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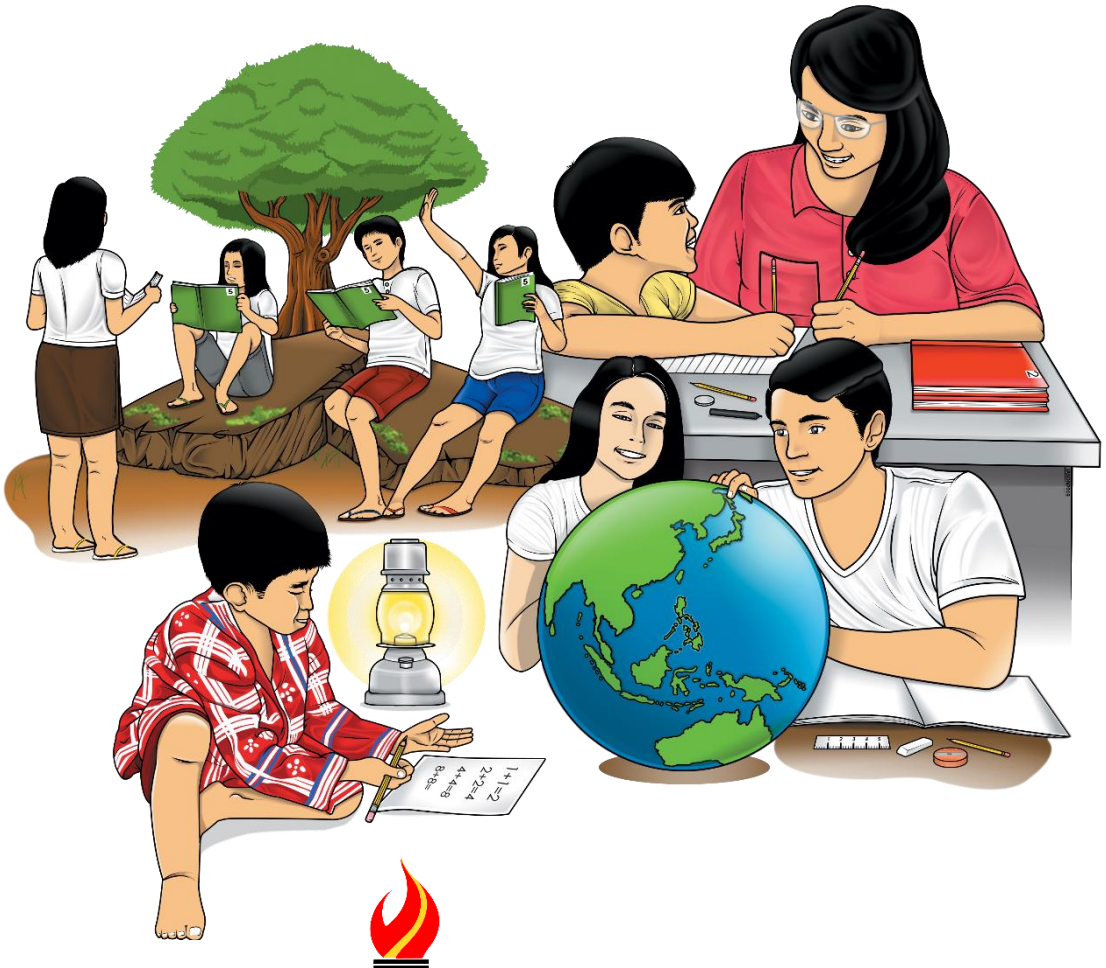
DepED
DEPARTMENT OF EDUCATION

Science
Quarter 1- LIVING THINGS
Module 1: Respiratory and Circulatory System



ALTERNATIVE DELIVERY MODE
ADM

Science – Grade 9

Alternative Delivery Mode
Quarter 1: Living Things
Module 1: Respiratory and Circulatory System
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Secretary: Leonor Magtolis Briones
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Development Team of the Module

Writer:	Hanna Angela E. Lejano
Editor:	Loreta E. Santos
Reviewers:	Allen Maye G. Bagorio, Lucinda S. Concepcion, Marilou B. Cortes, Jaquilyn A. Floriano, Richard S. Galang, Myla D. German, Merbelyn R. Maligat, Karmila C. Ortega, Loreta E. Santos, Merry Chris T. Tabligan
Language:	Astrid E. Arevalo, Elvira P. Emerenciana, Maria Isabel L. Etang, Mirasol C. Eugenio, Nova V. Tarcena
Design and Layout:	Gizelle Magsipoc, Regina G. Nicolas, Ana Lisa M. Mesina
Layout Artist:	Hanna Angela E. Lejano, Edgardo Reyes
Management Team:	Malcolm S. Garma Genia V. Santos Dennis M. Mendoza Micah S. Pacheco Josefina M. Pablo Manolo C. Davantes Jr. Dalisay E. Esguerra Hilda C. Valencia

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Department of Education – National Capital Region

Office Address: Misamis St. Bago Bantay, Quezon City
Telefax: (632)8929-0153
E-mail Address: depedncr@deped.gov.ph

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Science
Quarter 1- LIVING THINGS
Module 1: Respiratory and Circulatory System

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

This module was designed and written with you in mind. It is here to help you master Respiratory and Circulatory System. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course, but the order in which you read them can be changed to correspond with the textbook you are now using.

The module focuses on achieving this 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 (S9LT-Ia-b-26)

After going through this module, you are expected to:

1. Identify the key parts of the breathing system;
2. Describe the function of each part of the breathing system;
3. Explain how the lungs work;
4. Describe how the movement of the diaphragm helps the air go in and out of the lungs;
5. Identify the components of the circulatory system;
6. Explain the different types of circulation;
7. Explain how blood is pumped by the heart; and,
8. Explain the mechanism of how the respiratory and circulatory systems work together

What I Know

Choose the letter of the best answer. Write your answer on a separate sheet of paper.

Use the figure below to answer questions 1 and 2.

Human Respiratory System
Figure from Canva.com

1. What important process happens in the netlike structure labeled A?
   A. Nitrogen and oxygen are exchanged.
   B. Carbon dioxide and oxygen are exchanged.
   C. Nitrogen and carbon dioxide remain constant.
   D. Carbon dioxide and oxygen diffuse into the blood.

2. What structure of the Respiratory System is labeled B in the diagram?
   A. Alveolus
   B. Bronchi
   C. Bronchiole
   D. Pharynx

3. Why is the lung considered as the primary organ of the respiratory system?
   A. Because it is the largest organ of the system.
   B. Because it has two parts: the right and left lungs.
   C. Because it is located near the middle of the chest cavity.
   D. Because it contains the alveoli that is responsible for gas exchange.

4. Which of the following statements about the human respiratory system is false?
   A. The bronchioles branch into bronchi.
   B. Alveolar ducts connect to alveolar sacs.
   C. When we breathe in, air travels from the pharynx to the trachea.
   D. Gas exchange between the lungs and blood takes place in the alveolus.

5. Which structure is responsible for the movement of the chest cavity during the breathing process?
    A. Bronchi and trachea
    B. Larynx and pharynx
    C. Nasal cavity and pharynx
    D. Diaphragm and rib muscle

6. Which is the order of airflow during inhalation?
    A. Nasal cavity, trachea, larynx, bronchi, bronchioles, alveoli.
    B. Nasal cavity, larynx, trachea, bronchi, bronchioles, alveoli.
    C. Nasal cavity, larynx, trachea, bronchioles, bronchi, alveoli.
    D. Nasal cavity, trachea, larynx, bronchi, bronchioles, alveoli.

7. Which of the following statements about the circulatory system is false?
    A. Blood in the aorta is oxygenated.
    B. Blood in the pulmonary vein is oxygenated.
    C. Blood in the pulmonary artery is oxygenated.
    D. Blood in the inferior vena cava is deoxygenated.

