

SCIENCE

First Quarter

LEARNING ACTIVITY SHEETS

SCIENCE GRADE 9

Name: _____

Grade level: _____

Section: _____

Date: _____

LEARNING ACTIVITY SHEET

The Human Respiratory System

Background Information for Learners (BIL)

The respiratory system, which includes air passages, pulmonary vessels, the lungs, and breathing muscles, aids the body in the exchange of gases between the air and blood, and exchange.

In addition to air distribution and gas exchange, the respiratory system filters, warms, and humidifies the air you breathe. Organs in the respiratory system also play a role in speech and the sense of smell.

Moreover, between the blood and the body's billions of cells. Most of the organs of the respiratory system help to distribute air, but only the tiny, grape-like alveoli and the alveolar ducts are responsible for actual gas exchange. Respiratory system also helps the body maintain homeostasis, or balance among the many elements of the body's internal environment.

Parts of the Human Respiratory System

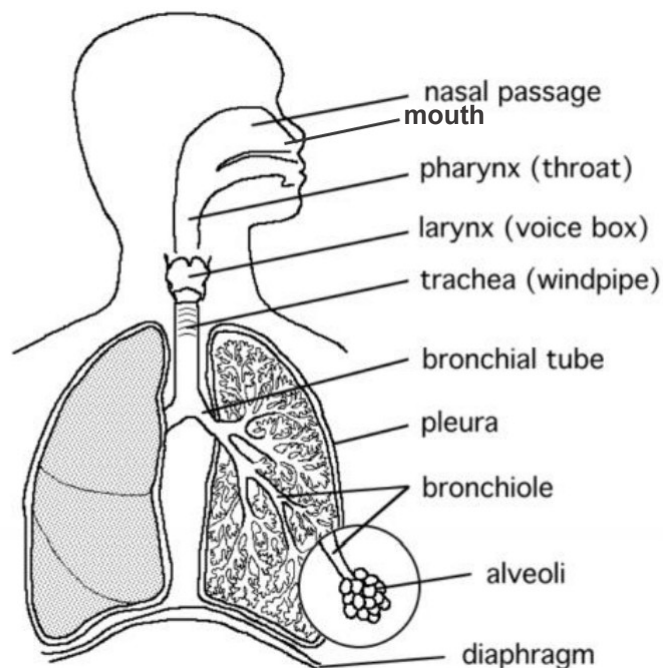


Image Source: Brainpop- The Respiratory System

The respiratory system is divided into two main components- the upper respiratory tract and the lower respiratory tract.

Upper Respiratory Tract: The organs of the upper respiratory tract are located outside the chest cavity and are composed of the nose, mouth, pharynx, and larynx.

NOSE: The nose is the primary airway used to breathe.

MOUTH: The mouth is used as an alternative airway when the nasal pathway (nose) is blocked due to illness or trauma.

SINUSES: These air-filled spaces alongside the nose help make the skull lighter.

PHARYNX (Throat): The pharynx is the area behind the tongue at the very back of the mouth. It allows the movement of air from the nose and mouth to the larynx in the process of breathing.

EPIGLOTTIS: It is the part that covers the opening of the trachea. It acts as a "trap door" which closes when swallowing to prevent food from entering the lower airway.

LARYNX (Voice box): It connects the pharynx and trachea.

Lower Respiratory Tract: The organs of the lower respiratory tract are located inside the chest cavity and are composed of the trachea, lungs, and all segments of the bronchial tree (bronchi, bronchioles including the alveoli).

TRACHEA (Wind Pipe): The trachea is a hollow tube which passes air to the lower airways, it is the main airway to the lungs. The trachea sits in front of the esophagus. It is supported by cartilage rings.

LUNGS: The lungs are a pair of spongy, air-filled organs located on either side of the chest (thorax).

BRONCHI: The bronchi are hollow tubes that branch off of the trachea into each lung and create the network of intricate passages that supply the lungs with air. These structures are supported by cartilage rings.

BRONCHIOLES: The bronchioles are smaller than bronchi and lie between the bronchi and the alveoli, they differ from the bronchi in that they do not have cartilage rings, and stay open via smooth muscle. These transfer air to the alveoli.

ALVEOLI (Air Sacs): The alveoli are the millions of thin-walled sacs inside the lungs which are surrounded by microscopic blood vessels (capillaries). The thin walls and a significant amount of blood flow allow oxygen and carbon dioxide to be easily exchanged. The alveoli are the end of the airway.

DIAPHRAGM: The diaphragm is the main respiratory muscle that contracts and relaxes to allow air into the lungs.

