



It Takes a Lickin', but Keeps on Tickin'.... (Learn the flow of blood through the human heart)

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Grade Level: 9-10

Time Allotment: One 45-minute class period

Overview: The human heart is the most important part of your body's vital organs. It is continually working, sending blood through the circulatory system. Understanding the path blood takes to, through, and from the heart is critical to understanding how the circulatory system functions.

Subject Matter: Health

Learning Objectives:

Students will be able to:

- Name the four chambers of the heart and describe the pathways for blood circulation
- Explain the purpose of arteries, veins, and capillaries

Standards:

From the Montana State Standards for Health Enhancement:

(Available on-line at www.opi.state.mt.us)

Standard 1: Have a basic knowledge and understanding of concepts that promote comprehensive health.

Standard 5: Demonstrate the ability to use critical thinking and decision making to enhance health.

Media Components:

VIDEO

Human Body in Action: Respiratory and Circulatory Systems. Schlessinger Science Library. Wynnewood, PA, 2001.

WEB SITES



MEDtropolis: The Virtual Body.2004.

<http://www.medtropolis.com/VBody.asp>

This interactive site gives students multiple ways to learn the different chambers of the heart and the route which blood flows through it. Using any or all three of the categories “The Heart Parts, The Animated Heart, or The Narrated Tour,” students will get a better understanding of its functions.

Materials:

For each student:

1 tennis ball

Circulatory System worksheet (see attached)

Keep on Tickin’ worksheet (see attached)

Flow Chart Terms (see attached)

For teacher:

1 stop watch

Prep for Teachers:

- Prior to teaching this lesson, bookmark the site used in the lesson on each computer in the computer lab.
- Prep the video so that it is at the desired location for the video portion of the lesson.
- Prepare the hands-on elements of the lesson by:
 - Making copies of the worksheets attached to the lesson
 - Gathering materials

When using media provide students with a FOCUS FOR MEDIA INTERACTION, a specific task to complete and/or information to identify during or after viewing of video segments, Web sites, or other multimedia elements.

Introductory Activity:

Step 1: Distribute 1 tennis ball to each student.

Step 2: Ask the students to squeeze their tennis balls just one time. Now tell students that the force needed to squeeze the tennis ball is about the same as the force needed to squeeze blood from the heart.

Step 3: Ask them to squeeze the tennis ball as many times as they can for 1 minute and keep track, in their heads, the total number of squeezes. As you tell them “Go,” start the stopwatch. When you reach one minute, tell them “Stop”.

Step 4: Ask three to four individuals to share their total with the others. (*Answers will vary.*) Ask for students to stand if their total is over 50 squeezes, have them sit and ask students whose total is over 60 squeezes to stand, have them sit and ask students whose total is 70 or more squeezes to stand (*Chances are there will be a decline in the number of student hands the higher you go.*)

Step 5: Tell students that an average heart beats approx. 70 times in one minute. Have a short discussion on what that says about our hearts. (*Strong, muscular, and enduring are only a few adjectives that may be discussed.*)

Learning Activity:

Step 1: Insert the video, *Human Body in Action: Respiratory and Circulatory System* into your VCR.

Step 2: *Tell the students that the video it will be giving them hints to track the flow of blood through the circulatory system. Listen for the specific hints to understanding the flow from the right hand side of the heart to the left.*

Step 3: Provide your students with a FOCUS FOR MEDIA INTERACTION; hand each student the *Keep on Tickin'* worksheet. Ask students to complete the worksheet as they watch video sections.

Step 4: START the tape at the conclusion of the first experiment; the picture will show 4 boys running up a hill, and the narrator says, "Derick prides himself in the strength of his legs." STOP the tape when the narrator says, "Strong and elastic, healthy arteries stretch and then spring back between beats." The video picture will be showing the arterial walls stretching to allow blood flow. (*Check for understanding by asking students "When tracking the flow of blood through the heart and you hear the word "left" what do you think. Student answers should be "When the blood passes through the left side of the heart)*

Step 5: Have the students find their heart rate. Explain to them the easiest way to find their pulse is by laying their index finger and middle finger on the thumb side of the wrist and pulling it slowly across until they find their pulse. If they are unable to locate their pulse here have them take it in the Carotid Artery in the neck (make sure that they do not push real hard on this artery because it could cause them to pass out if after a short time.) Have students take their pulse for one minute counting each beat and then record that number on a scratch piece of paper. While students are taking their pulse, FAST FORWARD the video to the video picture of a mercury gauge, used for checking blood pressure. The narrator will say, "Arteries are the superhighways of the circulatory system." PAUSE the tape.