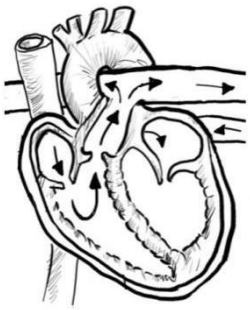
8. Which is the main organ of circulation?
    A. Blood
    B. Heart
    C. Capillary
    D. Blood vessels

9. How do arteries differ from veins?
    A. Arteries carry blood.
    B. Arteries are thin-walled and are used for gas exchange.
    C. Arteries have thicker wall layers to accommodate the changes in pressure from the heart.
    D. Arteries have thinner wall layers and valves and move blood by the action of skeletal muscle.

10. Which blood vessel carries blood from all parts of the body to the heart?
    A. Aorta
    B. Vena cava
    C. Pulmonary vein
    D. Pulmonary artery

11. What type of circulation is responsible for removing oxygen-depleted blood cells from the heart going to the lungs to receive proper amount of oxygen?
    A. Open circulation
    B. Coronary circulation
    C. Systemic circulation
    D. Pulmonary circulation

12. What is the correct order of blood circulation starting from the different parts of the body, lungs and, back to the body?



Blood Flow
Figure from DepEd BLR illustrations

A. Superior and inferior vena cava, right atrium, right ventricle, lungs, left atrium, left ventricle, aorta, body
B. Superior and inferior vena cava, left atrium, left ventricle, lungs, right atrium, right ventricle, aorta, body
C. Superior and inferior vena cava, left ventricle, right ventricle, lungs, left atrium, right atrium, aorta, body
D. Superior and inferior vena cava, right atrium, left ventricle, lungs, left atrium, right ventricle, aorta, body

13. In which organ do gas exchange and gas transport occur?
A. Tubes
B. Blood vessels
C. Lungs and tubes
D. Lungs and blood vessels

14. Which best defines this pair of words: Respiratory system: Circulatory system?
A. Gets the oxygen needed by the cells: Delivers the oxygen to the cells
B. Ingests food and breaks it down into usable nutrients: Excretes solid waste products
C. Cleans dissolved waste products from the blood and excretes them: Excretes solid waste products.
D. Moves materials between body systems, including oxygen, nutrients, hormones, and waste products: Allows gas exchange between cells and environment

15. How does the respiratory system work with circulatory system?
A. Always work independently from one another.
B. Work together to keep blood pumping to all parts of the body.
C. Work together only when we are active, and never when we are resting or sleeping.
D. Work together to deliver oxygen to cells and remove carbon dioxide from the body.

Lesson 1 Respiratory and Circulatory System

Our bodies are like complex machines and depend on many different body systems in order to function properly. In this module, you will explore each important aspect of two key body systems: the respiratory and circulatory systems.

Beginning with the respiratory system, you will understand the complex parts involved in the process of breathing, from our major air-intake passageway, the nose, to the smallest spaces of the lungs, called alveoli, where a vital exchange of oxygen and carbon dioxide occurs. It is here that the respiratory and circulatory systems meet. In this section of the module, you will learn about the anatomy of the heart and how it works, the structure and function of various blood vessels, the cellular components of blood and their purposes, as well as what blood pressure is and what it reveals. As this concludes, you will examine the link between these two amazing body systems, and understand the importance of maintaining them through exercise and a healthy diet.

Here are some key questions for you to ponder after finishing this module:

1. What are the main functions of the human respiratory and circulatory systems?
2. What are the key components of both the respiratory system and the circulatory system? Explain their functions.
3. How do the respiratory and the circulatory system work independently and together?

What's In

Our bodies are the mechanisms we depend upon to get us through each day. Even when at rest, it is working to keep us alive. This special machine relies on different systems that work either together or separately.

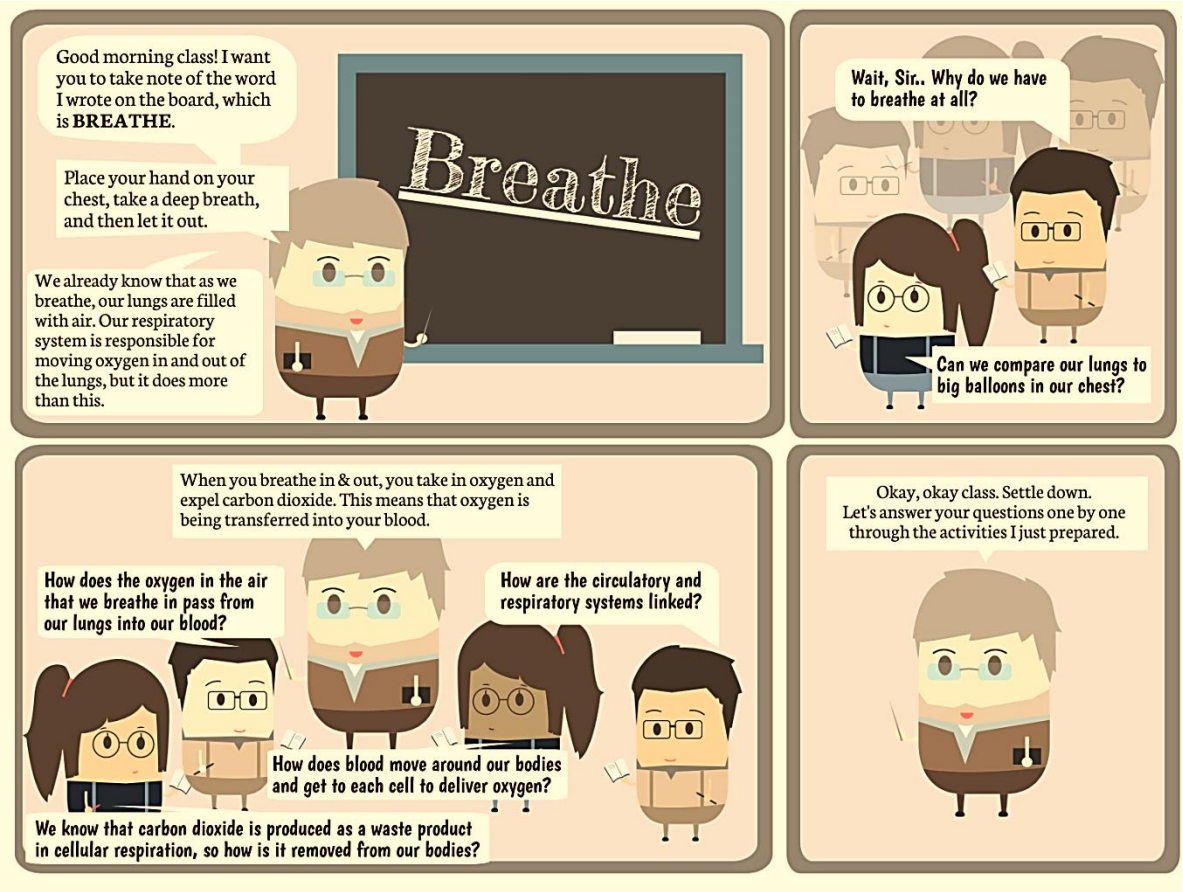
Do you have any body parts that constantly move, even while sitting still or asleep? What are these?

Now, place one hand on the middle of your chest to feel your heartbeat. Then, your other hand just below your ribs to feel the movement of your lungs, ribs, and diaphragm as you breathe.

What do you know about your heart and lungs?
How do they work?

What's New

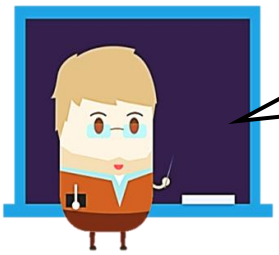
Read the comic strip below. Mr. Potato discovered that his students need help in understanding the body systems – respiratory and circulatory systems. Let us join them as they unravel how this body systems work.



Comic strip created in https://piktochart.com/

What is It

The Respiratory System



Do you know that each day we breathe about twenty thousand times? ***Breathing*** is so important to life that it happens automatically. All of us cannot live without breathing. All of this breathing could not happen without help from the respiratory system.