Phases in Human Respiration

Figure 1

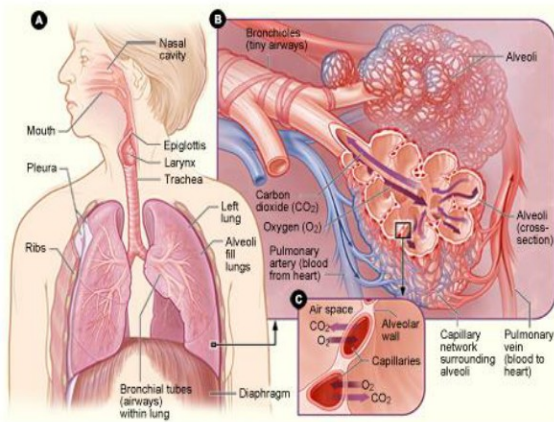


Image Source: Wikipedia

Figure 2

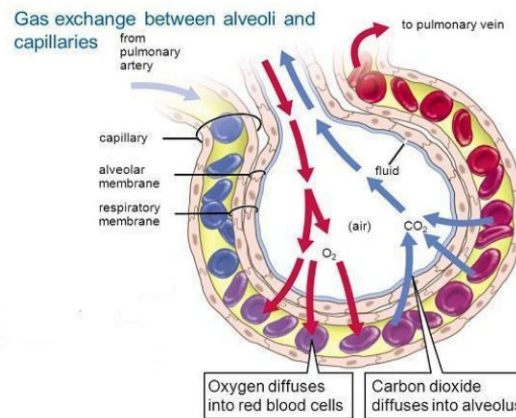


Image Source: Microbiology Notes

Respiration involves several functions such as oxidation of food by living cells; transport of oxygen to the body cells and the removal of carbon dioxide from the lungs; exchange of gases between your blood and lungs, and the breathing process.

Your respiratory system allows the exchange of gases to occur with two important phases involved: external respiration and internal respiration.

External respiration is the exchange of gases between the atmosphere and the blood. This involves the lungs. Internal respiration is the exchange of gases between the blood and body tissues. It occurs in every living cell.

In external respiration, oxygen from the air goes into your lungs through the respiratory tract. In your lung capillaries, oxygen joins your blood. At this point, the level of oxygen is higher in the alveoli of your lungs. (See figures 1 and 2). This is why oxygen easily diffuses from the air into your blood. The blood that leaves your lungs is called oxygenated blood, since it is now rich with oxygen.

In the same phase, carbon dioxide moves from the blood entering your lungs and out into the air. At this point, the blood in your lungs is said to be deoxygenated. It is rich in carbon dioxide, which your blood has picked up from your body cells. This same blood is low in oxygen because it has given up oxygen to your body cells. There is more carbon dioxide in this blood than in your lung alveoli. That is why carbon dioxide diffuses out of the blood and into the air.

How do you sleep at night? Do you allow yourself to be shut up in a close room? You need a well-ventilated room where the air circulates for you to get a steady supply of oxygen. Your body will be functioning normally in moving air.

What is the normal rate of your breathing? Infants breathe 30 to 40 cycles per minute (cpm). At about six years of age, the breathing rate slows down to about 22 times a minute. At your age, until you are about 25, the rate is further slowed down, about 16 to 18 cycles per minute (cpm). An exception is when you are an athlete or when you engage in hard work. Your breathing rate in such cases will be higher.

The Human Breathing System

Figure 1

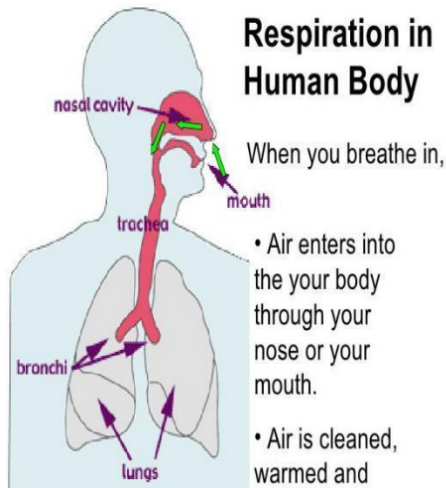


Image Source: Slideshare

Figure 2

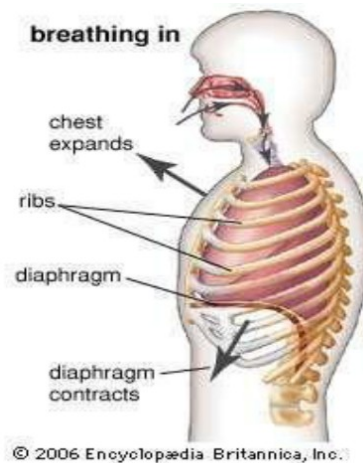


Figure 3



Image Source: Encyclopædia Britannica, Inc.

