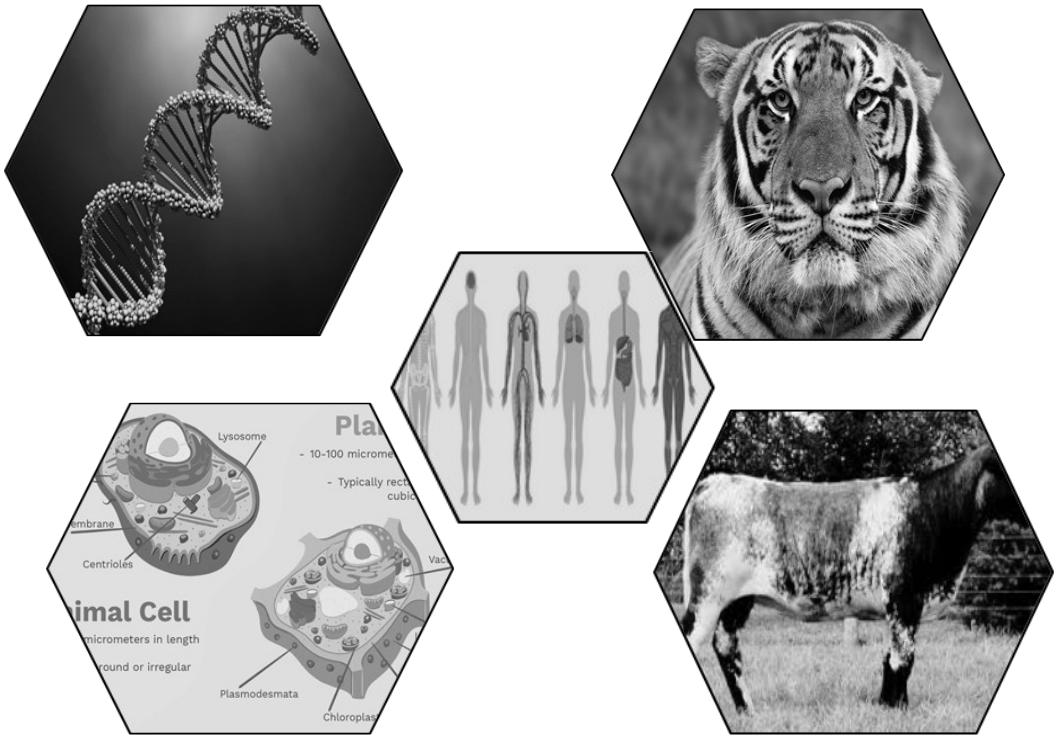
9

Science

Quarter 1 – Module 1: Respiratory and Circulatory Systems Working with other Organ System



Science – Grade 9
Self-Instructional Module
Quarter 1 – Module 1: Respiratory and Circulatory Systems Working with other Organ System
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9

Science

Quarter 1 – Module 1: Respiratory and Circulatory Systems Working with other Organ System

Department of Education • Republic of the Philippines

Introductory Message

For the facilitator:

Welcome to the Science 9 Module 1 Self-Instructional Module (SIM) on Respiratory and Circulatory System, Working with other Organ System.

This Self-Instructional Module (SIM) in Science includes learner-friendly pre-test, self-check exercises, post-test, and other learning instructions intended to help learners catch up on missed classes. This covers topics in Grade Six in the 3rd quarter with corresponding learning activities for students to achieve their missed learning competencies and lesson objectives. Moreover, each exercise in this module is designed for independent learning and practice however, ensure that the learners' parents, elder siblings, guardians or relatives at home will guide and support them as they accomplish its given tasks.

Furthermore, explain to students that taking the tests diligently will allow them to cope with missed lessons for their learning progress. Most importantly, remind them to answer the given activities on a separate answer sheet and handle this module with utmost care.

For the learner:

Welcome to the Science 9 Module 1 Self-Instructional Module (SIM) on Respiratory and Circulatory System, Working with other Organ System.