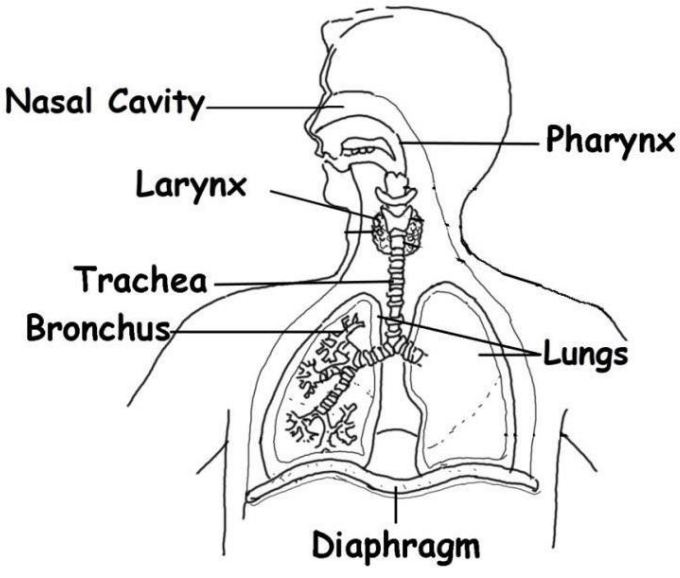
Breathing is the process that delivers oxygen to where it is needed in the body and removes carbon dioxide. All animals need oxygen to live. Land animals get oxygen from the air. We breathe in to allow oxygen to move into our bloodstream and we breathe out to remove carbon dioxide from our blood. The oxygen is carried in the blood to all cells of the body. And did you know that the air we breathe out has 100 times more carbon dioxide than the oxygen we breathe in. *And what organ is in-charge when it comes to breathing?*

If you guessed your lungs, you are right. Your lungs make up one of the largest organs in your body, and they work in your respiratory system to allow you to breathe.

Air flows into your body through the nose or mouth and enters a specific pathway for air. These pathways carry air into our lungs. Then these split off where they become smaller and smaller. In the end, the pathways are attached to small air sacs where the exchange of oxygen from the air for carbon dioxide occurs.

Parts and Its Functions

The human respiratory system is composed of the nasal cavity, pharynx, larynx, trachea, bronchi, and lungs. It is liable for the method of respiration that's vital to the survival of living beings.



Respiratory System
Figure from DepEd BLR illustrations

Nose and Mouth ***(Nasal Cavity)***

The nose is what we normally use to inhale and exhale. It has two holes called nostrils through which air passes. The skin lining both nostrils is embedded with tiny hairs called *cilia*, which act like a filter to catch dust and other small particles in the air we breathe. The mouth is what we use to breathe when we need more air than what can be taken in through the nostrils, as when we pant or puff when we are exhausted.

Pharynx and Larynx

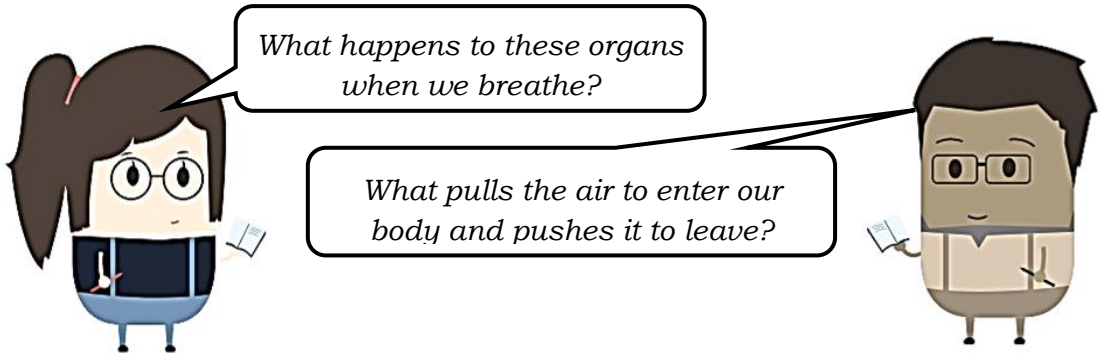
The pharynx is the opening just behind the nose and mouth and is part of both the respiratory and digestive systems. Both food and air pass through the pharynx; it is lined with tissues called *tonsils* which can partially obstruct the passage of either of the two. Like when swallowing, respiration is interrupted. The pharynx ends in the *esophagus* and the larynx. The larynx is also known as the "*voice box*" because it houses the vocal chords and the different muscles used in producing sounds. The *epiglottis*, a cartilage found at the top of the larynx, aids in closing it tightly to prevent the passage of food or liquids.

Trachea and Bronchi

The trachea, also referred to as the *windpipe*, is a tube through which respiratory gas transport takes place. It is lined with ciliated cells to push particles out, and cartilage rings to guard it against pressure when breathing. The end of the trachea is split into two tubes called the bronchi, which also have several thin-walled branches called *bronchioles*. These bronchioles lead to air sacs called alveoli, where most of the gas exchange happens.

Lungs

The lungs are the most essential organ for respiration. They consist of a cluster of bronchioles and alveoli, blood vessels, and elastic tissue. Their main function is to transfer oxygen into the bloodstream, and to excrete carbon dioxide into the air.



Mechanism of Breathing

Inhalation (*inspiration*) and **exhalation** *(expiration*) are the processes by which the body takes in oxygen and expels carbon dioxide during breathing.

You breathe with the help of the **diaphragm** and the **intercostal muscles** between your ribs.

The diaphragm is shaped like a parachute and located below your lungs. It divides the chest cavity from the abdomen, while intercostal muscles are located between your ribs.

- **Breathing in (Inhalation)**

  When you breathe in (inhale), your diaphragm contracts (tightens) and moves downward. In this way, it could provide a bigger space for your lungs to expand in the chest cavity. Also, the intercostal muscles help widen the area in the chest cavity. They contract to pull your rib cage both upward and outward when you breathe.

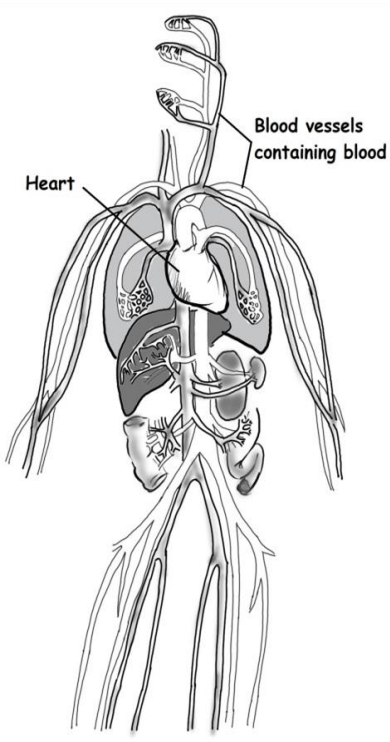
  As your lungs expand, air enters the nose and mouth, traveling towards your windpipe and into your lungs.

- **Breathing out (Exhalation)**

  When you breathe out (exhale), your diaphragm relaxes and moves upward into the chest cavity. The intercostal muscles also relax to decrease the area in the chest cavity.

  As the space in the chest cavity reduced, carbon dioxide is pushed out of your lungs and windpipe, and then out of your nose or mouth.

The Circulatory System



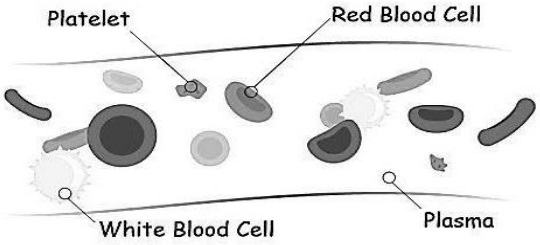
Human Circulatory System
Figure from DepEd BLR illustrations

Since oxygen is carried in the bloodstream, let us also discuss the body system in charge with that. What is ***Circulatory System?***

The function of the circulatory system is to ***transport oxygen and nutrients to the body cells and to carry deoxygenated (oxygen-poor) blood and carbon dioxide back to the heart and lungs***.