Life depends on breathing because the body cells need oxygen. Oxygen is one of the mixtures of gases found in the air. During inspiration, you breathe in or inhale to bring a fresh supply of air into your lungs. During expiration, you breathe out or exhale to get rid of carbon dioxide or waste gases not needed by your body.

How does your body use up oxygen and give off carbon dioxide? Breathe in and out. Notice your chest and belly moving and feel the soft air passing from the nose. Listen to the quiet sounds of breathing in and out. Imagine the air moving from the nose into the throat, through the air tubes, and into the airsacs.

The air we breathe goes through the nose, nasal passages, and then through the trachea or windpipe, which separates into two branches, called bronchial tubes or bronchi, one entering each lung. The bronchi subdivide many times inside the lungs, finally becoming hairlike tubes called bronchioles. In the last part of the terminal bronchioles are tiny bubble – like bunch of structures called alveoli or airsacs.

When you breathe in or **inhale**, the diaphragm muscle contracts. Inhaling moves the diaphragm down and expands the chest cavity(See figures 1 and 2) Simultaneously, the ribs move up and increase the size of the chest cavity. There is now more space and less air pressure inside the lungs. Air pushes in from the outside where there is higher air pressure. It pushes into the lungs where there is lower air pressure.

When you breathe out or **exhale**, the diaphragm muscle relaxes. The diaphragm and ribs return to their original place. The chest cavity returns to its original size (See figure 3). There is now less space and greater air pressure inside the lungs. It pushes the air outside where there is lower air pressure.

The Circulatory System



*Image Source: Cardiovascular System |
UNM TAOS CLOUD taos.unm.edu*

The circulatory system is the main transport system of the human body that nourishes your cells with nutrients from the food you eat and oxygen from the air you breathe. Another name for the circulatory system is the cardiovascular system. It is made up of the **heart**, **blood vessels** namely veins, arteries, and capillaries and **blood**.

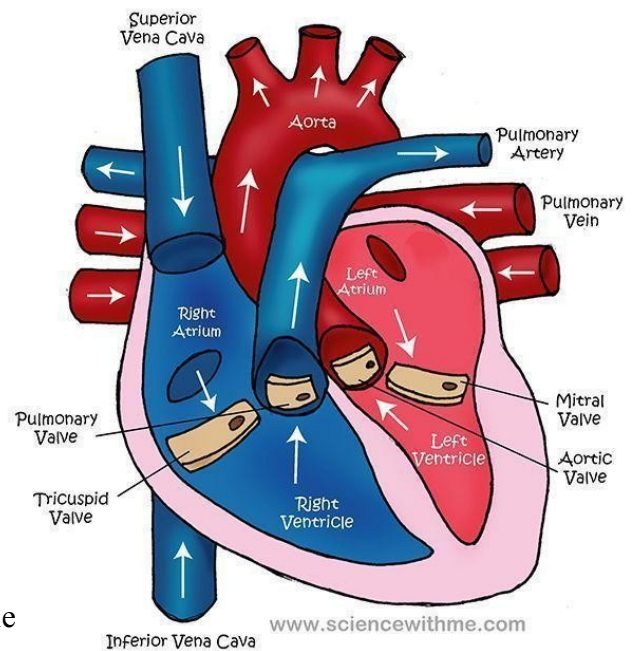
The heart provides the force to push oxygen- rich blood to the extremities of the body. The arteries carry oxygenated blood away from the heart to the cells, tissues, and organs of the body. Veins move deoxygenated blood to the heart. Capillaries, the smallest blood vessels in the body, are the actual site where gases and nutrients are exchanged. The blood is a fluid that circulates in the heart, arteries, and veins. It transports nutrients and oxygen throughout the body. Moreover, it brings away waste products from all the parts of the body

There are 3 types of circulation which are very important in our body. These are the pulmonary, coronary, and systemic circulations. In the **Pulmonary Circulation**, blood travels from the heart to the lungs and back to the heart. **Coronary circulation** involves the journey of blood through the tissues of the heart while **Systemic Circulation** includes the passage of the blood from the heart to the different parts of the body, excluding the lungs.

The Human Heart

The heart is a fist-sized, muscular organ that pumps blood through the body. It has four chambers - the **two ventricles** and the **two atria**. Each chamber has specific tasks to do. The upper chambers are the atria (*atrium singular*), the receiving chambers, that get blood coming in from the veins while the lower chambers are the ventricles, the pumping chambers, that force the blood out into the arteries. Accepting blood from the body is the **right atrium** while blood from the lungs is received by the **left atrium**. The **right ventricle** sends blood to the lungs. On the other hand, the **left ventricle** gives to tissues all over the body.