Step 6: *Ask students to share what their heart rate is? Why is there such a discrepancy between individual heart rates? (Answers will vary, but may include sex, diet, sedentary or nonsedentary, race, etc.)*

Step 7: PLAY the tape. STOP the tape when the narrator says, "It gets pumped through the arteries back to the body cells to make fresh deliveries." The video picture will go black. (*Check once again for understanding, by asking students to compare Veins, arteries and capillaries to roadways near your town. Examples may include interstates being like arteries, highways like veins, and city streets like capillaries.*)

Step 8: Hand out a *Circulatory System* worksheet to each student.

Step 9: Ask students to log on to *The Virtual Body* at <http://medtropolis.com/VBody.asp>. Once the students have reached the site, they will need to left click on the “English” icon. At the next screen students should scroll down to find the “Human Heart” icon and again left click on the icon. Provide the students with a FOCUS FOR MEDIA INTERACTION, asking them to fill out their worksheet using the site’s three given categories, “Heart Parts,” “The Animated Heart,” and “The Narrated Tour.” Students will need to use different categories to answer the different questions provided on the worksheet. (*Have students turn in their worksheet upon completion.*)

Culminating Activity:

Step 1: *Tell the students that they have just taken a drag off of a cigarette. As soon as the nicotine enters the body it is absorbed into the blood stream through capillaries. Create a flow chart showing the path that the nicotine will travel to and from the heart.*

Step 2: Give each student a copy of *Flow Chart Terms* and tell them to design a flow chart. The chart will be graded on creativity and correctness of blood flow. If you wish, you may demonstrate a design on the board, show the students an example that you have made beforehand, or show the designs of other students.

Step 3: Students may need extra time, out of class, to finish the flow chart. Allow them one night for completion of the chart. When students are finished, display their creations in your classroom or in the hallway.

Cross-Curricular Extensions:

ENGLISH

Discuss poetry that personifies the heart by giving it feeling. Why do students think the heart is linked to love, considering that it is not a very attractive organ?

ART

Create an anatomical drawing or painting of the heart.

MATH

-Calculate the length of an average person’s arteries and veins if they were all connected in one line.