Its major parts are the heart, the blood, and the blood vessels. The heart is a muscular pump which keeps the blood flowing to each part of the body. The blood circulates through a closed system—that is, blood in the circulatory system stays inside the vessels. Generally, your blood circulates from your heart, throughout your body, and back to your heart about every 60 seconds.

Blood: *Fluid Transport*



Components of Blood
Figure from Canva.com

Blood is a tissue made of fluid, cells, and fragments of cells. The fluid or the flowing portion of the blood is termed *plasma*. *Plasma* is straw-colored fluid and makes up about 55 percent of the total volume of blood. *Red* and *white blood cells* and platelets are suspended in plasma.

Blood Vessels: *Pathways of Circulation*

The circulatory system has three types of blood vessels: *arteries*, *veins*, and *capillaries*.

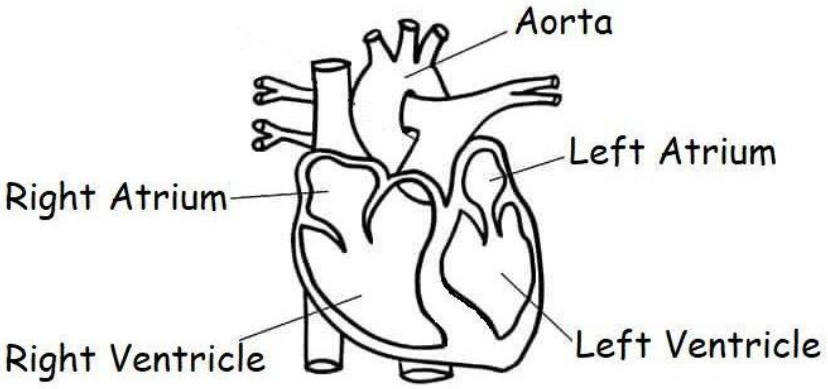
- **Arteries** carry blood away from the heart towards the rest of the body. They carry oxygenated (oxygen-rich) blood except pulmonary arteries, which carry deoxygenated blood to the lungs for oxygenation. The arteries branch off from the heart. They branch off into smaller arteries called *arterioles*. *Arterioles* enter tissues, where they branch into the smallest blood vessels, the capillaries.

- **Veins** carry blood from the rest of the body back towards the heart. They carry deoxygenated (oxygen-poor) blood excluding pulmonary veins, which carry oxygenated blood from the lungs to the heart. In your body, oxygen-poor blood has a darker red color.

You can think of arteries and veins as a system of roads. Large arteries and veins are like major highways. Smaller arteries and veins are like streets that route traffic through local neighborhoods. Arteries and veins are connected by a system of capillaries.

- **Capillaries** are the smallest blood vessels that move blood to and from the cells of the body. These vessels are so small that blood cells must move through them in single file. Its walls are very thin that materials can easily diffuse into and out of them.

Heart: ***The Vital Pump***



Parts of the Heart
Figure from DepEd BLR illustrations

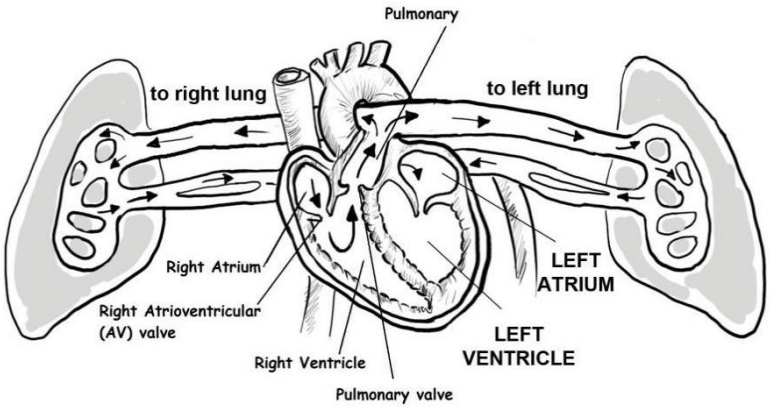
Thousands of blood vessels in your body would be of little use if there is no organ that will move blood through them. The heart moves blood through the vessels. In fact, the **main function of the heart is to keep blood moving constantly through the body**.

The largest structures in your heart are the four chambers. As shown in the figure, the two smaller chambers are the **right atrium and left atrium** (plural, *atria*), and the two larger chambers are the **right and left ventricles**. The ventricles are separated by a thick wall of tissue called *septum*. The heart valves are flaps of tissue that prevent blood from flowing backwards. They open when the atria or ventricles contract, and shut when it relaxes.

Types of Circulation

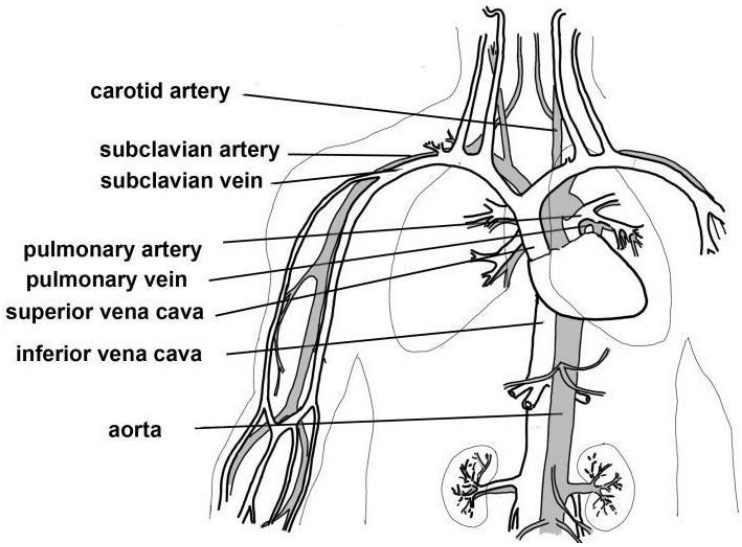
Circulating blood follows two separate pathways that meet at the heart, as shown in the figure. These pathways are called *pulmonary* and *systemic circulation*. All of your blood travels through both of these pathways.

- **Pulmonary circulation** occurs only between the heart and the lungs. The main function of this circulation is to carry deoxygenated (oxygen-poor) blood to the lungs, where it picks up O_2, expels excess CO_2 and water, and carries oxygenated (oxygen-rich) blood back to the heart. Each lung is supplied by its own pulmonary artery and pulmonary vein.



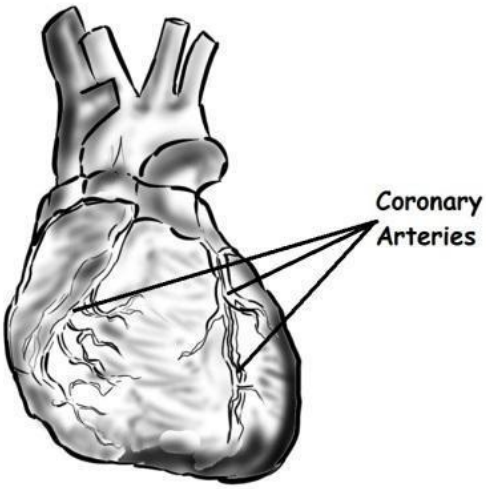
Pulmonary Circulation
Figure from DepEd BLR illustrations

- **Systemic circulation** occurs between the heart and the rest of the body, except for the lungs. The main function of this circulation is to carry oxygenated blood to all cells and transport deoxygenated blood back to the heart. Systemic circulation starts when blood leaves the left ventricle. The blood then flows through the torso, arms, legs, and head, and then reverts to the heart.