This learner-friendly module is specially designed for your learning needs and progress. Your patience and dedication in reading and answering its learning exercises will help you successfully cope with your missed lessons. You are free to ask assistance from your teachers, parents, siblings, friends, and family members whom you think can help you best. Read each lesson carefully and follow the instructions for your activities after reading.

The following are the parts of this module that will help you finish your tasks. Read the following descriptions below to better understand each part.

What I Need to Know

This part will be your guide to learn in the specific lessons specifically your skills and competencies.

What I Know

This contains a 10-item pre-test that will check what you already know.

What's In

In this section, you will be given review questions or exercises that connects your previous lesson to the new one.

What's New

It is in this part that the new lesson will be introduced to you in different ways: a story, a poem, a problem opener, an activity, or a situation.

What is It

This portion will give you the topic, information and concepts as a brief discussion for you to learn. You will be also be given specific instructions on how to go about the lesson.

What's More

This provides you questions and exercises to help you deepen your understanding and find practical applications of the concept.

What I Have Learned

This includes a short fill-in the blanks summary of the topic. It is in this part that helps you generalize your understanding of the concepts.

What I Can Do

This section includes an activity or exercises that will help you apply your knowledge into real-life situations.

Assessment

This is composed of a 10-item exercises for you develop your mastery of the topic to and to assess if you have attained the learning competency.

Additional Activities

This part will be the last activity for you to enhance your skill of the lesson learned. It will give you step by step instructions to follow.

Answer Key

This contains answers to all activities in the module.

At the end of this module you will also find:

References This is a list of all sources used in developing this module.

The following are some reminders in using this module:

1. Use the module with care. Do not put unnecessary mark/s on any part of the module. Use a separate sheet of paper in answering the exercises.
2. Don't forget to answer *What I Know* before moving on to the other activities included in the module.
3. Read the instruction carefully before doing each task.
4. Observe honesty and integrity in doing the tasks and checking your answers.
5. Finish the task at hand before proceeding to the next.
6. Return this module to your teacher/facilitator once you are through with it.

If you encounter any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator. Always bear in mind that you are not alone.

We hope that through this material, you will experience meaningful learning and gain deep understanding of the relevant competencies. You can do it!

What I Need to Know

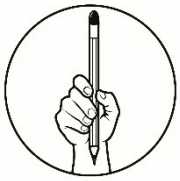
This module is designed to help you learn how the different structures of the circulatory and respiratory systems work together to transport oxygen-rich blood and nutrients to the different parts of the body. You will also understand the prevention, detection, and treatment of diseases affecting the respiratory and circulatory systems.

The module is divided into 3 lessons, namely:

- Lesson 1: The Respiratory System
- Lesson 2: The Circulatory System
- Lesson 3: Preventing Diseases and Healthy Lifestyle

At the end of this module, you are expected to:

1. Explain the mechanism on how the respiratory and circulatory systems work together to transport nutrients, gases, and molecules to and from the different parts of the body; (***S9LT-1a-b-26***)
2. Infer how one's lifestyle can affect the functioning of respiratory and circulatory systems. (***S9LT-1c-27***)



What I Know

Directions: Choose the letter of the correct answer on your answer sheet.

1. Which system is responsible for the exchange of oxygen and carbon dioxide between the air and the cells?
   A. Circulatory B. Excretory C. Digestive D. Respiratory

2. Arrange the following structures in correct order in which air passes through breathing.
   1. Alveoli 2. Bronchus 3. Larynx 4. Trachea
   A. 3,4,2,1, B. 1,2,3,4 C. 4,3,2,1 D. 2,1,3,4

3. During inspiration or inhaling, the diaphragm contracts so that
   A. More air enters in the chest cavity.
   B. More nutrients will be processed by the body.
   C. Less air enters in the chest cavity.
   D. Space inside the lungs lessened for gas exchange.

