. So, the heart is more than a pump– in keeping your blood in motion, it also prevents your blood components from separating. Also discuss the work of gravity in the separation process.

**Procedures/Activities**
1. **Discuss:** No waste technology.
   Interview determines donor suitability: acceptance or deferral. During a “whole blood” donation, part of the mini-physical is to determine suitability: finger stick– this is an iron level check. There must be enough hemoglobin in the blood to donate.
   One who is volunteering to donate platelets only (called the Apheresis process) must not only pass the finger stick test as described above, but his/her platelet count must be at or above 150,000. This is measured in the Hemocrit testing (See page 17 of the Learning Guide).
   Platelet donors are hooked up to a machine called the Cobe® Spectra™. It takes 10 whole blood donors to give the same amount of platelets as one Apheresis donor. Platelets are called “liquid gold” in the blood banking industry. This is such a precious gift, particularly for cancer patients.
   The highest technology right now is the Cobe® Trima™ Collection System. This machine is unique since it can be programmed to collect more than one component at a time. One donor, depending on his/her blood levels, may donate 2 or 3 components (e.g., a bag of platelets, a bag of red blood cells, and a bag of plasma).

2. **Guest Lecture:** Manatee Community Blood Center staff. (Donation video of apheresis and whole blood processes may be shown.)

**Unit Culminating Event**
Students present their work from the unit in a fair environment.
COBE® Trima™ Automated Blood Component Collection System
**A New Way To Donate... Trima™**

**MAKE THE MOST OF YOUR DONATION**

**What is Trima™?**

When patients are requiring blood transfusions, physicians tend to order just one blood component such as platelets, red cells or plasma. Trima™ is a new technology that allows for the simultaneous collection of platelets, red cells and plasma.

**What happens when I donate using Trima™ technology?**

After the medical screening, the operator will request your height, weight and possibly blood type. This information along with your hematocrit and platelet count will be entered into the system. The system will automatically determine the components that are most needed and can be safely donated.

During the process, blood is drawn from your arm and channeled through continuous, sterile, single use tubing to an automated system. Trima™ will separate and collect the needed component(s) and then safely return the remaining components. Also, the procedure uses a small, single needle which is more comfortable for the donor.

**How do you decide which blood component(s) are needed?**

The Trima™ technology allows your blood center to prioritize collection procedures based on local patient needs. Generally, blood centers will prioritize their procedures based on their inventory needs, blood types and donor physiology.

**How long does the procedure take?**

Since the donations are based on individual donor information (height, weight, and blood counts) the collection times vary. If you have limited time, the system can calculate what products can be collected during that time.

**How often can I donate?**

Because components are replenished differently in the body, donation frequencies vary. Below are our donation frequency rates by component.

<table>
<thead>
<tr>
<th>Component</th>
<th>Frequency Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platelets</td>
<td>Every 2 weeks, up to 24 times a year</td>
</tr>
<tr>
<td>Single red cell</td>
<td>Every 8 weeks, up to 6 times a year</td>
</tr>
<tr>
<td>Two red cells</td>
<td>Every 16 weeks, up to 3 times a year</td>
</tr>
<tr>
<td>Plasma</td>
<td>Every 4 weeks, up to 12 times a year</td>
</tr>
</tbody>
</table>

**Is the donation procedure safe?**

Yes, Trima™ utilizes a continuous, sterile, single use tubing set. Your blood doesn’t come in contact with the machine. Our primary concerns are donor safety and comfort.

**How do my component(s) help patients?**

By donating component(s) via Trima™, you are ensuring that patients are receiving a "full and consistent" dose. This means you are donating the quantity needed to give the minimum benefit of that component to the patient. For example, it takes on average eight whole blood donors compared to one Trima™ donor to provide an effective dose of platelets to a patient. By donating components, you are reducing the number of donor exposures, which in turn is safer for the patient. Multiple donor exposures can increase the risk of transfusion reactions.

**THANK YOU!**
~ CELEBRATION ~
MY BLOOD, YOUR BLOOD ~ MY LIFELINE, YOUR LIFELINE

My Blood, Your Blood: CULMINATING ACTIVITY

Materials / Equipment ~

♦ Use of gymnasium, cafeteria, or other large area
♦ Video equipment for playing authentic products
♦ Tables, walls, areas for display
♦ Sound system for announcements and introductions
♦ Red and white food samples (e.g., white cupcakes with red hots)
♦ Paper plates and cups, napkins, plastic utensils
♦ Yellow punch
♦ Outline of human body on floor in tape for “Mega-Animated Lifeline”

Procedures ~

1. Convene class representatives for planning.
2. Divide responsibilities for:
   ➢ permissions
   ➢ media releases
   ➢ invitations
   ➢ publicity
   ➢ guests
   ➢ food
   ➢ displays
   ➢ AV equipment
   ➢ videotaping performances
   ➢ duplicating tapes to give away or keep in library for reference
   ➢ communication
   ➢ setup, takedown, cleanup
   ➢ thank you notes