Systemic Circulation
Figure from DepEd BLR illustrations

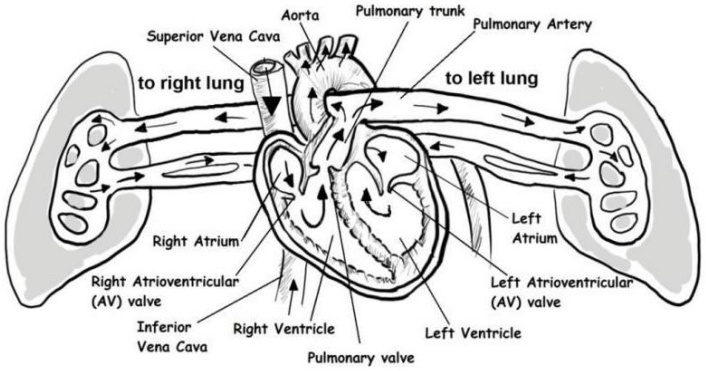
- **Coronary circulation** consists of the blood vessels that supply blood to, and remove blood from, the heart. The vessels that provide blood high in oxygen levels to the heart are called as *coronary arteries*.



Coronary Circulation
Figure from DepEd BLR illustrations

Blood Flow in the Heart

Once you know the basic structures and actions of the heart, it is now easier to understand how oxygenated (oxygen-rich) and deoxygenated (oxygen-poor) blood flow through this organ.



Blood Circulation
Figure from DepEd BLR illustrations

1. Deoxygenated (oxygen-poor) blood from the body enters the right atrium.
2. Blood then flows through right Atrioventricular (AV) valve going to right ventricle.
3. Contraction of right ventricle pushes the pulmonary valve open. With that, blood moves through pulmonary valve to pulmonary trunk.
4. Then it is dispersed by right and left pulmonary arteries to both right and left lungs, where it drops off Carbon dioxide (CO_2) and picks up oxygen (O_2).
5. Oxygenated (oxygen-rich) blood from lungs returns thru pulmonary arteries going to left atrium.
6. From there, it flows through left Atrioventricular (AV) valve into left ventricle.
7. Contraction of left ventricle makes the aortic valve open. This makes blood flow to aorta.
8. It is then disseminated to every structure in the body, where it unloads O_2 and loads CO_2.
9. Blood reverts to heart thru vena cava.

The Respiratory and Circulatory systems working together

Every cell in your body needs nutrients and oxygen to function, but it also needs to get rid of waste products.

The circulatory system transports blood and other materials. It carries essential supplies to the cells and extracts their wastes. The organization of the blood vessels in the circulatory system also keeps oxygen-poor blood from mixing with oxygen-rich blood.

While in respiratory system, gas exchange takes place. You can think of it as a supply warehouse where the blood can load up oxygen (O_2) and expel carbon dioxide (CO_2). The lungs of the respiratory system are the only place in your body where gases in the blood are exchanged with gases from the atmosphere.

The respiratory and circulatory systems work closely together to maintain *homeostasis* in the face of constant change. Every time you exercise, lie down to rest, or simply stand up, you change your needs for oxygen and nutrients. As a result, your heart speeds up or slows down and you breathe faster or slower, depending on your activity.

What's More

Activity 1: Mix and Match.

As shown in the diagram, the parts of the Respiratory System are labelled 1, 2, 3 etc. Below the diagram is a table with three columns. The first column refers to the labelled parts on the diagram, the second column (A, B, C, etc.) are the parts of the respiratory system and lastly (r, s, t, etc.) are the functions. Your first task is to unscramble the letters of each word found in the second column. Then, match the first column to the second column and to the third column by writing the letter/s for each number. Write your answer on a separate sheet of paper.

Example: 1. C – w

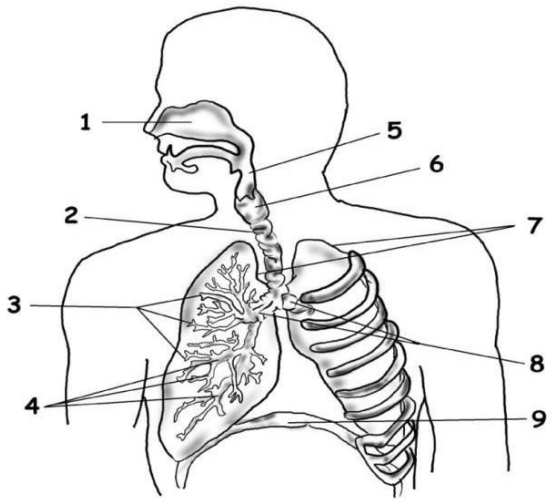


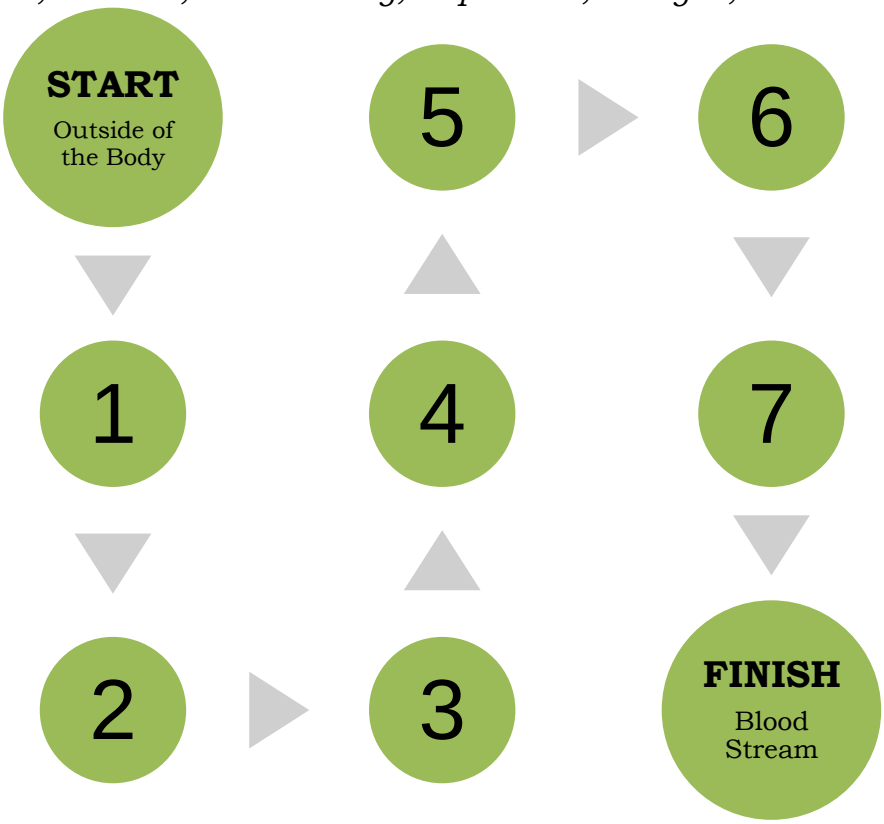
Figure from DepEd BLR illustrations

No.	PARTS OF THE RESPIRATORY SYSTEM	FUNCTIONS
1	A. MAIDGRAPH	r. also called windpipe; a hollow tube that serves as passageway of air into the lungs
2	B. CHEATAR	s. also called bronchial tubes; two branching tubes that connect the trachea to the lungs
3	C. ALSAN VACITY	t. also called air sacs; allow the gas exchange in lungs
4	D. SNUGL	u. Located behind the nasal cavity and above the larynx. Food as well as air passes through it
5	E. VIALOLE	v. associated with the production of sound; is situated in the neck of mammals and plays a vital role in the protection of the trachea
6	F. BONRICH	w. the organ through which the air enters and is filtered
7	G. SCHOOLBRINE	x. the finer subdivisions of bronchi; hair like tubes that connect to alveoli
8	H. XYLARN	y. either of the paired respiratory organs, situated inside the rib cage, that transfer oxygen into the blood and remove carbon dioxide from it
9	I. HAXYNRP	z. muscular wall below the rib cage that contracts when we exhale

Activity 2: The Oxygen Treasure Map

Identify the correct order of the body parts where the oxygen passes through starting from outside of the body to the bloodstream. Write your answer on a separate sheet of paper. Use the words below as your clue:

Bronchi, Alveoli, Trachea, Nasal Cavity, Capillaries, Pharynx, Bronchioles



Activity 3: Oxygen –Carbon Dioxide Exchange

Arrange the statements in alphabetical order from A-O based on the processes of oxygen and carbon dioxide exchange. Write your answer on a separate sheet of paper.

