

6-7. THE HEART CYCLE

Instructions: (1.) Read the text. (2.) Complete the project. (3.) Use the text and your observations to help you to answer the questions.

In this project, you will follow the flow of blood through the heart.

Your heart has two jobs to do, and its two sides have separate responsibilities: The left side pumps oxygen-enriched blood from your lungs to your body's cells, and the right side pumps oxygen-poor, waste-carrying blood back from your body's cells to your lungs.

When blood has made one "round trip," it has completed one "heart cycle." Although this project will guide you through the heart cycle by examining what happens in one chamber at a time, it is important for you to know that blood flows through both sides of the heart simultaneously (at the same time). That is, when the right atrium contracts and pumps its blood, the left atrium contracts at the same time. The same is true for the ventricles—both the right and left ventricles contract and pump blood at the same time.

In biological drawings, it is standard to use blue to represent deoxygenated blood and red to represent oxygenated blood. (This practice is not just to make your drawing colorful; oxygen-rich blood actually looks bright red, and oxygen-poor blood looks bluish or purple.) You will, therefore, use blue circles to follow deoxygenated blood through the right side of the heart and red circles to follow oxygenated blood through the left side of the heart.

Obtain the following materials:

- ten blue circles and ten red circles (you can make them by using a hole punch on blue and red construction paper)
- color pencils or markers

Procedure

1. Each stage will instruct you to place colored circles on the "number" diagram. Be sure to place the circles on the correct numbers and to use the correct color (red or blue).
2. On the "heart sequence" page, sketch and color the circles for each stage.
3. Before going to the next stage, remove the circles from the "number" diagram so that they can be reused for the next stage. The idea, of course, is to show the movement of the blood in successive stages.

Stage one: Deoxygenated blood enters the right atrium through the superior and inferior venae cavae. Place blue circles on numbers 1, 2, 3, 4, 5, 6, 7, and 8. Sketch and color these circles on Diagram A.

Stage two: When the right atrium is full, it contracts and forces blood through the tricuspid valve and into the right ventricle. Remove the blue circles from stage one and place them on numbers 9, 10, 11, 12, and 13. Sketch and color these circles on Diagram B.



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Stage three: After the blood passes into the right ventricle, the tricuspid valve slams shut. The muscular wall of the right atrium contracts, forcing the blood through the pulmonary artery and to the lungs. Remove the blue circles from stage two and place them on numbers 14, 15, 16, 17, 18, 19, 20, 21, 22, and 23. Sketch and color these circles on Diagram C.

Stage four: The blood returns from the lungs to the left atrium through the pulmonary veins. While in the lungs, the red blood cells become saturated with oxygen and change from a bluish color to a bright red. Remove the circles from stage three. Place *red* circles on numbers 24, 25, 26, 27, 28, 29, 30, and 31. Sketch and color these circles on Diagram D.

Stage five: When the left atrium is full, it contracts and forces blood through the bicuspid valve and into the left ventricle. Remove the red circles from stage four and place them on numbers 32, 33, 34, 35, 36, 37, and 38. Sketch and color these circles on Diagram E.

Stage six: The last stage of the heart cycle occurs when the bicuspid valve slams shut and the oxygen-enriched blood is pumped out of the left ventricle through the aorta. From the aorta, the blood is directed to the body's cells. Remove the red circles from stage five and place them on numbers 39, 40, 41, 42, 43, 44, 45, 46, and 47. Sketch and color these circles on Diagram F.

Level One Questions:

1. Through which veins does deoxygenated blood enter the right atrium?

2. What structure must the blood pass through before it enters the right ventricle?

3. Where is the blood pumped after it leaves the right ventricle?

4. What is the job of the pulmonary veins?

5. What happens when the left atrium is full?

6. Describe the last stage of the heart cycle.

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