Located between an atrium and a ventricle is a valve. It prevents the blood from flowing backwards. The valves are like one-way doors that keep the blood moving in only one direction. Valves control movement of blood into the heart chambers and out to the aorta and the pulmonary artery.



*Image Source: Cardiology:
Basic Physiology of the Heart
and Mechanisms of Its Actions*

Blood Flow

The heart pumps blood that circulates throughout the body. Oxygen-poor blood enters the right atrium of the heart (via veins called inferior vena cava and the superior vena cava). The blood is then pumped into the right ventricle and then to the lungs through the pulmonary artery, where the blood is enriched with oxygen (and loses carbon dioxide). The oxygen-rich (oxygenated) blood is then carried back to the left atrium of the heart via the pulmonary vein. The blood is then sent to the left ventricle, then to the various parts of the body through the aorta. This cycle is then repeated. Everyday, the heart pumps about 2,000 gallons (7,600 liters) of blood and beats about 100,000 times.

Learning Competency:

Explain how the respiratory and circulatory systems work together to transport nutrients, gases, and other molecules to and from the different parts of the body.

(Quarter 1, Week 1-2) S9LT-Ia-b-2

Activity 1

Hunt that Part

Directions: Hidden in any direction in the star are parts of the Human Respiratory System. Find and enclose the parts that you know. Write the identified parts in the box.

I P
J G
L D E W
S S S J
J O P J M L
N Y X P X F
O P Z H V Q A H L Z S M A L V E O L I R
O B R O N C H I Y Y J T O P F P K O S Q
P P G K A G Z C C U S N V J O O G D
H G G U N B Q C R C L A R Y N X
A F C O D I A P H R A G M K
R F C Z T K A U K Q Z T
L F Y J Z T U T U W I B R H
B R O N C H I O L E K J A N
G J H B H X T R Z R G V V C G Z
Q X G T V B P X W C P H A S
H F N U V J R U Z R E V R M
M U O I O P A H W U
J L M A I G B M
B T E X

- Bronchi
- Alveoli
- Pharynx
- Larynx
- Diaphragm

- Bronchiole
- Lung
- Trachea
- Nose
- Mouth

Activity 2

Name that Part!

Directions: Label the numbered part of the Human Respiratory System. Write your answer beside the number.

