Title: Stayin’ Alive!

Unit Description:

The purpose of this unit is to allow students to explore the interactions between the circulatory and respiratory systems, and their importance within the human body. The driving question used for this unit will be "Is it more important for our hearts to beat or for our lungs to breathe?" The ultimate goal will be for students to realize the interdependence of these two functions, and their role in keeping humans alive and healthy. Throughout the study of the human body, connections between all organ systems will be made, since research shows that learning is more meaningful when bridges are created between topics than in learning the concepts in isolation.

Emphasis will be placed on the importance of knowledge of the human body as an essential life skill for all citizens, since it will be relative to all people throughout their lives. It is also intended that students will link together the information learned in this unit with their studies from the beginning of the year, including the characteristics of living things and cellular function.

Students will conduct independent research on various topics, such as life-saving techniques related to circulatory and respiratory function, the health of these systems, etc. In class, students will investigate the parts of the systems, including observing blood and calf hearts, and conducting experiments on the relationships between lung capacity, pulse, and exhalation rate. Reading, writing, and online activities will also enhance the learning of this topic.

Unit Enduring Understandings:
1. All organ systems of the human body are interdependent upon one another, and have specific purposes to maintain the body.
2. Cells are the basic unit of structure & function in all organ systems.
3. Interactions between cells, tissues, organs and organ systems are the reason our bodies stay healthy and function normally.

Unit Essential Questions:
1. Is it more important for your heart to beat or your lungs to breathe?
2. How do the circulatory and respiratory systems support the human body?
3. How do the circulatory and respiratory systems function together?
4. Why are blood and oxygen important to us?
What students will need to know and be able to do (knowledge and skills):

✓ The heart is the center of the circulatory system and pumps blood throughout the body.
✓ The alveoli in the lungs are the sites of the transfer of oxygen and carbon dioxide molecules to/from the blood.
✓ The diaphragm facilitates inhalation and exhalation.
✓ The trachea and bronchi are tubes that filter air prior to entering the lungs.
✓ The blood is the transportation system for many of the nutrients and wastes needed or created by the body’s cells.
✓ Oxygenated blood travels through the arteries, and deoxygenated blood travels through the veins.
✓ Blood pressure is determined by how well the heart pumps blood, which directly affects how well materials travel through the body.
✓ Blood is made of plasma, red cells, white cells, and platelets.
✓ Plasma contains nutrients which travel to cells through lymph.
✓ Red cells carry oxygen and carbon dioxide.
✓ White cells fight diseases.
✓ Platelets clot wounds.
✓ The health of the circulatory and respiratory systems can be measured by vital signs, such as pulse, blood pressure, exhalation rate, and lung capacity.
✓ Diseases with the circulatory system affect the respiratory system, and vice versa.
✓ Blood type is determined by markers on the red blood cells, and is essential factor in receiving blood from a donor.
✓ Without oxygen and nutrients, cells cannot create energy; therefore, they cannot survive.
✓ Materials move in and out of cells through the process of diffusion.
✓ Red blood cells do not live long, and new ones are constantly created in the bone marrow.

What do students typically misunderstand?

✗ Blood does not travel from the heart to the lungs.
✗ Blood is not contained in vessels; rather, it flows openly throughout the body.
✗ One blood cell travels through all veins and arteries in the body prior to returning to the heart.
✗ Air tubes carry air to the body’s cells.
✗ Blood is created in the heart.
✗ The heart is completely hollow, without chambers.
✗ Blood, itself, is vital to life. (as opposed to the materials the blood is carrying)
✗ Nutrients and oxygen “ooze” into a cell.
**Stage 2: Determine Acceptable Evidence**

**Title:** Body Business Plan

**Goal:** Understand the importance of the heart and lungs in the body.

**Role:** Each student is the CEO of the body, the brain. They will make the decision for the final budget plan for the body.

