Course/Subject: Science  
Grade(s): 7  
Teacher(s): JoEllen Niedeck

Topic/Title: Circulatory System

Length of Time for the UbD Unit: 4 - 5 weeks

Date the unit was reviewed by the UbD Team: March 22, 2004

Summary of the Unit:
The purpose of this unit is to guide students to further their understanding of the circulatory system’s function and help them gain awareness of lifestyle choices that maintain the health of the system. This unit is taught following other units on human body systems, specifically in 7th grade the muscular, skeletal, and respiratory systems. Differentiation of learning is included by allowing students to choose from a “menu” of activities, designed with consideration of learning modalities. The unit also includes a lab that illustrates diffusion, the process by which molecules move in and out of the blood stream. One performance task, the creation of a children’s book, comic strip or play about the circulatory system, allows for differentiation based on student choice. The other performance task is a multi step assignment that culminates in a group presentation on diseases and actions that affect the health of the system. The later task includes a research component, using the internet, that is differentiated according to student readiness. Technology is also included through an instructional video, a student created power point presentation, and video taping of student presentations. Students will be expected to self assess both of the performance tasks, and to assess their peers in the group presentation.

Standards

Connecticut Curriculum Science Framework: Draft as of 2004

<table>
<thead>
<tr>
<th>Number</th>
<th>Content Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.5</td>
<td>Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.</td>
</tr>
<tr>
<td>7(f)</td>
<td>Explore the structures of the human digestive, respiratory, and circulatory systems and describe how they function to support life.</td>
</tr>
<tr>
<td>SRC 6-8.2</td>
<td>Science literacy includes speaking, listening, presenting, interpreting, reading and writing about science.</td>
</tr>
<tr>
<td>Regional curriculum</td>
<td>The specialized cells and organs of the circulatory system function to transport needed nutrients to and remove waste products from our cells. A healthy circulatory system is essential for good quality of life.</td>
</tr>
</tbody>
</table>
Understanding by Design “Unit Template

**Enduring Understandings**
*(Students will understand that...)*

<table>
<thead>
<tr>
<th>Identify Topic(T) or Overarching(O).</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The parts of a system are interdependent. (O)</td>
</tr>
<tr>
<td>2. The form of our body parts is suited to their function. (T)</td>
</tr>
<tr>
<td>3. The proper functioning of the circulatory system is essential to our good health. (T)</td>
</tr>
<tr>
<td>4. Our choices can impact the health of the circulatory system. (T)</td>
</tr>
<tr>
<td>5. The process of science includes communication. (O)</td>
</tr>
</tbody>
</table>

**Essential Questions**
*(Open-ended significant questions related to the Enduring Understandings.)*

| 1. Why do I need a circulatory system? |
| 2. What is the worst type of damage that could happen to my circulatory system? |
| 3. How does the shape of the circulatory system relate to its function? |
| 4. Why do students need to know how their lifestyle affects the health of their circulatory system? |
| 5. In what ways are the parts of the system interdependent? |
| 6. Where would we be if scientists didn’t communicate? |

**Key Elements: Important Vocabulary, People, Terms, etc.**

<table>
<thead>
<tr>
<th>Circulatory system</th>
<th>Red blood cell</th>
<th>Ventricle</th>
<th>Pathogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular</td>
<td>White blood cell</td>
<td>Pulmonary circulation</td>
<td>Cholesterol</td>
</tr>
<tr>
<td>Artery</td>
<td>Plasma</td>
<td>Systemic circulation</td>
<td>Pulse</td>
</tr>
<tr>
<td>Vein</td>
<td>Platelet</td>
<td>Diffusion</td>
<td>Blood pressure</td>
</tr>
<tr>
<td>Capillary</td>
<td>Atrium</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Knowledge—Students will know...**

- That the circulatory system is responsible for transporting oxygen, nutrients and waste products through our body.
- That the proper functioning of each part is necessary for the circulatory system to function properly.
- The names and functions of blood vessels, parts of blood, and chambers of the heart.
- Examples of diseases or activities that may damage the system.
- The relationship between circulatory, respiratory and digestive systems.