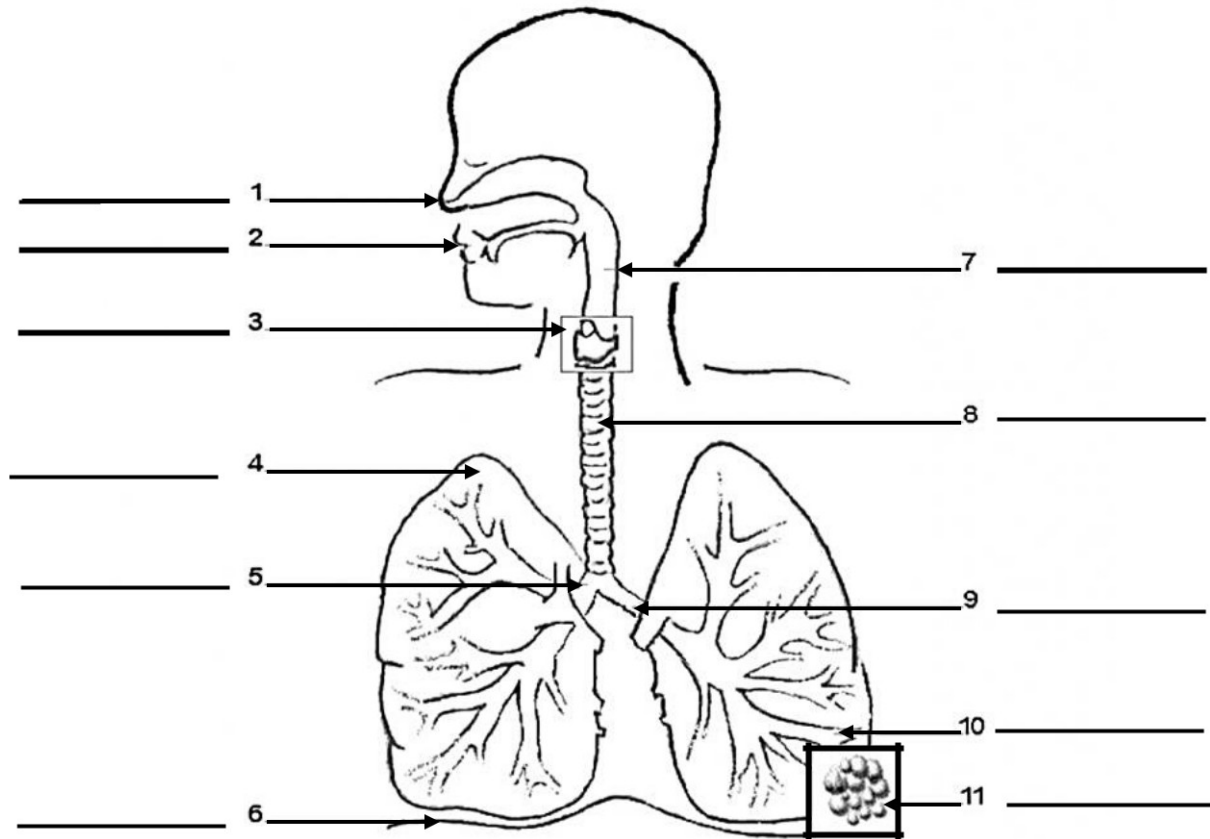


Image Source: Study Resource

Directions: Identify what is being described or asked. Write the answer before the number.

- _____ 1. It is the large band of muscles that controls the size of the chest cavity.
- _____ 2. These are the two large lightweight organs of the respiratory system.
- _____ 3. These are the little branches of the respiratory system.
- _____ 4. It is the tube that connects the throat and the bronchi.
- _____ 5. These are grape-like clusters of air sacs.

Activity 3

Human Respiration

Exercise A

Directions: Complete the following statements. Write your answer on the blank.

1. The exchange between the cells of the body and the blood by way of the fluid bathing the cells is identified as _____.
2. The exchange of gases between the atmosphere and the blood which involves the lungs is known as _____.
3. The blood that leaves the lungs which is rich in oxygen is described as _____.
4. The condition of the environment /room in order to acquire steady supply of oxygen is referred as _____.
5. An activity that may lead to higher rate of breathing is called _____.

Exercise B

Directions: Fill in the blanks with the missing words to complete the paragraph.

In the process of respiration, there is an exchange of (1) _____ and (2) _____. In your body, oxygen is continuously supplied to your (3) _____ and is transported through your bloodstream. Oxygen is then used to oxidize or “burn” food materials in every (4) _____. After the cellular breakdown of (5) _____, (6) _____ is released by your cell. This gaseous waste is again (7) _____ by your (8) _____ and is expelled from your body system.

The breathing rate of individual varies according to (9) _____ or activities. Infants breathe 30 to 40 times a minute while at your age, until you are about 25, the rate is further slowed down, about (10) _____ times a minute.

Activity 4

The Human Breathing System

Complete Me

Directions: Fill in the blanks with the missing words to complete the paragraph.

A life process common to both plants and animals is called (1) _____. The process helps get air in and out of the (2) _____. The air we breathe goes through (3) _____ (4) _____ and (5) _____. When we breathe in or inhale the (6) _____ contracts. Inhaling moves the diaphragm down and expands the (7) _____. When you breathe out or exhale, the diaphragm muscle (8) _____. The diaphragm and ribs return to their original place. The chest cavity returns to its original size. There is now (9) _____ and greater (10) _____ inside the lungs. It pushes the air outside where there is lower air pressure.

Word Cryptogram

Directions: Identify the structures of the circulatory system described in each box and write the answer in the boxes provided.

1. Smallest blood vessel

[illegible]

2. Pumps the blood throughout the body

| | | | | |
|--|--|--|--|--|
| | | | | |
|--|--|--|--|--|

3. Carry deoxygenated blood to the heart

| | | | | |
|--|--|--|--|--|
| | | | | |
|--|--|--|--|--|

4. Movement of blood from the heart to the rest of the body except the lungs

5. Carries the materials throughout the body

| | | | | |
|--|--|--|--|--|
| | | | | |
|--|--|--|--|--|

6. Carries oxygenated blood away from the heart to the cells.

| | | | | | | | |
|--|--|--|--|--|--|--|--|
| | | | | | | | |
|--|--|--|--|--|--|--|--|

7. Carries the blood throughout the body

| | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|

8. Movement of blood through the tissues of the heart

| | | | | | | | |
|--|--|--|--|--|--|--|--|
| | | | | | | | |
|--|--|--|--|--|--|--|--|