**Audience:** The audience will be the body council, including representatives from all organs of the body.

**Situation:** As the brain of the body, the student has the decision of allocating $1 million dollars between the heart and the lungs. Based on their importance in the body, students must decide how much of the money each organ will receive. The money may be completely designated to one organ, or may be divided in some way between the two.

**Product:** An address to the company in the form of a letter will be written by each student to justify the decision. Also, a graphic organizer will be provided to show the allocation of the budget between the heart and lungs.

**Standards:**

**COMPANY LETTER:**

**INFORMATION:**
The letter describes the evidence that was used to make the decision. The letter must accurately address both organs and their functions within the body.

**ORGANIZATION:**
The letter is written using proper English, and is organized in a manner that is easy to understand and has flow.

**GRAPHIC ORGANIZER:**

**INFORMATION:**
The organizer contains accurate information in a clear fashion.

**ORGANIZATION:**
The organizer is neatly arranged in a way that clearly shows the outcome of the budget decision. It should contain a few sentences to summarize the final judgment.

**TECHNOLOGY PRESENTATION:**
The organizer should be created using a computer program, such as Word or PowerPoint, should be neatly done, and words should be easy to see and read.
Preconceptions Assessment:
1. How does oxygen get to a cell in the body? How does it get into a cell?
2. Draw a picture of a cross-section, or the inside, of the heart.
3. Does blood go to the lungs? Why or why not?
4. Where is blood made?
5. Why is blood important?
6. Draw a flow chart to show all the stops a drop of blood makes on its travels.

Quizzes, Tests, and Academic Prompts:
Students will take quizzes to assess their knowledge of the vocabulary associated with the topic.
Students will take tests to demonstrate their understanding of the functions of the heart and lungs.
Students will create a presentation based on their group assignment (maintenance of organs, life-saving techniques, etc.) to answer the driving question “Is it more important for the heart to beat or the lungs to breathe?”
Students will perform lab activities to measure the relationships between pulse, blood pressure, lung capacity, and exhalation rate.
Students will view blood cells and calf hearts.

Other Evidence:
Students will record evidence they learn in their “company” notebooks.
Students will submit writing samples periodically to show their knowledge of the topic.
**Stage 3: Plan Learning Experiences, Instruction, and Resources**

**Where are they headed and why?**
Begin by reviewing the six characteristics of living things. Remind students that the purpose of studying the human body is to understand what keeps us alive. Two functions of the body that keep us alive are our heart beat and our breathing. Introduce the driving question for the unit "Is it more important to breathe or have a heart beat?" Conduct the preconceptions assessment.

**Hook**
Present the rubrics for the Body Business Plan and the presentations for the groups that will research topics for the driving question (see last pages). A class discussion will provide ideas for concepts to investigate to determine the answer to the driving question. Final groups should incorporate some of the ideas from the discussion, but should ultimately consist of these: life-saving techniques, respiratory and circulatory disorders, and keeping your heart and lungs healthy.

**Experience**

*Online Heart Transplant & associated teacher-developed questions:*
http://www.pbs.org/wgbh/nova/eheart/transplantwave.html - completed independently at home

*Calf Heart Dissection: Teacher will dissect, and students will draw and label parts while investigating the chambers and vessels.*

*Online Sheep Heart Dissection - http://www.zerobio.com/videos/sheep_heart_anatomy.html* - Use with the Calf Heart to show the differences and similarities between the two.

* Vital Signs Experiment: Students will test lung capacity, carbon dioxide exhalation and pulse and blood pressure to research the correlation between them. A lab report will be written at the conclusion of the tests.

* Microscope Slides - Students will investigate what blood looks like by viewing prepared slides under the microscope.

* I Am Joe’s Heart and Lung articles – Describe the functions of these organs from first person of the organ. Students should identify key words in the articles.

* Hollywood or Hospital activity – determine if patient would survive a blood transfusion based on blood type combinations.