**Skills—Students will be able to...**

- To produce a comic, story or play about the circulatory system.
- Demonstrate an understanding of the relationship of the form to the system’s function through written communication.
- Compare and contrast a model of the process of diffusion to what happens in the circulatory system.
- Use the internet to research a circulatory health topic.
- Communicate about personal actions that can promote the health of the system using power point.
Assessment with a Detailed Description
All performance assessments will be graded using a specified set of criteria known to students.

Content Standard(s):
CT science 7.5 Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.
7(f) Explore the structures of the human digestive, respiratory and circulatory systems and describe how they function to support life.
SRC 6-8.2 Science literacy includes speaking, listening, presenting, interpreting, reading and writing about science

I. Performance – Based Assessment:
Students will prepare a story book, comic strip or play about the circulatory system that is suitable for younger students. The product must tell the story of a blood cells trip through the body and include all parts of the system, the pickup and delivery of oxygen and nutrients by the blood and the entry of a pathogen into the blood stream.

Rubric for Circulatory Story Assessment
Possible Scores:
4 = WOW, complete and accurate
3 = Complete and accurate except for a few minor mistakes or omissions
2 = Majority of requirement is met; mistakes and omissions do not indicate a major misunderstanding.
1 = Omission or error that indicates lack of understanding of requirement.
0 = requirement not included.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project shows or tells about:</td>
<td></td>
</tr>
<tr>
<td>Path of blood through the four chambers of the heart and all three types of blood vessels.</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>The sights, sounds and sensations a blood cell would experience traveling through the system.</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>The form and function of both types of blood cells.</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>The form and function of plasma and platelets.</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>Where and how oxygen enters the bloodstream</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>Where and how nutrients enter the bloodstream</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>That oxygen and nutrients are delivered to and waste is removed from cells.</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>The entry of one pathogen into the bloodstream and the blood’s defense against it.</td>
<td>4 3 2 1 0</td>
</tr>
</tbody>
</table>
### Mechanics - 20%

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least 8 settings/scenes are included</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>The project shows care in construction. Illustrations are neat, writing is legible.</td>
<td>4 3 2 1 0</td>
</tr>
<tr>
<td>Writing uses correct spelling and grammar.</td>
<td>4 3 2 1 0</td>
</tr>
</tbody>
</table>

Content Standard(s):
CT standards: 7(f) Explore the structures of the human digestive, respiratory and circulatory systems and describe how they function to support life.
SRC 6-8.2 Science literacy includes speaking, listening, presenting, interpreting, reading and writing about science.

II. Performance – Based Assessment:
Students will write an article that reviews and highlights information presented by the entire class. In preparation for this, students will work in groups and as a class to produce a video in the style of a television show, which may be given to the public access station for broadcast. The name of the show will be the “Health Forum” and the topic of this week’s episode is health of the circulatory system. This task has several components.

- Students are grouped to find out about one specific disease or health risks to the circulatory system. The list should include, but need not be limited to, heart attack, strokes, diet, smoking and sedentary lifestyle. Each member of the group will get a specific research assignment pertinent to their topic. These topics could include cause, treatment, affects, data and recommendations from current research. This individual assignment provides an opportunity to differentiate based on student ability.
- The student groups compile their information to prepare a presentation that includes a power point as the visual aid for their portion of the health forum.
- Students present their presentations, which are video taped.
- Class as a whole will view completed video and perform peer assessment.
- Individual Students will write an article about the show for the school paper that includes the 5 pieces of information they felt to be most important.

Rubric for Performance-Based Assessment - Include here or attach at the end.
To be completed by August 29, 2004.

Other Assessment Evidence: (Tests, quizzes, self-assessment, peer-assessment, etc.)

