Science Worksheet

Instructions

Read each question carefully and answer to the best of your ability. The worksheet is divided into three sections: Objective Questions, Short Answer Questions, and Problem-Solving. Good luck!

Section A: Objective Questions

Part 1: Multiple Choice (Questions 1-20)

Circle the letter of the best answer for each question.

1. What is the main pumping organ of the circulatory system?
   a. Lungs
   b. Heart
   c. Brain
   d. Kidney

2. Which blood vessels carry blood away from the heart?
   a. Veins
   b. Capillaries
   c. Arteries
   d. Ventricles

3. What is the liquid part of blood called?
   a. Plasma
   b. Platelets
   c. Water
   d. Haemoglobin

4. Which component of blood is responsible for fighting infections?
   a. Red blood cells
   b. Plasma
   c. Platelets

d. White blood cells

5. Where does the exchange of oxygen and carbon dioxide take place in the lungs?
   a. Trachea
   b. Bronchi
   c. Alveoli
   d. Diaphragm

6. What is the large muscle below the lungs that helps with breathing?
   a. Stomach
   b. Diaphragm
   c. Heart
   d. Ribs

7. The trachea is also known as the:
   a. Food pipe
   b. Windpipe
   c. Aorta
   d. Nasal passage

8. Which part of the blood carries oxygen to the body's cells?
   a. Plasma
   b. White blood cells
   c. Platelets
   d. Red blood cells

9. The tiniest blood vessels that connect arteries to veins are called:
   a. Alveoli
   b. Capillaries
   c. Bronchioles
   d. Aorta

10. What is the main waste gas that we breathe out?
    a. Oxygen
    b. Nitrogen
    c. Carbon dioxide
    d. Hydrogen

11. Which side of the heart pumps oxygen-rich blood to the rest of the body?
    a. The right side
    b. The left side
    c. Both sides
    d. The top part

12. The circulation of blood between the heart and the lungs is called:
    a. Systemic circulation
    b. Pulmonary circulation
    c. Coronary circulation
    d. Partial circulation

13. What prevents blood from flowing backwards inside the heart and veins?
    a. Capillaries
    b. Thick muscular walls
    c. Valves
    d. The septum

14. Which of the following is NOT a part of the respiratory system?
    a. Trachea
    b. Lungs
    c. Diaphragm
    d. Oesophagus

15. The process of breathing air into the lungs is called:

a. Exhalation

b. Respiration

c. Inhalation

d. Circulation

16. What is the main function of blood platelets?
    a. To carry oxygen

    b. To fight disease

    c. To help blood clot

    d. To transport nutrients

17. The two upper chambers of the heart are called the:
    a. Ventricles

    b. Septum

    c. Aorta

    d. Atria

18. Air from the trachea splits into two tubes called:
    a. Arteries

    b. Bronchi

    c. Capillaries

    d. Veins

19. The largest artery in the human body is the:
    a. Pulmonary artery

    b. Femoral artery

    c. Aorta

    d. Vena cava

20. What is the name of the iron-containing protein in red blood cells that binds to oxygen?
    a. Plasma

b. Haemoglobin

c. Platelet

d. Antibody

Part 2: True or False (Questions 21-30)

Write 'T' for True or 'F' for False in the space provided.

21. ____ Veins always carry blood towards the heart.

22. ____ The right side of the heart pumps deoxygenated (oxygen-poor) blood to the lungs.

23. ____ During gas exchange, oxygen passes from the blood into the alveoli.

24. ____ The circulatory system is responsible for transporting nutrients and hormones.

25. ____ The bronchi are large blood vessels that enter the lungs.

26. ____ When you exhale, your diaphragm relaxes and moves upwards.

27. ____ All arteries carry oxygen-rich blood.

28. ____ White blood cells are the most numerous type of cell in the blood.

29. ____ Cellular respiration and breathing are the exact same process.

30. ____ The heart is made of a special type of muscle tissue.

Part 3: Fill in the Blanks (Questions 31-40)

Complete the sentences below using words from the word bank.

> Word Bank: alveoli, capillaries, heart, plasma, haemoglobin, diaphragm, platelets, trachea, ventricle, carbon dioxide

31. The large tube that carries air from the throat to the bronchi is the _____.

32. A lower chamber of the heart that pumps blood out is called a _____.

33. The main pumping organ of the circulatory system is the _____.

34. Gas exchange occurs between the _____ and the capillaries in the lungs.

35. The cell fragments in blood that help to stop bleeding are called _____.

36. The substance in red blood cells that carries oxygen is _____.
37. The waste gas produced by our cells during respiration is _____.
38. The _____ are the smallest blood vessels in the body.
39. The liquid part of blood that carries cells and dissolved substances is _____.
40. The large, dome-shaped muscle under the lungs that powers breathing is the _____.

Section B: Short Answer Questions

Write your answers in the spaces provided.