* Blood typing simulation – determine which blood types can mix, and which cannot

* Blood-letting – read story about blood-letting – displays the importance of blood
* Emphysema description – read brief description of emphysema – displays the importance of lungs

* Red Gold – Journey of Blood – information about blood
  http://www.pbs.org/wnet/redgold/journey/index.html

* Review of Diffusion Labs – egg in various liquids – Students will review exemplar lab report conclusions which described the process of diffusion on a cell. This will remind students how materials transport in and out of the cell.

* Pump Your Blood song – reviews, generally, the path of blood through the body – Singing this song every three days allows students to remember the path easily.

* Blood recipe – Using everyday items to represent the parts of blood and mix them together.

* Online pictures of cardiovascular & respiratory systems:
  http://www.nucleusinc.com/animation2.php - Can be used to show what the organs of the system look like – animations and illustrations

* Animation of Lymph Node inflammation:
  http://www.umm.edu/patiented/articles/lymph_nodes_animation_000486.htmj - Displays what “swollen glands” are

* Brain Pop videos on blood, lungs, and heart – reviews functions of the circulatory and respiratory systems

* Super Healers site: http://www.smm.org/tissues/healers_intro.php - reviews the functions of blood components

* Review of bone marrow – remind students where red blood cells are created (previously discussed in bone chapter)

* Web pictures of lungs – healthy vs. unhealthy lungs, animation of lung irritants and reaction by body

* Research & presentations of group information on driving question topics – Reserve the computer lab one day for groups to find and print research. Students should review the research for homework, and present their findings in class. Any additional research will be conducted at home.
Reflect
Students will keep “company” journals as they learn information relating to the driving question. They will also record important ideas from other groups which will help them determine which system is more vital to the body – circulatory or respiratory. Twice during the group projects, students will write a reflection paragraph to evaluate how well their project is progressing. Prior to the exhibit portion of the project, select answers from the preconception assessment will be presented to students. They will briefly respond to each preconception assessment question by listing the reasons why they believe average citizens and fellow students do/did not understand the correct responses.

Exhibit
Students will choose three of the preconception assessment questions and create a 8 ½ x 11 inch sign informing others of the truthful answer to it. These posters will be displayed in the hallway, and the most effective answers of each will be scanned and attached to the teacher’s eBoard website. Students will also take a traditional assessment to practice responding to the facts in the enduring understandings as well as the “What students will need to know” statements. This assessment will help students to prepare for the cumulative multiple-choice final exam at the end of the year.
Rubric for Lab Reports

1 point  Title – must be appropriate, creativity is encouraged!

2 points  Purpose – must be clearly written in statement form

4 points  Hypothesis – 2 points for clarity, 2 points for being based on past knowledge, experience and/or observations

2 points  Materials – must be complete

3 points  Procedure – must be numbered & complete – unless you created the procedure, you need only write “See lab instructions” or “See page … in the textbook”

10 points  Data – 4 points for having complete information, 3 points for organization, and 3 points for appropriate labels on all parts – all graphs must be created using Microsoft Excel

Illustration (when appropriate) – title of what the illustration shows, labels on all parts

13 points  Conclusion
4 points for stating what happened (relates to the purpose)
5 points for explaining whether or not the hypothesis was supported and what led you to decide that it was or was not supported
4 points for stating what was learned, or describing patterns, or comparing to others’ results – try to include all of these

5 points  Application – Give an example of how you can use the information or skills in real life, an invention that could be created using what you learned, or how you might use what you learned to explain how something else works

3 points for having a specific example,
2 points for having an appropriate example

Theory guides, experiment decides.
~Unknown
Remember:
When writing your lab report, keep in mind that the purpose of the report is to inform any reader about what you did and what you learned from your experiment. For example, your social studies teacher should be able to clearly understand how you conducted the lab, and the results you discovered, even though he was not in the class at the time of the experiment. This is your chance to show the world what you know, and prove that you are a true scientist!