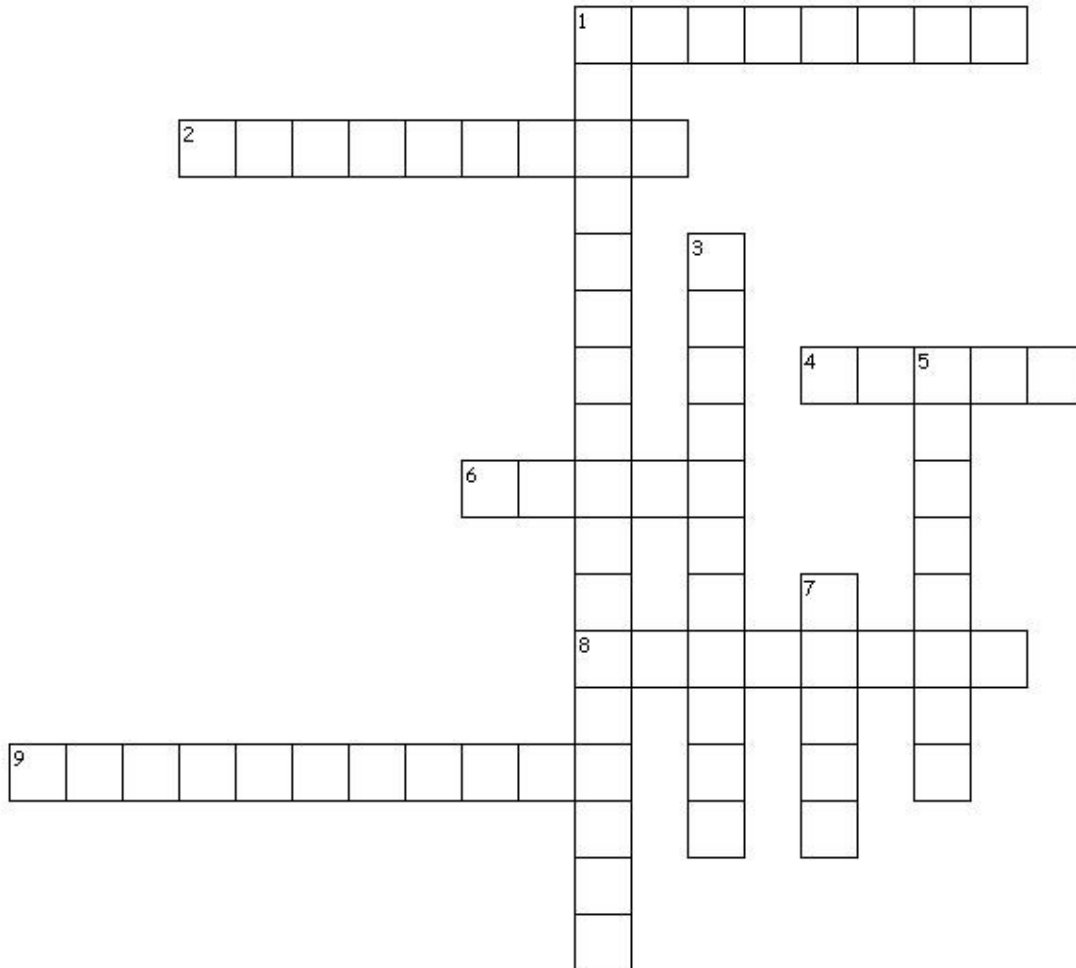
9. Movement of blood from the heart, to the lungs and back to the heart.

| | | | | | | | | |
|--|--|--|--|--|--|--|--|--|
| | | | | | | | | |
|--|--|--|--|--|--|--|--|--|

10. Other name of Circulatory system

Activity 6 The Circulatory System

Directions: Fill up the cells with the appropriate letters. Do not leave space for two words. Write your answers also at the space provided before the numbers below.



Across

1. A circulation of blood through the tissues of the heart
2. A circulation of blood from the heart, to the lungs, and back to the heart
4. Pumps the blood throughout the body
6. Carries the materials throughout the body
8. A circulation of blood from the heart to the rest of the body, excluding the lungs.
9. The smallest blood vessels in the body, connecting the smallest arteries to the smallest veins