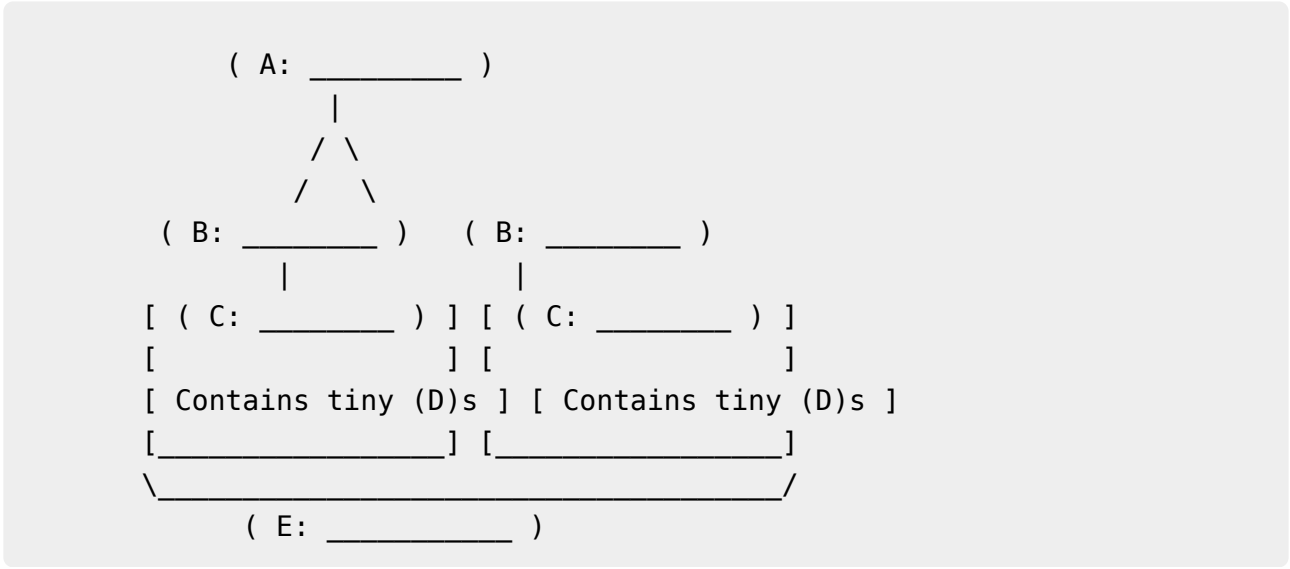
1. What are the three main components of the circulatory system?
2. What is the primary function of the respiratory system?
3. Name the four chambers of the human heart.
4. What is the difference between inhalation and exhalation?
5. List the three main types of blood vessels.
6. What is the role of white blood cells in the body?
7. Why is the muscular wall of the left ventricle thicker than the wall of the right ventricle?
8. What happens to the oxygen after it passes from the alveoli into the blood?
9. What is blood pressure a measure of?
10. Besides oxygen and carbon dioxide, name two other substances transported by the blood.
11. What are cilia and what is their function in the trachea?
12. Why is blood in most arteries bright red, while blood in most veins is darker red?
13. What is the function of the septum in the heart?
14. Briefly explain how the respiratory and circulatory systems work together.
15. What is your pulse?
16. Describe the path air takes from your nose to your alveoli.
17. What is the job of the epiglottis?

18. What do platelets do when you get a cut?
19. What is the aorta and what is its function?
20. Why is it important for our bodies to get rid of carbon dioxide?

Section C: Problem-Solving

Read the scenarios and answer the questions thoughtfully.

1. Imagine you are a red blood cell starting in the right atrium. Briefly describe your journey through the pulmonary and systemic circuits, ending back where you started. Mention where you pick up and drop off oxygen.
2. A person is diagnosed with anaemia, a condition where they have a low number of red blood cells. What symptoms might this person experience, and why?
3. Explain why both your breathing rate and your heart rate increase when you do strenuous exercise.
4. Use the words from the bank to label the parts of the respiratory system in the diagram below.
   Word Bank: Trachea, Bronchus, Lung, Alveoli, Diaphragm



5. An asthma attack causes the small airways in the lungs (bronchioles) to become narrow. Explain why this makes breathing difficult.
6. Smoking tobacco is very harmful. Describe two specific ways it damages the respiratory system.
7. If a blood clot blocks an artery leading to the brain, what medical emergency occurs? What if the clot blocks a coronary artery supplying blood to the heart muscle?

8. The diagram below shows a simplified model of blood flow through the heart. Which chambers (A, B, C, or D) carry oxygen-rich blood? Explain your answer.

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[ From Lungs ] -> [ Left Atrium (A) ]  -> [ Left Ventricle (B) ]  -> [ To Body  ]
                                                  ^
                                                  |
[ To Lungs ]   <- [ Right Ventricle (D) ] <- [ Right Atrium (C) ] <- [ From Body ]
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9. Deep-sea diving mammals like whales can hold their breath for over an hour. Suggest one adaptation their circulatory or respiratory system might have to allow this.