Basic steps – How to create an XY scatter plot in Excel
1. Enter one set of values in column A, starting with rows 1, 2, 3…
   Enter the other set of values in column B the same way.
2. Click on Insert, then Chart.
3. Click on XY scatter, then “Scatter with data points connected by smooth lines.” Then, click on Next.
4. Click on Series, and click on the box with the arrow to the right of “X values.” Highlight the set of numbers you want on your x-axis. (This should be the dependent variable, the thing that you did not change, but was altered as a result of your experiment.)
5. Click on Series, and click on the box with the arrow to the right of “X values.” Highlight the set of numbers you want on your x-axis. (This should be the dependent variable, the thing that you did not change, but was altered as a result of your experiment.) Then, click on the arrow box to the right of the formula that was automatically entered in the pop-up box.
6. Do the same thing to enter your “Y values” numbers. (This should be the independent variable, or the thing that you changed during each stage of your experiment.)
7. Click Next. Enter a title for your graph, and the name of the values on your x and y axes. REMEMBER TO INCLUDE UNITS!
8. Click Next, and Finish. You can now paste your graph into your lab report.

I’m finished!
## Oral Presentation Rubric: Individual Circ/Resp Presentation

**Teacher Name:** Ms. Loftus  
**Student Name:** ______________________________________

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Excellent</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Needs Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content</strong></td>
<td>Shows a full understanding of the topic. (13-16 points)</td>
<td>Shows a good understanding of the topic. (9-12 points)</td>
<td>Shows a good understanding of parts of the topic. (5-8 points)</td>
<td>Does not seem to understand the topic very well. (0-4 points)</td>
</tr>
<tr>
<td><strong>Preparedness</strong></td>
<td>Student is completely prepared and has obviously rehearsed. (3 points)</td>
<td>Student seems pretty prepared but might have needed a couple more rehearsals. (2 points)</td>
<td>The student is somewhat prepared, but it is clear that rehearsal was lacking. (1 point)</td>
<td>Student does not seem at all prepared to present. (0 points)</td>
</tr>
<tr>
<td><strong>Comprehension</strong></td>
<td>Student is able to accurately answer almost all questions posed by classmates about the topic. (3 points)</td>
<td>Student is able to accurately answer most questions posed by classmates about the topic. (2 points)</td>
<td>Student is able to accurately answer a few questions posed by classmates about the topic. (1 point)</td>
<td>Student is unable to accurately answer questions posed by classmates about the topic. (0 points)</td>
</tr>
<tr>
<td><strong>Posture and Eye Contact</strong></td>
<td>Stands up straight, looks relaxed and confident. Establishes eye contact with everyone in the room during the presentation. (3 points)</td>
<td>Stands up straight and establishes eye contact with everyone in the room during the presentation. (2 points)</td>
<td>Sometimes stands up straight and establishes eye contact. (1 point)</td>
<td>Slouches and/or does not look at people during the presentation. (0 points)</td>
</tr>
<tr>
<td><strong>Volume</strong></td>
<td>Volume is loud enough to be heard by all audience members throughout the presentation. (3 points)</td>
<td>Volume is loud enough to be heard by all audience members at least 90% of the time. (2 points)</td>
<td>Volume is loud enough to be heard by all audience members at least 80% of the time. (1 point)</td>
<td>Volume often too soft to be heard by all audience members. (0 points)</td>
</tr>
<tr>
<td><strong>Speaks Clearly</strong></td>
<td>Speaks clearly and distinctly all (100-95%) the time, and mispronounces no words. (3 points)</td>
<td>Speaks clearly and distinctly all (100-95%) the time, but mispronounces one word. (2 points)</td>
<td>Speaks clearly and distinctly most (94-85%) of the time. Mispronounces no more than one word. (1 point)</td>
<td>Often mumbles or can not be understood OR mispronounces more than one word. (0 points)</td>
</tr>
<tr>
<td>CATEGORY</td>
<td>Excellent</td>
<td>Good</td>
<td>Satisfactory</td>
<td>Needs Improvement</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Content Accuracy</td>
<td>The letter contains at least 10 accurate facts about the topic. (10 points)</td>
<td>The letter contains 6-9 accurate facts about the topic. (6-9 points)</td>
<td>The letter contains 1-5 accurate facts about the topic. (1-5 points)</td>
<td>The letter contains no accurate facts about the topic. (0 points)</td>
</tr>
<tr>
<td>Evidence</td>
<td>Every claim is supported by factual evidence. (5 points)</td>
<td>Most claims are supported by factual evidence. (3-4 points)</td>
<td>Few claims are supported by factual evidence. (1-2 points)</td>
<td>All claims are unsupported by factual evidence. (0 points)</td>
</tr>
<tr>
<td>Length</td>
<td>The letter is 15 or more sentences. (3 points)</td>
<td>The letter is 12-14 sentences. (2 points)</td>
<td>The letter is 9-11 sentences. (1 point)</td>
<td>The letter is less than 8 sentences. (0 points)</td>
</tr>
<tr>
<td>Ideas</td>
<td>Ideas were expressed in a clear and organized fashion. It was easy to figure out the decision reached. (3 points)</td>
<td>Ideas were expressed in a pretty clear manner, but the organization could have been better OR the decision was not clearly stated. (2 points)</td>
<td>Ideas were somewhat organized, but were not very clear. It took more than one reading to figure out the decision reached. (1 point)</td>
<td>The letter seemed to be a collection of unrelated sentences. It was very difficult to figure out what decision was reached. (0 points)</td>
</tr>
</tbody>
</table>