1. The heart pumps oxygen-rich blood to the body.
2. Carbon dioxide moves from bronchioles to bronchi.
3. Air moves through the bronchi into the bronchioles.
4. Blood picks up Carbon dioxide from the body.
5. Breathe in.
6. Alveoli receive oxygen to pass to blood.
7. The heart pumps carbon dioxide-rich blood to the lungs.
8. Nose traps germs in the air.
9. Oxygen passes into the blood.
10. Air moves down the trachea.
11. Alveoli receive carbon dioxide from the blood.
12. Oxygen-rich blood flows to the heart.
13. Carbon dioxide flows up the trachea.
14. Breathe out.
15. Carbon dioxide flows out of the nose and mouth.

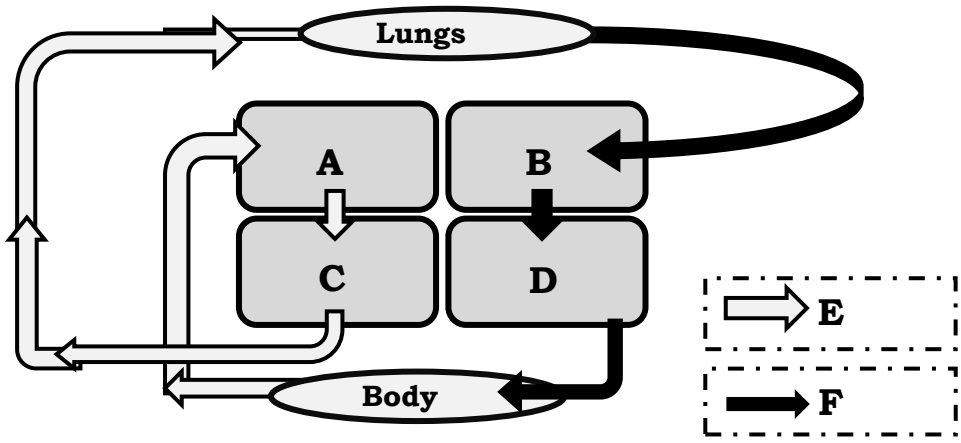
Activity 4: Missing Parts

Find the 10 names of the different parts of the circulatory system in the word search grid. Look for them in all directions including backwards and diagonally. Write it on a separate sheet of paper and provide the functions of each.

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

Activity 5: Go with the flow!

Below is a simplified path of the blood flow inside our body. You are asked to identify first the parts of the heart indicated by A-D. Also, name the two arrows labelled as E and F which represents the pathways. By looking at the diagram, fill in the blanks on *How blood flows through the heart*. Write your answer on a separate sheet of paper.

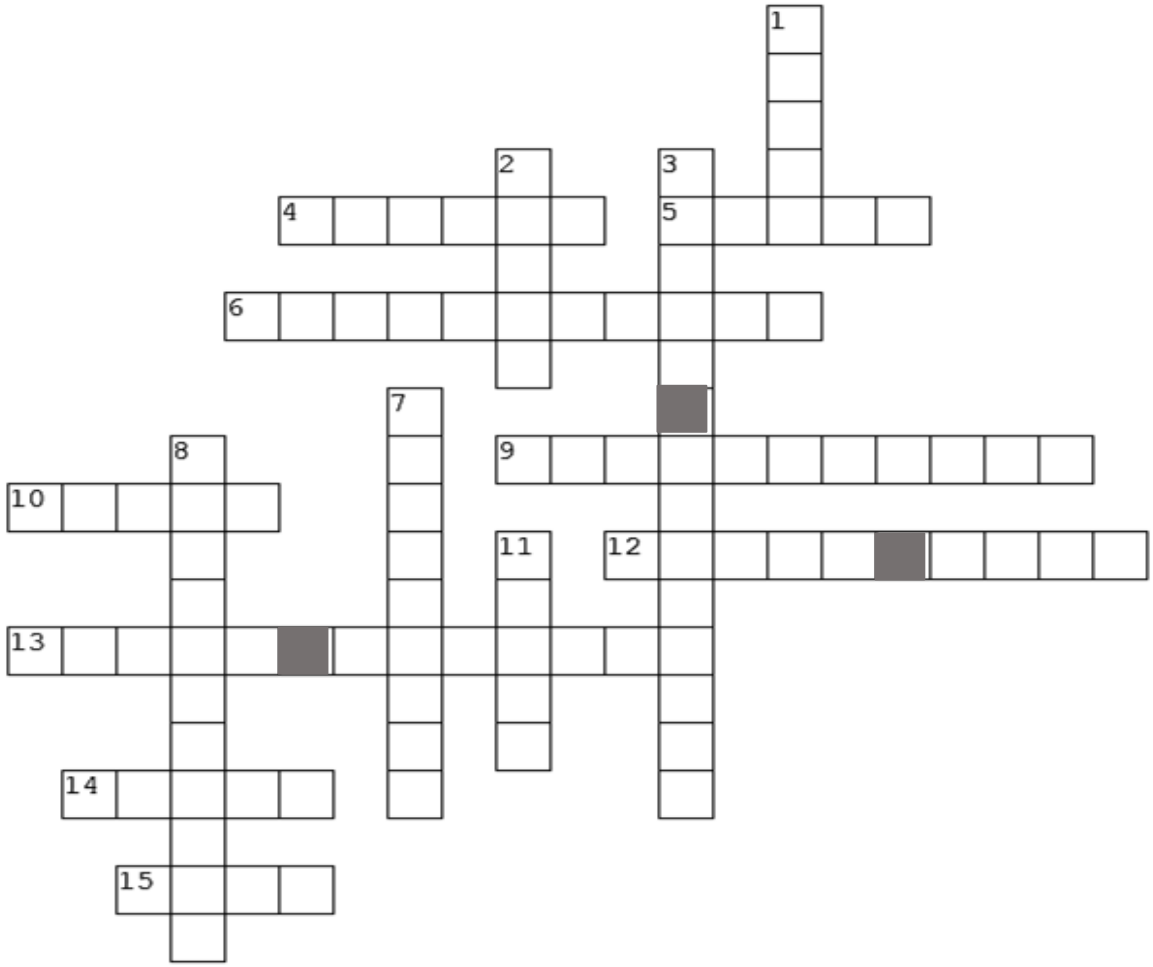


How blood flows through the heart?

Blood from the body travels into the **(A)**_____, moves into the **(C)**_____, and is finally pushed into the lungs in the pulmonary **(E)**_____. The blood then picks up oxygen and travels back to the heart into the **(B)**_____through the pulmonary **(F)**_____. Then it travels through to the **(D)**_____and exits the body through the aorta.

Activity 6: Working Together!

Complete the crossword puzzle by filling in the missing words in the text below. Once the crossword and the text are complete, answer the guide questions found on the next page. A scoring rubric will be used to grade your answers.



Each individual body system works in conjunction with other body systems. The circulatory system is a good example of how body systems interact with each other. Your **(14)**_____ pumps blood through a complex network of **(13)**_____. When your **(10)**_____ circulates through your digestive system, for example, it picks up **(7)**_____ your body absorbed from your last meal. Your blood also carries oxygen inhaled by the **(5)**_____. Your **(6)**_____ system delivers oxygen and nutrients to the other **(2)**_____ of your body then picks up any **(11)**_____ products created by these cells, including carbon dioxide, and delivers these to the kidneys and lungs for disposal.

Each of your body systems relies on the others to work well. Your **(9)** system relies on your circulatory system to deliver the **(4)**_____ it gathers; while the muscles of your heart cannot function without the oxygen they receive from your lungs. The circulatory system provides your **(1)**_____ with a constant supply of oxygen-**(15)**_____ blood while your brain regulates your **(12)**_____and **(3)**_____.