3. Guests circulate, viewing displays and videos.
4. Guests interview characters about history, careers in blood banking industry, and information on healthy practices.
5. Everyone stops to watch the “Mega-Animated Lifeline.”
6. All join hands and “circulate” for the finale.
7. Evaluate the celebration!
### Activities and Displays ~

<table>
<thead>
<tr>
<th><strong>Verbal-Linguistic</strong></th>
<th><strong>Logical-Mathematical</strong></th>
<th><strong>Visual-Spatial</strong></th>
<th><strong>Musical-Rhythmic</strong></th>
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</thead>
<tbody>
<tr>
<td>1. Video</td>
<td>1. Prove, statistically, the value of the blood bank.</td>
<td>1. Illustrated glossary</td>
<td>1. Mega-Animated Lifeline</td>
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<tr>
<td>5. Annotated bibliography</td>
<td></td>
<td>5. Blue prints</td>
<td>5. Jingles</td>
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<table>
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<th><strong>Interpersonal</strong></th>
<th><strong>Intrapersonal</strong></th>
<th><strong>Bodily-Kinesthetic</strong></th>
<th><strong>Naturalist</strong></th>
</tr>
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</table>
# Interdisciplinary Thematic Individual Lesson Plan
## Middle School Level

### Objectives
- Students will use writing processes effectively to communicate ideas and information.
- Students will create various works of art for marketing and recruitment purposes.
- Students will know how to use effective communication skills that enhance health.

### Standards/Benchmarks
- LA.B.1.3.1; 1.3.2; 1.3.3; 2.3.2; 2.3.3.
- LA.C.3.3.3.
- LA.D.2.3.4.
- HE.B.3.3.5.
- HE.C.1.3.2.
- VA.A.1.3.1; 1.3.2; 1.3.3; 1.3.4.
- VA.B.1.3.1; 1.3.2; 1.3.3; 1.3.4.

### Materials/Equipment
- Poster board, pencils, markers/paint, home-room sign-in sheets and PSA (Appendix), VCR.
- From MCBC: posters/flyers, donor signup sheet, evaluation form, pizza and soft drinks (if there is a competition).

## Presentation

This blood drive could piggy-back an established blood drive at your school. (Please contact your school chairperson to determine how the students could be involved in planning and recruiting.) Or, if your school does not currently sponsor a blood drive, your school will need a primary contact (chairperson) for communication with the blood center.

### Anticipatory Set/“The Hook”
**In cooperative groups:** Instruct students to compose a rap/poem, focusing on the organizing idea, *My Blood, Your Blood: My Lifeline, Your Lifeline*, to be performed and video-taped for viewing on the last day of this unit. Inform students that their intended audience is perspective blood donors.

### Procedures/Activities
1. Contact MCBC to set up a blood drive date and time.
2. Students create recruitment / marketing plan, e.g., posters, handouts, press release; ways to reach parents, teachers, neighborhood, etc. Discuss slogans, or see your blood drive chairperson.
3. Students may do their recruitment work on their own time; then post/distribute products with the permission and/or help of the blood drive sponsor. Contact local hospitals and/or doctor’s offices for permission to hang posters. Contact local newspapers and/or educational TV for announcements and press releases. *(Note: May want to have a school-wide or grade-level poster event.)*
4. Recruitment Competition: Create a school-wide or grade-level competition. Students could have the donors they recruit sign in under their homeroom teacher’s name. The class that recruits the most blood donors could win a pizza lunch! *(Contact MCBC—we may be able to provide pizza and drinks.)*
5. The day of the blood drive, selected students could volunteer to assist the blood center staff (distributing food and drinks in the canteen).

**IDEA:** Have a competition with another middle school in the county!

### Vocabulary
- Recruitment
- Marketing
- Blood donor
- Blood drive
- Canteen

### Authentic Assessment
- Students will write an editorial essay describing their marketing/recruiting experiences and will address how their efforts made a difference.
- Students will create an ad to accompany their essays.

### Great Ideas/Improvements

---

60
Teacher Evaluation of *My Blood, Your Blood Interdisciplinary Thematic Unit*

**Middle School Version**

Name: _______________________________  Date: ___________________

School: _______________________________  Subject: _________________  Grade: _______

*The thematic unit plans were written with the help of a grant from America’s Blood Centers Foundation. 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 information included in the Appendix 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.
Journal Writing Prompts