10. Place the following parts of the respiratory system in the correct order that air passes through them during inhalation:
Alveoli, Trachea, Bronchi, Nose, Bronchioles

Answer Key

Section A: Objective Questions

Part 1: Multiple Choice

1. b
2. c
3. a
4. d
5. c
6. b
7. b
8. d
9. b
10. c
11. b
12. b
13. c
14. d
15. c
16. c
17. d
18. b
19. c
20. b

Part 2: True or False

21. T
22. T
23. F
24. T
25. F
26. T
27. F
28. F
29. F
30. T

Part 3: Fill in the Blanks

31. trachea
32. ventricle
33. heart
34. alveoli
35. platelets
36. haemoglobin
37. carbon dioxide
38. capillaries
39. plasma
40. diaphragm

Section B: Short Answer Questions

1. Heart, blood vessels (arteries, veins, capillaries), and blood.
2. To take in oxygen from the air and remove carbon dioxide from the body.

3. Right atrium, right ventricle, left atrium, left ventricle.
4. Inhalation is breathing air in (diaphragm contracts and moves down). Exhalation is breathing air out (diaphragm relaxes and moves up).
5. Arteries, veins, and capillaries.
6. They are part of the immune system and help the body fight off infections and diseases.
7. The left ventricle has to pump blood to the entire body, which requires more force than the right ventricle, which only pumps blood to the lungs.
8. It binds to haemoglobin in red blood cells and is transported to all the cells in the body for cellular respiration.
9. It is a measure of the force of blood pushing against the walls of the arteries.
10. Nutrients (like glucose), waste products (like urea), hormones, water. (Any two)
11. Cilia are tiny hair-like structures that line the trachea. They trap dust and debris and sweep it up and out of the airways.
12. Arterial blood is oxygen-rich (oxygenated), which makes haemoglobin bright red. Venous blood is oxygen-poor (deoxygenated), making it appear darker red.
13. The septum is the muscular wall that divides the right and left sides of the heart, preventing oxygen-rich and oxygen-poor blood from mixing.
14. The respiratory system takes in oxygen, and the circulatory system (blood) picks up that oxygen and delivers it to the body's cells, while also picking up waste carbon dioxide to be removed by the respiratory system.
15. Your pulse is the rhythmic expansion and recoil of arteries resulting from heart contraction. It can be felt at points on the body like the wrist or neck.
16. Nose/mouth -> Trachea -> Bronchi -> Bronchioles -> Alveoli.
17. The epiglottis is a flap of tissue that covers the entrance to the trachea when you swallow, preventing food and drink from entering the lungs.
18. They gather at the site of the cut and stick together to form a plug, or clot, to stop the bleeding.
19. The aorta is the largest artery in the body. It carries oxygenated blood from the left ventricle to the rest of the body.
20. High levels of carbon dioxide in the blood can make it acidic, which is harmful to cells and can disrupt bodily functions.

Section C: Problem-Solving

1. Start in the right atrium -> right ventricle -> pulmonary artery -> LUNGS (drop off CO_2, pick up O_2) -> pulmonary vein -> left atrium -> left ventricle -> aorta -> BODY CELLS (drop off O_2, pick up CO_2) -> vena cava -> right atrium.

2. Symptoms would include tiredness, weakness, and shortness of breath. This is because there are fewer red blood cells to carry the necessary oxygen to the muscles and organs for energy production.

3. During exercise, your muscles work harder and need more oxygen for cellular respiration to produce energy. Your breathing rate increases to get more oxygen into the lungs. Your heart rate increases to pump the oxygen-rich blood to the muscles faster and remove waste carbon dioxide more quickly.

4. A: Trachea, B: Bronchus, C: Lung, D: Alveoli, E: Diaphragm.

5. When the bronchioles narrow, the pathway for air to travel to and from the alveoli is restricted. This means less air can get in and out of the lungs, making the person feel short of breath and have to work much harder to breathe.

6. 1. Tar in smoke coats the alveoli, making gas exchange less efficient. 2. Smoke damages the cilia, preventing them from cleaning the airways, leading to infections (like bronchitis). (Other answers: can cause lung cancer, emphysema).

7. A clot in a brain artery causes a stroke. A clot in a coronary artery (on the heart) causes a heart attack.

8. Chambers A (Left Atrium) and B (Left Ventricle) carry oxygen-rich blood. This is because they are on the left side of the heart, which receives blood that has just returned from the lungs where it picked up oxygen.

9. They might have a higher concentration of haemoglobin or myoglobin (an oxygen-storing protein in muscles), allowing them to store more oxygen. Their bodies might also be more efficient at using oxygen or be able to slow their heart rate dramatically to conserve it. (Any reasonable suggestion).

10. 1. Nose -> 2. Trachea -> 3. Bronchi -> 4. Bronchioles -> 5. Alveoli.