Working together, these systems maintain internal stability and balance, otherwise known as **(8)**_____.

Guide Questions:

Q1. How does blood get oxygen?

_____
_____
_____
_____

Q2. Why should the respiratory system need to respond to the activities of the circulatory system?

_____
_____
_____
_____

Q3. Can a disease in one body system affect Homeostasis? If yes, how?

_____
_____
_____
_____

Rubric:

	2 points	**1 point**	**0 point**
Claim *An assertion that something is true*	Makes a claim that is sufficient to answer the questions <u>and</u> is coherent	Makes a claim that is sufficient to answer the questions <u>or</u> is coherent	Does not make a claim or makes an incoherent claim
or			
Explanation *Describe how and why a phenomenon occurs*	Provides an explanation how <u>and</u> why a phenomenon occurs	Provides an explanation how <u>or</u> why a phenomenon occurs.	Does not provide an explanation.
	3 points	**2 points**	**0 point**
Reasoning *Provides reasons the reader should accept your claim or explanation*	Includes all of the following:	Includes two of the following:	Includes one or none of the following:
	o Cites sufficient and relevant evidence to support the claim/explanation. o Describes how the cited evidence defends the claim/ explanation. o Reader feels compelled to accept the argument		

What I Have Learned

To sum up what you have learned from this module, fill in the blanks using the words inside the box. Write your answer on a separate sheet of paper.

Alveoli	Capillaries	Lungs	Right Atrium
Aorta	Circulatory System	Nasal Cavity	Right Ventricle
Arteries	Heart	Oxygenated	Trachea
Blood	Larynx	Oxygen	Veins
Blood Vessels	Left Atrium	Pharynx	Ventricles
Breathing	Left Ventricle	Respiratory System	Wastes
Bronchi			

1. The _____ is composed of the nasal cavity, pharynx, larynx, trachea, bronchi, and lungs.

2. The primary function of the respiratory system is to supply the blood with _____ to all parts of the body.

3. The respiratory system is made of body parts that are in charge of your _____. It includes:

    a. The _____ which is responsible for conditioning the air that is received by the nose.
    b. The _____ which is the opening just behind the nose and mouth and is part of both the respiratory and digestive systems.
    c. The _____ which is commonly called the voice box, an organ on top of the neck involved in breathing, producing sound and protecting the trachea against food aspiration
    d. The _____, also referred to as the windpipe, is a tube through which respiratory gas transport takes place.
    e. The _____ which carries air that is breathed in through to the functional tissues of the lungs, called alveoli.
    f. The _____ which carry out the process of gas exchange.
    g. The _____ that give our lungs huge surface area for absorbing oxygen from the air.

4. The (a) _____ is the body system that transports blood and other materials. It brings vital supplies to the cells and carries away their (b) _____.

5. _____ is the red liquid that circulates in the arteries and veins of humans and other vertebrate animals, carrying oxygen to and carbon dioxide from the tissues of the body.

6. The _____ are part of the circulatory system that transports blood throughout the body.

7. There are three major types of blood vessels: the (a) _____, which carry the blood away from the heart; the (b) _____, which enable the actual exchange of water and chemicals between the blood and the tissues; and the (c) _____, which carry blood from the capillaries back toward the heart.

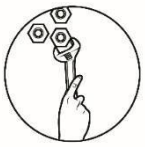
8. The _____ is a muscular pump that generates the blood pressure needed to keep the blood flowing. It is divided into four chambers; (a) _____, (b) right ventricle, (c) _____, and (d) left ventricle.

9. The (a) _____ is the main artery from the heart. It carries (b) _____ blood to the body and head.

10. The _____ are underneath the atria and are the chambers that pump blood out of the heart.

11. The _____ has a thin wall because it only needs to pump the blood around the lungs at low pressure.

12. The _____ has a much thicker wall because it generates the high pressure needed to push blood to the head and body.



What I Can Do

Read and analyze the given daily situations. You might already have experienced them, answer these situations with the concepts you just learned. The same scoring rubric found on page 19 will be used to grade your answers.

Blush Response. What causes you to blush? Why do we look the same whenever we experience intense heat?

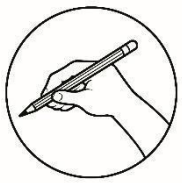
_____
_____
_____

How does the increase in blood flow help in cooling down our bodies? Why do people also turn pale when they feel cold? On extremely cold days, which parts of the body turn pale first? Why?

_____
_____
_____

Why do people turn pale once they are frightened?

_____
_____
_____



Assessment

Choose the letter of the best answer. Write your answers on a separate sheet of paper.

1. Which are the organs of the respiratory system?
   A. Lungs, heart, and blood.
   B. Rib cage, diaphragm, and lungs.
   C. Nose, lungs, heart, and diaphragm
   D. Lungs, throat, and passageways that lead to the lungs

2. What happens in the diaphragm when we exhale (breathe out)?
   A. The diaphragm relaxes and moves upwards.
   B. The diaphragm contracts and moves upwards.
   C. The diaphragm relaxes and moves downwards.
   D. The diaphragm contracts and moves downwards.

3. What will happen if the epiglottis does not close the entrance of airways?
   A. The larynx will be blocked with food particles.
   B. The pharynx will have difficulty in swallowing.
   C. The food particles will block the opening of the trachea and a person will have difficulty in breathing.
   D. The food particles will block the bronchioles thus making it difficult to breathe in and breathe out.

4. What important activity takes place in the lungs?
   A. Food is digested.
   B. Liquid waste is filtered from the blood.
   C. The trachea is exchanged for the larynx.
   D. Oxygen is exchanged for carbon dioxide.

5. Which is taking place in this figure?
   A. Exhalation; the rib cage is expanding.
   B. Exhalation; the diaphragm is relaxing.
   C. Inhalation; the chest cavity is reduced.
   D. Inhalation; the diaphragm is contracting.

Figure from DepEd BLR

6. Which statement is true about the human circulatory system?
   A. It makes blood cells.
   B. It transports oxygen and nutrients.
   C. It breaks down food and releases nutrients.
   D. It is the first line of defense against bacteria.

7. Which blood vessel carries blood back to the heart?
   A. Artery B. Blood vessel C. Capillary D. Vein

8. Which is NOT a function of the circulatory system?
   A. Deliver oxygen and nutrients to cells.
   B. Break down carbohydrates into glucose.
   C. Transport other materials through body.
   D. Remove carbon dioxide and wastes from cells.

9. If a rupture occurs in the pulmonary artery, which passageway is affected?
   A. The passageway of blood going to aorta.
   B. The passageway of blood going to lungs.
   C. The passageway of blood going to vena cava.
   D. The passageway of blood going to right atrium.

Use the figure to answer questions 10 and 11.

10. Which path in the figure does the blood follow through the heart as it returns from the head and body?
    A. 1→2 B. 2→1 C. 3→4 D. 4→3

11. In which chamber does the blood flow while transporting fresh oxygen?
    A. 1 B. 2 C. 3 D. 4

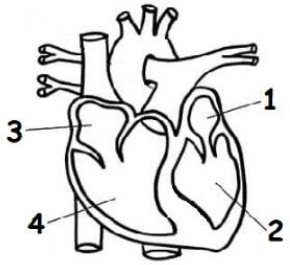


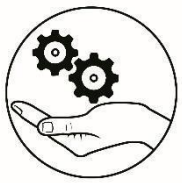
Figure from DepEd BLR illustrations

12. What type of circulation carries oxygenated blood to the body?
    A. Bodily Circulation C. Pulmonary Circulation
    B. Coronary Circulation D. Systemic Circulation

13. In order for the body to maintain homeostasis, the intake of oxygen into the lungs must be followed by which process?
    A. A decrease in blood flow. C. An increase in blood pressure.
    B. A decrease in gas exchange. D. The exhalation of carbon dioxide.

14. How do the respiratory and circulatory systems work together?
    A. They supply the body's cells with oxygen.
    B. They are responsible for the movement of the body.
    C. They break down food into energy and eliminate waste.
    D. They send chemical signals throughout the body via hormones.

