

Name: _____ Date: _____

Student Exploration: Circulatory System

Vocabulary: artery, atrium, blood vessel, capillary, circulatory system, heart, platelet, pulmonary artery, pulmonary vein, red blood cell, urea, ventricle, vein, white blood cell

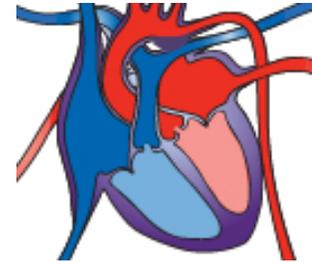
Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

1. Why do you need blood? _____

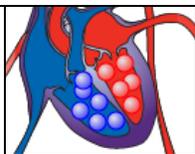
2. What organ pushes blood through your body? _____

Gizmo Warm-up

The *Circulatory System* Gizmo™ shows the **heart** and **blood vessels** that make up the **circulatory system**. Look at the heart.



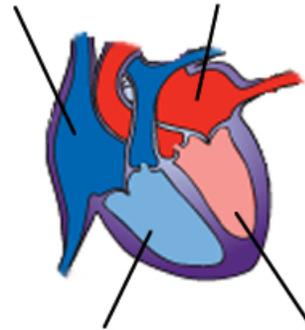
1. How many chambers does the heart have? _____
2. Do you see tiny “doors” that open and close as blood is pumped through the heart? _____ These are **valves**. Valves keep blood from flowing backward.
3. Turn on **Show labels**. What are the names of the chambers? _____,
_____, _____, _____
4. Observe the two parts of the heartbeat. The first part of the heartbeat is nicknamed “lub,” and the second is nicknamed “dub.” (This is because a heartbeat sounds like “lub-dub.”)
 - A. Which chambers contract during “lub”? _____
 - B. Which chambers contract during “dub”? _____
5. Challenge: Why do you think the left **atrium** and left **ventricle** are shown on the *right* side of the diagram? _____

<p>Activity A: Blood flow</p>	<p><u>Get the Gizmo ready:</u></p> <ul style="list-style-type: none"> • Turn off Show labels. • Turn on Show blood flow. 	
---	--	---

Question: How does blood flow through the heart?

1. Observe: Blood in each chamber of the heart is represented by little balls. Observe the balls as they move through the heart and lungs.

2. Label: Turn on **Show labels**. Label the four chambers of the heart on the diagram. Then draw arrows to show the direction that blood flows through the heart.



Starting at the right atrium, in what order does blood flow through the four chambers?

right atrium, _____, _____, _____

3. Analyze: Observe the path of blood that leaves each ventricle.

A. Where does blood from the right ventricle go? _____

B. Where does blood from the left ventricle go? _____

4. Collect data: Use the **syringe** to collect a blood sample from the right (blue) side of the heart. Look at the **Data from blood sample** on the right side of the Gizmo.

A. What is the concentration of oxygen in this sample? _____

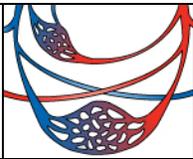
B. What is the concentration of carbon dioxide in this sample? _____

5. Collect data: Collect a sample from the left (red) side of the heart.

A. What is the concentration of oxygen in this sample? _____

B. What is the concentration of carbon dioxide in this sample? _____

6. Draw conclusions: Between the right ventricle and the left atrium, blood goes through the lungs. Based on the data you have collected, what happens in the lungs?

Activity B: Blood circulation	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> • Check that Show labels is on. • Turn on Show blood flow. 	
--	---	---

Question: How is blood carried to different parts of the body?

1. Observe: Watch the blood after it leaves the left ventricle. What are some places that blood goes after leaving the heart? _____

2. Compare: The Gizmo shows three types of blood vessels. **Arteries** carry blood away from the heart, **capillaries** carry blood to body cells, and **veins** carry blood back to the heart. Locate examples of arteries, veins, and capillaries.

Use the **syringe** to take blood samples from several different veins and arteries.

- A. Which type of blood vessel *usually* carries oxygen-rich blood? _____
- B. Which type of blood vessel *usually* carries oxygen-poor blood? _____
- C. In which type of blood vessel is oxygen released into body cells? _____

3. Challenge: The **pulmonary artery** carries blood from the right ventricle to the lungs. The **pulmonary vein** carries blood from the lungs back to the left atrium. Locate these blood vessels, and use the **syringe** to take a blood sample from each.

- A. How is the blood in the pulmonary artery different from blood in other arteries?

- B. How is the blood in the pulmonary vein different from blood in other veins?

4. Extend your thinking: How is the circulatory system similar to a road-and-highway system?

<p>Extension:</p> <p>What's in your blood?</p>	<p><u>Get the Gizmo ready:</u></p> <ul style="list-style-type: none"> • Take a blood sample from any blood vessel using the syringe. 	
--	--	---

Question: What is inside blood?

1. Observe: Look at the **Microscopic view of blood sample**. Sketch what you see in the space at right. (If you like, you could also click the **camera** icon to take a Gizmo snapshot, and then paste your snapshot into a blank word-processing document.)



Find and label the following objects in your sketch:

- **Red blood cells** (small, round cells that carry oxygen)
- **White blood cells** (large, irregular cells that fight disease)
- **Platelets** (tiny fragments that help to stop bleeding when you are cut)

2. Collect data: Blood carries many vital substances. Four of these are listed above the **Microscopic view**. Oxygen and sugar are needed by all body cells. Carbon dioxide and urea are waste products. What are the concentrations of each substance in this sample?

Oxygen: _____ Carbon dioxide: _____ Sugar: _____ Urea: _____

3. Investigate: Take samples of blood from all over the body. Try to determine where sugar enters the blood, and where it is removed.

A. Where does sugar enter the blood? _____

B. How can you tell where sugar enters the blood? _____

C. Where is sugar removed from the blood? _____

D. How can you tell? _____

4. Investigate: Take blood samples to determine where urea enters the blood and is removed.

A. Where does urea enter the blood? _____

B. Where is urea removed from the blood? _____