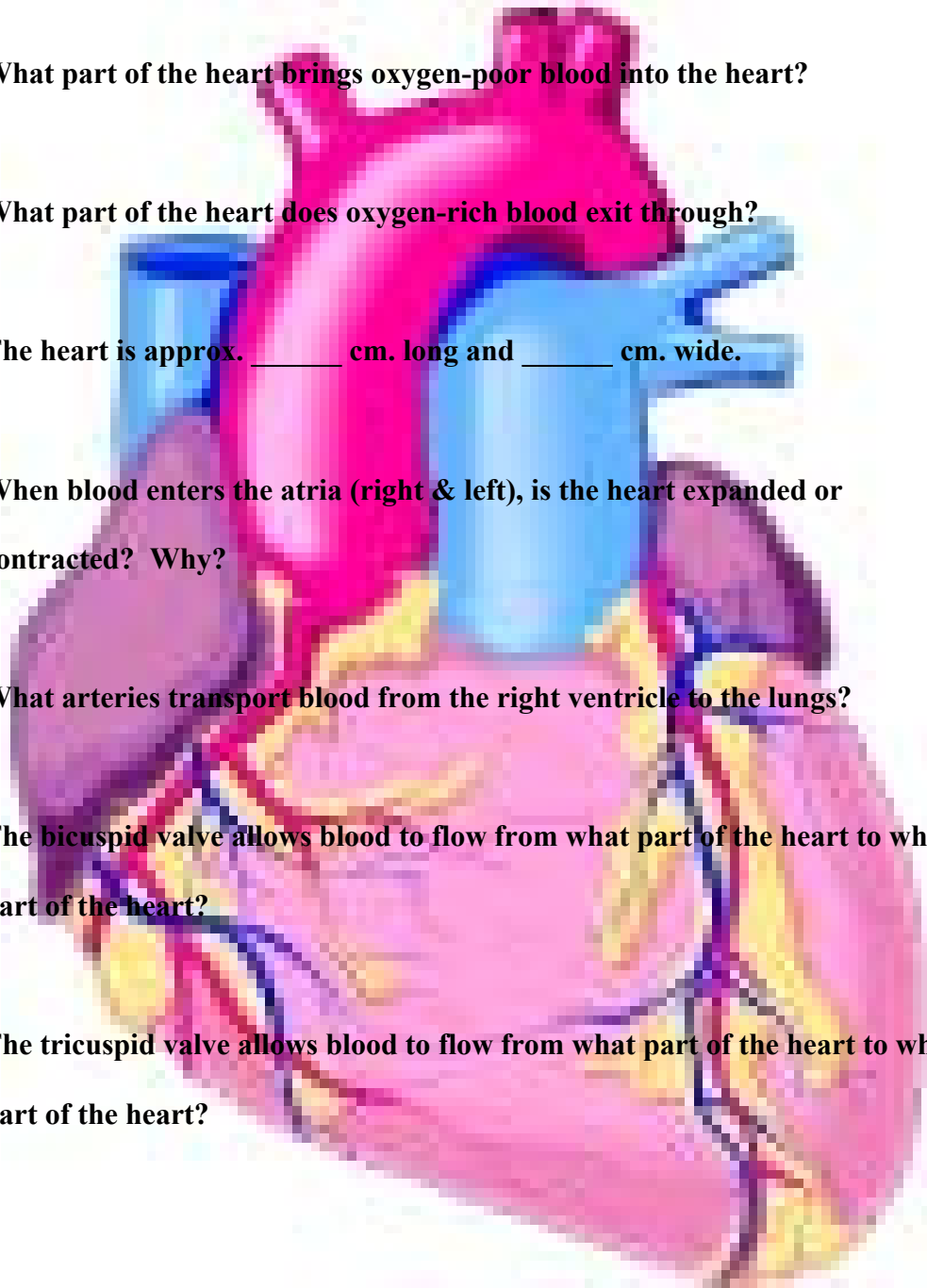
-Calculate heart rate after a variety of activities including sitting, eating, exercising, and/or talking.

Community Connections:

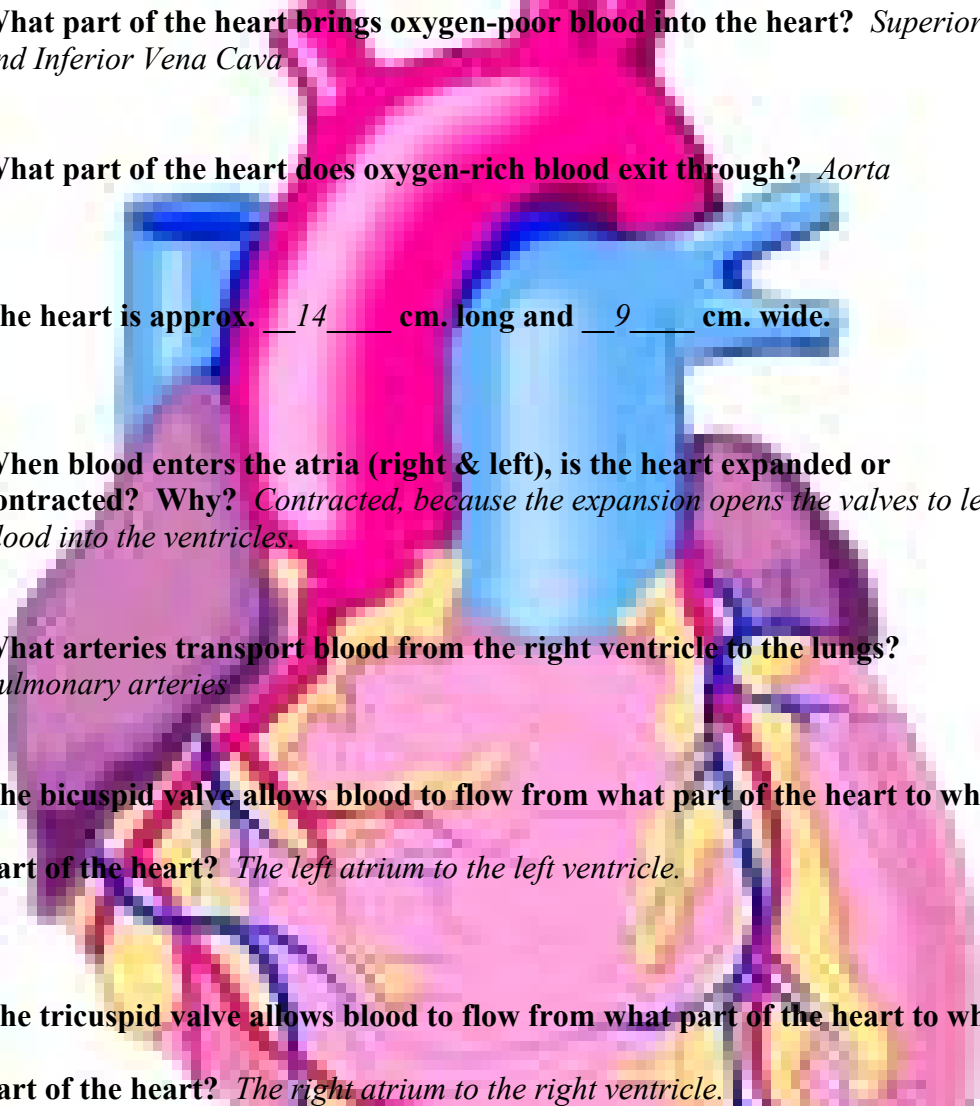
- Ask a cardiologist to visit the classroom to discuss various kinds of heart surgery. Ask a general doctor to visit the classroom to discuss the effects of smoking cigarettes on the heart.