15. The circulatory and respiratory systems work together to provide cells with oxygen and nutrients and remove wastes such as carbon dioxide. When the body needs more oxygen, how does the circulatory system respond?
    A. The heart beats faster to match the increase in breathing rate.
    B. More blood is sent to the lungs and less to the rest of the body.
    C. The blood vessels in the arms and legs constrict to conserve oxygen.
    D. Blood moves more slowly through the organs to carry away more wastes.



Additional Activities

Part A: INHALE-EXHALE SEQUENCE

Arrange the order of the path of air through the respiratory system by writing 1 (being the first) – 8 (being the last)

_____ Air enters the alveoli.
_____ Carbon dioxide passes out of the bloodstream, and is eventually exhaled.
_____ Cilia and mucus trap tiny particles found in the air and warm and moisten the air.
_____ Air moves through smaller and smaller passageways called bronchi.
_____ The trachea, or windpipe, then carries the air to the lungs.
_____ Air enters the nose.
_____ Oxygen passes into the bloodstream.
_____ Air moves down the throat or pharynx.

Part B: BLOOD FLOW SEQUENCE

Arrange the steps in the heart's action as it pumps blood by writing 1 (being the first) – 8 (being the last)

_____ Oxygen-rich blood enters the left atrium from the lungs.
_____ Blood from the right ventricle goes to the lungs to pick up oxygen.
_____ At the same time, oxygen-poor blood enters the right atrium.
_____ Blood is squeezed into the ventricles.
_____ The ventricles contract.
_____ The heart muscle relaxes.
_____ At the same time, blood from the left ventricle goes to the body to supply it with oxygen.
_____ The heart muscle contracts.

Answer Key

What I Know

1. B	9. C		
2. A	10. B		
3. D	11. D		
4. A	12. A		
5. D	13. D		
6. B	14. A		
7. C	15. D		
8. B			

What's more Activity 1:

1. C. Nasal Cavity – w
2. B. Trachea – r
3. E. Alveoli – t
4. G. Bronchioles – x
5. I. Pharynx – u
6. H. Larynx – v
7. D. Lungs – y
8. F. Bronchi – s
9. A. Diaphragm - z

Activity 2:

1. Nasal Cavity
2. Pharynx
3. Trachea
4. Bronchi
5. Bronchioles
6. Alveoli
7. Capillaries

Activity 3:

1.	H
2.	M
3.	D
4.	I
5.	A
6.	E
7.	J
8.	B
9.	F
10.	C
11.	K
12.	G
13.	N
14.	L
15.	O

Activity 4

1. HEART - is a muscular pump that generates the blood pressure needed to keep the blood flowing.
2. VENA CAVA - A large vein that receives blood from different parts of the body and delivers it to the right atrium of the heart.
3. AORTA - the main artery that carries blood away from your heart to the rest of your body.
4. ATRIUM - receives oxygenated blood from the body through the vena cava and pumps it into the ventricle which then sends it to the lungs to be oxygenated
5. VENTRICLE - are underneath the atria and are the chambers that pump blood out of the heart.
6. BLOOD - blood transports substances essential to life, such as sugars, oxygen, and hormones.
7. PLASMA - is straw-colored fluid and makes up about 55 percent of the total volume of blood
8. CAPILLARIES - help to connect your arteries and veins in addition to facilitating the exchange of certain elements between your blood and tissues
9. ARTERY - carries oxygenated blood from the right ventricle to the lungs.
10. VEINS - carry deoxygenated blood from the rest of the body back towards the heart.

Activity 5:

A. right atrium
C. right ventricle
E. arteries
B. left atrium
D. left ventricle
F. veins

Activity 6:

Assessment

1.	D	8.	B
2.	A	9.	B
3.	D	10.	C
4.	D	11.	C
5.	D	12.	D
6.	B	13.	D
7.	D	14.	A
		15.	A

Q1. This is through the Pulmonary Circulation. The pulmonary artery carries oxygen-poor blood which is connected to the heart's right ventricle. When the right ventricle contracts it pumps blood out into the pulmonary artery, which leads to the lungs. Once it has arrived at the fine network of blood vessels in the lung tissue, blood gives off carbon dioxide and picks up oxygen. The network of vessels in the lungs leads to larger and larger vessels that eventually become the pulmonary vein (following the direction of blood flow toward the heart). The pulmonary vein leads to the heart's left atrium, a chamber that delivers oxygen rich blood to the left ventricle. When the left ventricle contracts, newly oxygenated blood is pumped through a large vessel called the aorta. The aorta branches out into a network of arteries and leads to smaller and smaller vessels that connect to all parts of the body. The oxygenated blood is delivered once again to supply the body with needed oxygen.

Q2. One specific example here is when you are in physical activities such as exercise. During exercise there is an increase in physical activity and muscle cells respire more than they do when the body is at rest. The heart rate increases during exercise. The rate and depth of breathing increases - this makes sure that more oxygen is absorbed into the blood, and more carbon dioxide is removed from it.

Q3. Disease in one body system can disrupt homeostasis and cause trouble in other body systems. For instance, having AIDS virus affects your immune system, this may develop pneumonia in your respiratory system, a yeast infection in your reproductive system, Candida that affects your esophagus in your digestive system or the skin cancer known as Kaposi's sarcoma.

What I Have Learned

1. Respiratory system
2. Oxygen
3. Breathing
   a. Nasal cavity
   b. Pharynx
   c. Larynx
   d. Trachea,
   e. Bronchi
   f. Lungs
   g. Alveoli
4. (a) Circulatory system, (b) Wastes.
5. Blood
6. Blood vessels
7. (a) Arteries, (b) Capillaries, (c) Veins.
8. (a) Right atrium, (c) Left atrium
9. (a) Aorta, (b) Oxygenated
10. Ventricles
11. Right ventricle
12. Left ventricle

What I Can Do

✓ **Blush Response**. What made you blush? Why does the same blushed appearance occur when we are hot? *Caused by increased blood flow when blood vessels open up*

✓ How might the increased blood flow help to cool our bodies? Why do people also turn pale when they are cold? On very cold days, which parts of the body turn pale first? Why? *Blood vessels open to allow heat to be released.*

✓ Why do people turn pale when they are frightened? *The sympathetic nervous system speeds the heart rate, narrows blood vessels, and raises blood pressure. The sympathetic nervous system is the "fight or flight" system; it allows us to respond to danger by fighting off an attacker or by running away. When danger threatens, the sympathetic nervous system increases heart and respiration rates, increases blood flow to muscles, and decreases blood flow to other areas, such as skin, digestive tract, and limb veins.*

Additional Activities

Part A: INHALE-EXHALE SEQUENCE

6 Air enters the alveoli.
8 Carbon dioxide passes out of the blood stream, and is eventually exhaled.
2 Cilia and mucus trap tiny particles found in the air and warm and moisten the air.
5 Air moves through smaller and smaller passageways called bronchi.
4 The trachea, or windpipe, then carries the air to the lungs.
1 Air enters the nose.
7 Oxygen passes into the blood stream.
3 Air moves down the throat, or pharynx

Part B: BLOOD FLOW SEQUENCE

2 Oxygen-rich blood enters the left atrium from the lungs.
7 Blood from the right ventricle goes to the lungs to pick up oxygen.
3 At the same time, oxygen-poor blood enters the right atrium.
5 Blood is squeezed into the ventricles.
6 The ventricles contract.
1 The heart muscle relaxes.
8 At the same time, blood from the left ventricle goes to the body to supply it with oxygen.
4 The heart muscle contracts.

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For inquiries or feedback, please write or call:

Department of Education - Bureau of Learning Resources (DepEd-BLR)

Ground Floor, Bonifacio Bldg., DepEd Complex
Meralco Avenue, Pasig City, Philippines 1600

Telefax: (632) 8634-1072; 8634-1054; 8631-4985

Email Address: blr.lrqad@deped.gov.ph * blr.lrpd@deped.gov.ph