Down

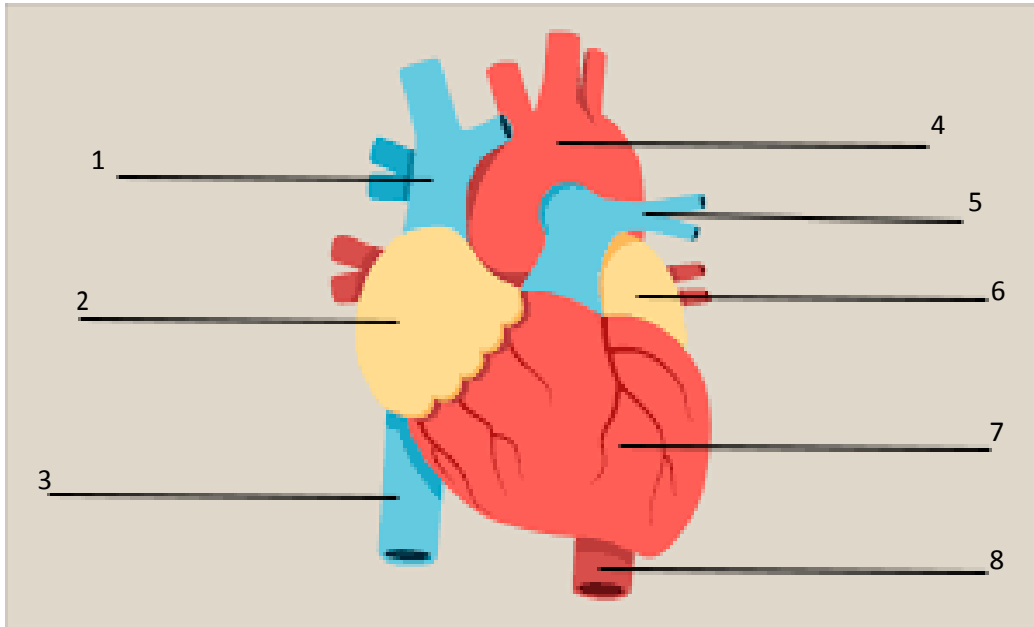
1. The life support structure that nourishes your cells with nutrients from the food you eat and oxygen from the air you breathe.
3. Carries the blood throughout the body
5. Carry oxygenated blood away from the heart to the cells, tissues and organs of the body
7. Carry deoxygenated blood to the heart

Activity 7

Identify Me

Exercise 1

Directions: Study the illustration of the human heart. Identify or label the numbered parts. Write the correct answer on the blank beside the number.



Exercise 2

Directions: Write your answer on the blank provided.

1. Which vessels carry blood away from the heart? _____
2. Where would blood go when it leaves through :
 - a. Pulmonary artery? _____
 - b. Aorta? _____
3. Which vessels carry deoxygenated blood from different parts of the body to the heart?

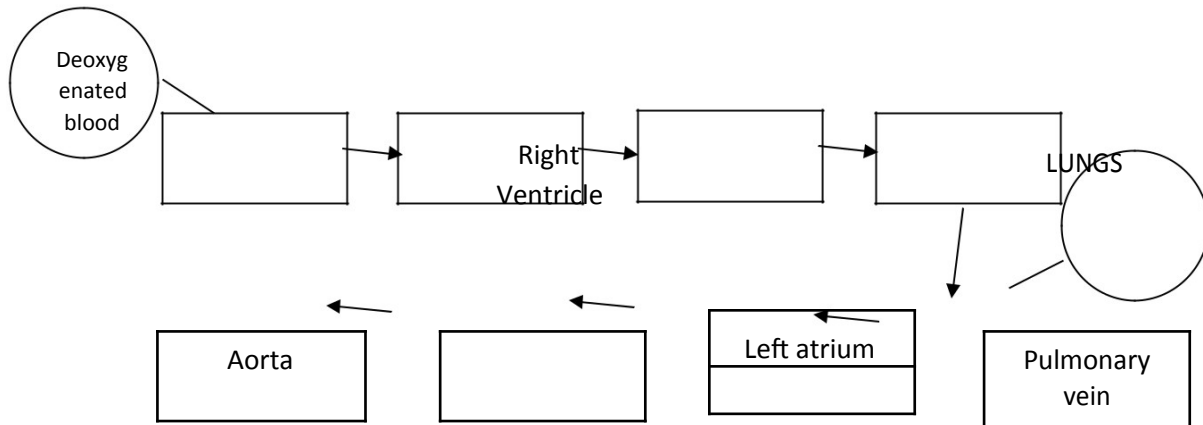
4. What structure prevents the backflow of blood? _____
5. How many cusps do the valves of the heart have? _____
6. Which chambers of the heart receive blood entering from the different parts of the body and from the lungs? _____
7. Which chambers of the heart pump blood away from the heart?