1. When you become eligible at age 17, will you donate blood? Why or why not?
2. Name as many ways as you can that the word heart is used in the world.
3. Platelet is to clot as _______ is to _______. Write five more analogies.
4. Pretend that you are a hematologist / immunologist and just discovered a cure for the AIDS virus. Describe your feelings and ideas about this discovery.
5. What part does the cultural heritage or environment of the inventor play in his/her discovery or invention?
6. Predict: In the year 2101, what will be the community function of the blood banking industry?
7. The tubes through which the blood travels away from your heart are called arteries. The tubes that carry blood back to your heart are called veins. The smallest tubes that carry blood and are responsible for the gas exchange in the body’s cells are called capillaries. Name as many other tubes you can think of and their purpose.
8. Choose a blood component. Draw a cartoon of that component at work in the body.
9. Name the four blood components and the way that each functions in the body.
10. Blood is a renewable natural resource. What is its role in sustaining life processes?
11. List items and/or structures relevant to the blood banking industry.
12. Make a cluster map or flowchart about organizing a blood drive.
13. Pretend that you are a blood drive chairperson for an organization in which you are involved (e.g., a church, club, or business). Describe where you are holding the blood drive and how you will recruit donors.
14. Your best friend has leukemia or severe sickle-cell anemia. How will you help him or her continue to feel a part of the community?
15. How has our culture influenced the way you think about blood diseases and donating blood?
16. Draw a picture of your biggest fear that could keep you from donating blood.
17. Imagine that you are the Manatee Community Blood Center building. In the course of one day, what people may enter your life and what problems and solutions might occur?
18. Describe the impact of the blood banking industry on healthcare.
19. In what ways has technology changed the blood banking industry?
20. What might happen if blood centers did not have regulations on collecting, testing, separating components, and hospital delivery of blood units?
21. Sketch a design to build a blood center that would allow the necessary functions to be performed smoothly.
22. Pretend you are retired. How would you prioritize the use of your time and money in volunteer work and/or charitable contributions?
23. Compose a poem or rap to encourage blood donation.
24. Compare and contrast your perceptions of blood prior to this unit with today’s perspective. Construct a Venn Diagram to show what is the same and what has changed.
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.

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

5. Then, the blood is used for those who need it.
The Path of Blood

- Capillary
- Artery
- Vein

I travel all this way just for you!
Outline of the Heart

- From Body
- To Body
- Veins
- Left Atrium
- Right Atrium
- Right Ventricle
- Left Ventricle

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>
</tr>
</thead>
<tbody>
<tr>
<td>O+</td>
<td>1 in 3</td>
</tr>
<tr>
<td></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>
</tr>
<tr>
<td></td>
<td>This is a fairly rare blood type, occurring in only 7% of the population. O negative is known as the Universal Donor; 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>
</tr>
<tr>
<td></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>
</tr>
<tr>
<td></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>
</tr>
<tr>
<td></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>
</tr>
<tr>
<td></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>
</tr>
<tr>
<td></td>
<td>This is a rare blood type, occurring only in 3% of the population. Persons with AB positive blood are known as Universal Receivers, 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>
</tr>
<tr>
<td></td>
<td>This is the rarest blood type. Only ½ % 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>

If you have…  You can receive…

<table>
<thead>
<tr>
<th>Blood type and Rh factor</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>
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.
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.

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.
## 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>90</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.
Idiomatic Expressions

Valentine's Heart

Cold Blooded

Heavy Hearted

Red As A Beet

Sweetheart

Blue Blooded

Big Hearted
Idiomatic Expressions

Heartbroken

Hearts and Flowers

Heart to Heart

Blood Curdling Scream

Blood Bath

Wear your heart on your sleeve

Blood Brothers
# ACRONYMS

1. **AABB**  
   American Association of Blood Banking
2. **ABC**  
   America’s Blood Centers
3. **AHCA**  
   Agency for Health Care Administration (State of FL)
4. **AIDS**  
   Acquired Immunodeficiency Syndrome
5. **BBP**  
   Bloodborne Pathogen
6. **BMW**  
   BioMedical Waste
7. **CBER**  
   Center for Biologics Evaluation and Research
8. **CCBC**  
   Council of Community Blood Centers
9. **CDC**  
   Centers for Disease Control
10. **CDCP**  
    Centers for Disease Control and Prevention
11. **CFR**  
    Code of Federal Regulations
12. **CLIA**  
    Clinical Laboratory Improvement Amendment
13. **EPA**  
    Environmental Protection Agency
14. **FBS**  
    Florida Blood Services (St. Petersburg)
15. **FDA**  
    Food and Drug Administration
16. **FD&C Act**  
    Federal Food, Drug, and Cosmetic Act (1938)
17. **GMP**  
    Good Manufacturing Practices (cGMP – current GMP)
18. **HAZCOM**  
    Hazardous Communication
19. **HBV**  
    Hepatitis B Virus
20. **HCFA**  
    Health Care Finance Administration (State of FL)
21. **HCV**  
    Hepatitis C Virus
22. **HIV**  
    Human Immunodeficiency Virus
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<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>
</tbody>
</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

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
www.fda.gov
www.innerbody.com
www.lurenemcdaniel.com
www.manateeblood.org
www.osha.gov
www.pc.collegestation.isd.tenet.edu/heart.html/
www.readersdigetskids.com
www.teachers.net/lessons/posts

**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

**CuriosHeart.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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8


K-2


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