Circulatory System

1. What part of the heart brings oxygen-poor blood into the heart?
2. What part of the heart does oxygen-rich blood exit through?
3. The heart is approx. _____ cm. long and _____ cm. wide.
4. When blood enters the atria (right & left), is the heart expanded or contracted? Why?
5. What arteries transport blood from the right ventricle to the lungs?
6. The bicuspid valve allows blood to flow from what part of the heart to what part of the heart?
7. The tricuspid valve allows blood to flow from what part of the heart to what part of the heart?



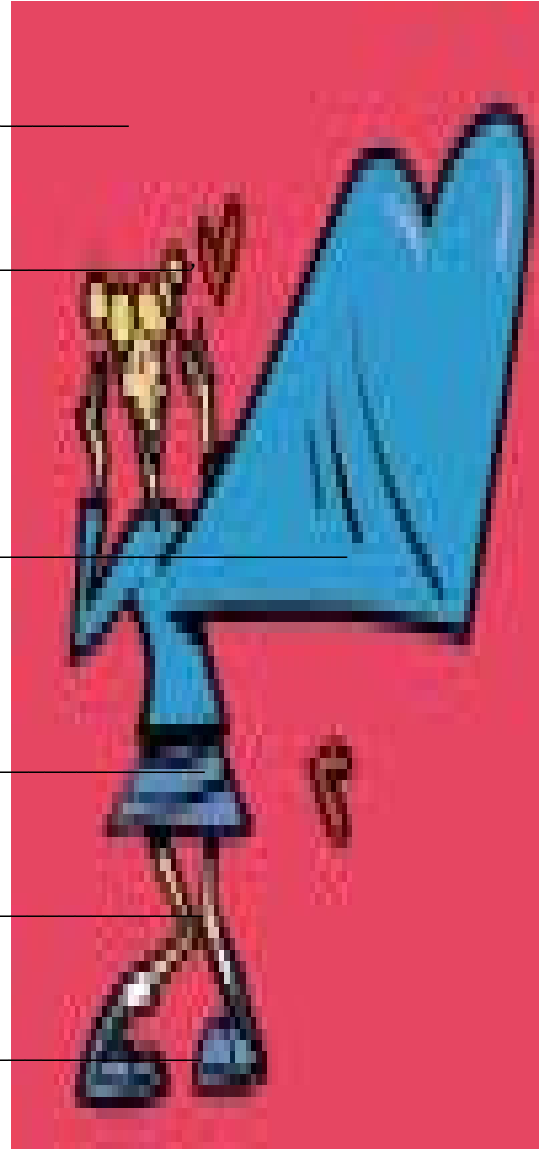
Circulatory System ***Answer Sheet***

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8. What part of the heart brings oxygen-poor blood into the heart? *Superior and Inferior Vena Cava*
9. What part of the heart does oxygen-rich blood exit through? *Aorta*
10. The heart is approx. 14 cm. long and 9 cm. wide.
11. When blood enters the atria (right & left), is the heart expanded or contracted? Why? *Contracted, because the expansion opens the valves to let blood into the ventricles.*
12. What arteries transport blood from the right ventricle to the lungs?
Pulmonary arteries
13. The bicuspid valve allows blood to flow from what part of the heart to what part of the heart? *The left atrium to the left ventricle.*
14. The tricuspid valve allows blood to flow from what part of the heart to what part of the heart? *The right atrium to the right ventricle.*

Keep On Tickin'

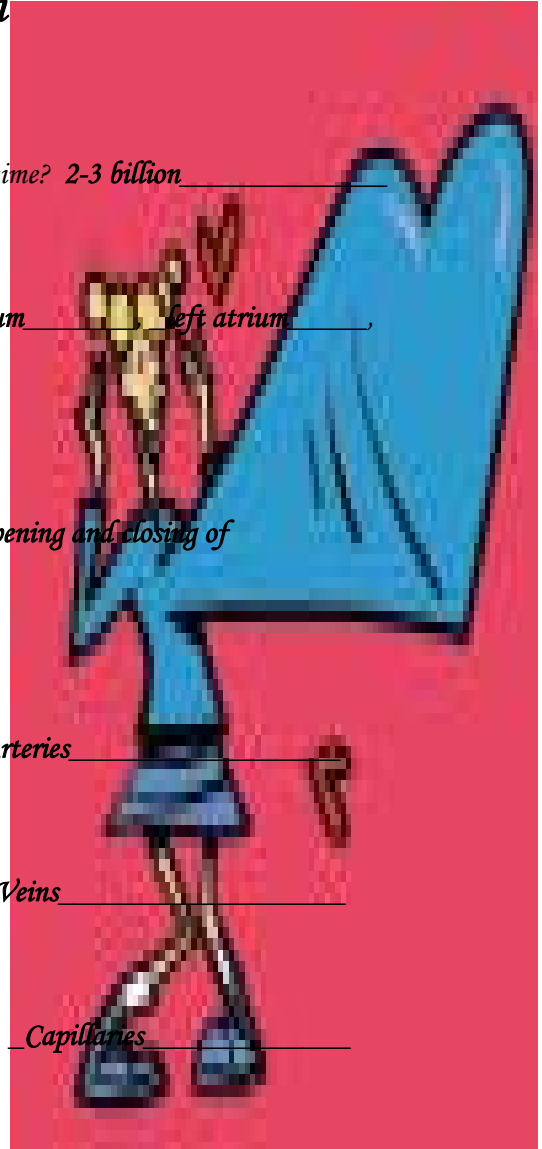
1. *Approx. how many times will your heart beat in a lifetime?* _____
2. *Name the four (4) chambers of the heart.* _____, _____
_____, _____.
3. *What makes the lub-dub sounds of the heart?*

_____.
4. *What type of blood vessels lead out of the heart?* _____
5. *What type of blood vessels lead back to the heart?* _____
6. *What type of blood vessels connect arteries and veins?* _____
7. *Blood traveling from the heart to other parts of the body and back again could travel as far as _____ km., and may take less than _____ minute(s) to do so.*



Keep On Tickin' Answer sheet

1. Approx. how many times will your heart beat in a lifetime? 2-3 billion
2. Name the four (4) chambers of the heart. right atrium, left atrium,
right ventricle, left ventricle.
3. What makes the lub-dub sounds of the heart? The opening and closing of valves.
4. What type of blood vessels lead out of the heart? Arteries
5. What type of blood vessels lead back to the heart? Veins
6. What type of blood vessels connect arteries and veins? Capillaries
7. Blood traveling from the heart to other parts of the body and back again could travel as far as 100,000 km., and may take less than 1 minute(s) to do so.



Flow Chart Terms

***Use **all** of the following terms to complete your flow chart.

Inferior and Superior Vena Cava

Right Atrium

Right Ventricle

Aorta

Lungs

Left Ventricle

Left Atrium

Pulmonary Artery