- Completion of one task from each row on the differentiated learning activity grid.
- Analysis of diffusion lab
Library and Technology Skills: If appropriate summarize how library and technology skills are integrated within the unit and how you are collaborating with library and technology staff to plan and implement the unit.
- Research on health issue using internet and library resources.
- Student creation of power point.
- Video taping of student presentations.

Connection to the CMT/CACT: This unit addresses the following CMT/CACT objectives.

Conceptual Understanding and Application of Scientific Knowledge
Interpret and communicate scientific information using words.

Human Biology
16. Students understand the healthy functioning of the human body and how environmental conditions, nutrition, physical activity and pathogens affect its functioning.
17. Describe the structure and function of the major human organ systems.

Learning Activities with a Detailed Description

Hook: Mini-lab where students observe the affect of exercise on heart rate. Most students will know that heart rate increases- but can they explain why? This question is posed and discussed at the end of the activity.

Note: Activities related to the CMT/CACT are noted with an asterisk *

Sequence: List activities below and/or attach a daily activity chart

1. Read sections in text on circulatory system and answer guided reading questions.*
2. Post and discuss first and third essential questions.
3. Watch Bill Nye video and answer questions*
4. Diagram the flow of blood through the heart, using a picture of cross section of heart and colored pencils to show oxygenated and deoxygenated blood*.
5. Observe/dissect beef heart*
6. Observe prepared microscope slide of blood cells*
7. Blood typing lab activity* - Ward’s Natural Science
8. Diffusion lab activity* - Ward’s Natural Science
9. Group creation of concept maps that show connection between respiratory, digestive, circulatory systems and cellular respiration.*

10. Peer review of circulatory story plan*

11. Post second and fourth essential questions. Class discussion on heart disease. Student sharing information about family members, friends or others they know who have experienced some form of heart disease.*

12. Overview of research sources relevant to health of circulatory system.

**Resources**

**Text:**

**Videotapes, DVDs or Films:**
The Circulatory System, Bill Nye video

**Software:**
Microsoft PowerPoint

**Lab Materials**
Ward’s Natural Science, Wardsci.com

**Internet Sources with addresses and full title of the site:**
Pathfinder fact file
http://infozone.imcpl.org/kids_circ.htm

Franklin Institute
http://sln.fi.edu/biosci/heart.html

Nova – Human heart
http://www.pbs.org/wgbh/nova/heart/

Kid’s health
http://kidshealth.org/kid/body/heart_SW_p4.html

Body on line (view cardiovascular system)
http://www.innerbody.com/htm/body.html
Human body adventure
http://vilenski.org/science/humanbody/hb_html/circ_system.html

Flow of blood
http://science.howstuffworks.com/heart3.htm

Attached Supporting Materials

1. Task Grid for Learning Activity
2. Peer Check List
**Circulatory Task Grid Instructions**: Complete one of the options (A, B or C) in each row.

<table>
<thead>
<tr>
<th>OPTIONS Requirements</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify the parts of the Circulatory System.</td>
<td>Create a labeled drawing of each part.</td>
<td>Write a sentence for each part. The sentence must demonstrate an understanding of the part’s definition.</td>
<td>Create an accurate concept map that includes all the parts and has labeled connecting arrows.</td>
</tr>
<tr>
<td>2. Describe their functions.</td>
<td>Write a help wanted ad that includes a detailed job description for each of the parts.</td>
<td>Create an analogy of the circulatory system to a town – What people and/or places would the parts compare to? Communicate your analogy in writing, pictures or make an appointment to do it verbally (have note cards with prompts prepared)</td>
<td>Create 3 Venn diagrams to compare and contrast the following. Be sure to include functions: • Types of blood vessels • Parts of the blood • Left and right side of the heart</td>
</tr>
<tr>
<td>3. Identify patterns in the system.</td>
<td>Draw a graphic organizer that shows the path blood follows in its journey through the body.</td>
<td>Create a mnemonic phrase for the paths of blood through the body.</td>
<td>Write directions for a new red blood cell on its first trip through the body.</td>
</tr>
</tbody>
</table>