Date Created: Apr 02, 2006 04:55 pm (CDT)
<table>
<thead>
<tr>
<th>Grammar &amp; spelling (conventions)</th>
<th>Writer makes no errors in grammar or spelling. (4 points)</th>
<th>Writer makes 1-2 errors in grammar and/or spelling. (2-3 points)</th>
<th>Writer makes 3-4 errors in grammar and/or spelling (1 point)</th>
<th>Writer makes more than 4 errors in grammar and/or spelling. (0 points)</th>
</tr>
</thead>
</table>

Date Created: **Apr 02, 2006 05:19 pm (CDT)**

### Making A Poster : Body Business Plan Organizer

**Teacher Name:** Kate Loftus  
**Student Name:**

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Excellent</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Needs Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content - Accuracy</td>
<td>At least 5 accurate facts are displayed on the poster. (5 points)</td>
<td>3-4 accurate facts are displayed on the poster. (3-4 points)</td>
<td>1-2 accurate facts are displayed on the poster. (1-2 points)</td>
<td>No accurate facts are displayed on the poster. (0 points)</td>
</tr>
<tr>
<td>Required Elements</td>
<td>The poster includes all required elements as well as additional information. (3 points)</td>
<td>All required elements are included on the poster. (2 points)</td>
<td>All but 1 of the required elements are included on the poster. (1 point)</td>
<td>Several required elements were missing. (0 points)</td>
</tr>
<tr>
<td>Labels</td>
<td>All items of importance on the poster are clearly labeled and text is easy to read. (3 points)</td>
<td>Almost all items of importance on the poster are clearly labeled and text is easy to read. (2 points)</td>
<td>Several items of importance on the poster are clearly labeled and text is easy to read. (1 point)</td>
<td>Labels are too small to view OR no important items were labeled. (0 points)</td>
</tr>
<tr>
<td>Attractiveness - Created on computer program</td>
<td>The poster is exceptionally attractive in terms of design, layout, and neatness. (4 points)</td>
<td>The poster is attractive in terms of design, layout and neatness. (3 points)</td>
<td>The poster is acceptably attractive though it may be a bit messy. (2 points)</td>
<td>The poster is distractingly messy or very poorly designed. It is not attractive OR it was not created on a computer program. (0-1 points)</td>
</tr>
</tbody>
</table>

Date Created: **Apr 02, 2006 05:33 pm (CDT)**