8. What are the two (2) large veins that deliver blood into the right atrium?

Activity 8

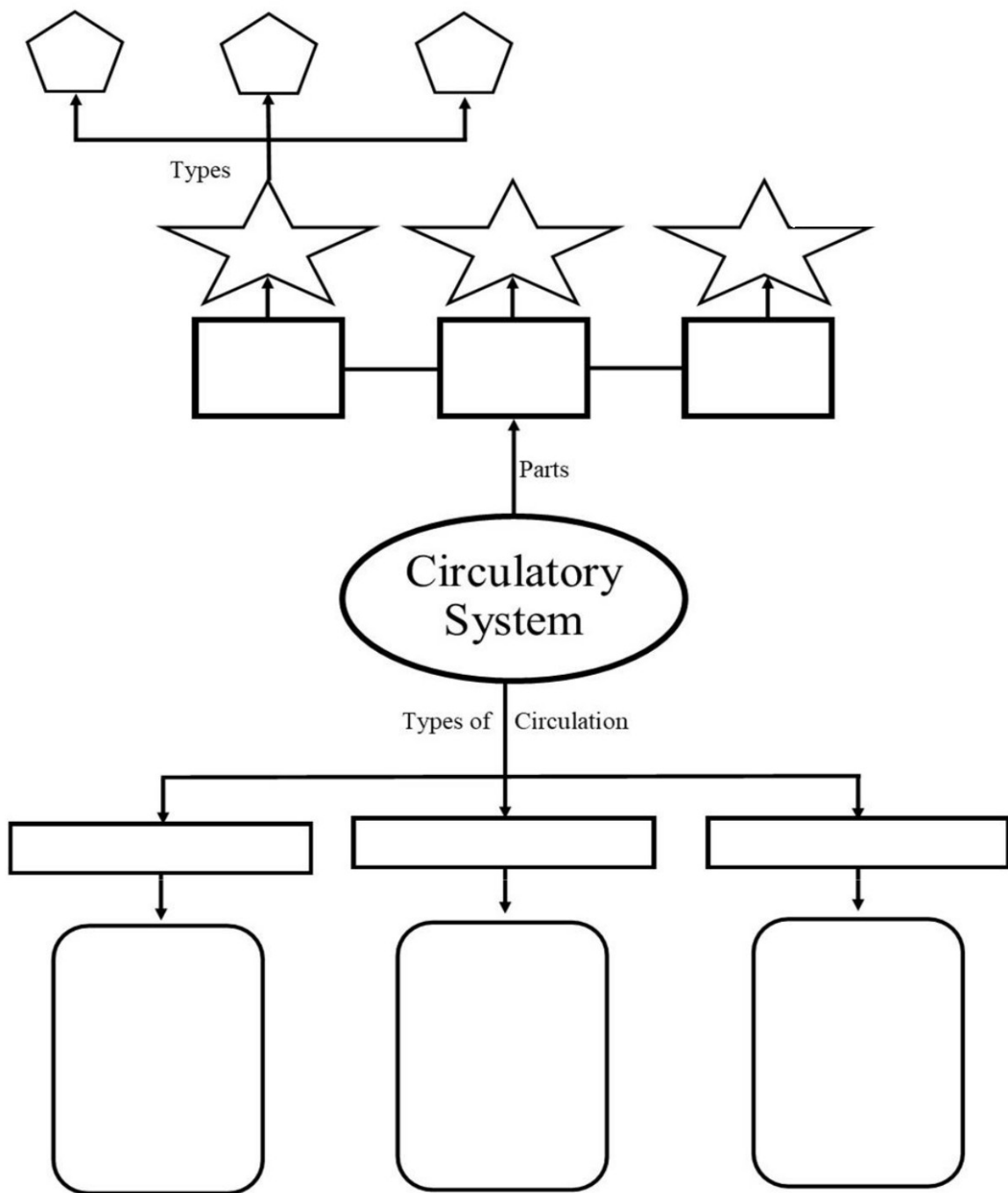
Arrow Diagram

Directions: Below is a diagram that shows the path of the blood. Fill in the box with the correct part.



Activity 9
Sum It Up!

Directions: Using the given graphic organizer, fill in the missing parts, description, and functions to complete the entire concept.



Guide Question:

1. Compare the circulatory system to a community and cite representations of the different parts of the circulatory system and types of circulation.

| Rubrics for Scoring | | | |
|---|------------------|-------------|-------------------------|
| 1. Completeness (5 points) - Does your response directly answer each part of the question(s)? | | | |
| Excellent | Very Good | Good | Need Improvement |
| 5 | 4-3 | 2 | 0 -1 |
| 2. Knowledge (10 points) - Does your response clearly show you have read and understand the lesson content by correctly defining key terms, key persons and summarizing concepts? | | | |
| Excellent | Very Good | Good | Need Improvement |
| 10-9 | 8-7 | 7-6 | 0-5 |
| 3. Analysis (5 points) - Have you clearly state analysis and give examples to back them up? | | | |
| Excellent | Very Good | Good | Need Improvement |
| 5 | 4-3 | 2 | 0 -1 |
| 4. Writing Skills (5 points) - Do you write clearly, in complete sentences, with minimal errors in grammar and spelling? | | | |
| Excellent | Very Good | Good | Need Improvement |
| 5 | 4-3 | 2 | 0 -1 |

Closure / Reflection

I learned that

I enjoyed most on

I want to learn more on

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