4. What is the function of blood vessels and capillaries?
   A. They pump the blood to the heart
   B. They carry blood to all parts of the body
   C. They filter impurities from the blood
   D. They carry messages from the brain to the muscles

5. In which order does the blood pass from the body through the heart chambers?
   A. left atrium → left ventricle → right atrium → right ventricle
   B. left atrium → right atrium → left ventricle → right ventricle
   C. right atrium → right ventricle → left atrium → left ventricle
   D. right ventricle → right atrium → left ventricle → left atrium

6. Which chamber of the heart pumps oxygenated blood to the different parts of the body?
   A. right ventricle B. left ventricle C. right atrium D. left atrium

7. What disease is characterized by the buildup of fatty materials on the artery wall?
   A. hypertension B. atherosclerosis C. leukemia D. heart failure

8. Tobacco smoke contains how many carcinogens?
   A. 60 B. more than 60 C. less than 60 D. none

9. What can you do to help lower your chances of getting heart disease?
   A. Stop smoking
   B. Check your blood pressure regularly
   C. Lose weight if you are overweight or obese
   D. All of the above

10. A healthy lifestyle can be described as:
   A. Avoiding meat, eating a balanced diet, exercising everyday
   B. Eating anything you like and exercising 3 time a week
   C. Eating a balanced diet with fruit and vegetables, exercising regularly.
   D. None of thesE

Lesson 1 The Respiratory System

.

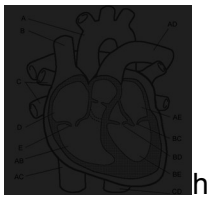
Most people would define respiration synonymously with breathing, the process by which air is taken in and out of the body. Respiration is a far more complex process. Respiration is a gas exchange process by which oxygen is

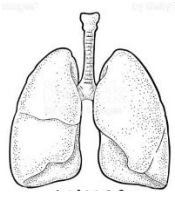
obtained from the environment and delivered to the cells, and carbon dioxide gas is transported and removed from the body.

The process of gas exchange in respiration makes it possible for organisms to make use of the nutrients in food with the release of energy. Without a continuously supply of oxygen, organisms cannot obtain enough energy from their food to survive. The release of energy also generates wastes, specifically carbon dioxide gas.

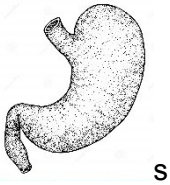
What's In

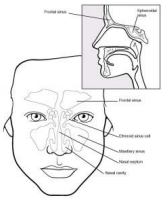
Put a check (✔) if the picture is an organ of the respiratory system and (**X**) if the picture is not an organ of the respiratory system in the box provided.

☐ 1.  heart

☐ 2.  lungs

☐ 3.  trachea

☐ 4.  stomach

☐ 5.  nose

What's New

Do you know that you can survive for several days without water and survive for a month without food, but you cannot survive for more than five minutes without oxygen?

Oxygen is the part of the air that we breathe. Air is a mixture of different gases. The air you breathe is made up of

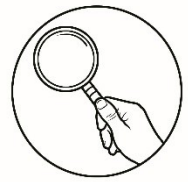
Oxygen	…	21.0%
Nitrogen	…	78.1%
Carbon Dioxide	…	0.03%
Other gases	…	0.87%

Life depends on breathing because the cells of the body need oxygen. You breathe in to bring fresh air into the lungs. The lungs must separate the oxygen from the air. Then you breathe out to get rid of the carbon dioxide that the body does not need.

Breathing is a mechanical process. It is a process of pumping air into and out of the lungs. Breathing is done by a group of organs that make up the **RESPIRATORY SYSTEM** (Figure 1.1). The function of the respiratory system is to exchange oxygen and carbon dioxide between the air and the cells.

The respiratory organs filter particles from the incoming air. They help control the temperature and water content of air. They also aid in producing the sounds used in speech and play important roles in the sense of smell and the regulation of pH.

Now, let us take a tour of our respiratory system



What is It

Read and Learn More.

The Parts and Functions of the Respiratory System

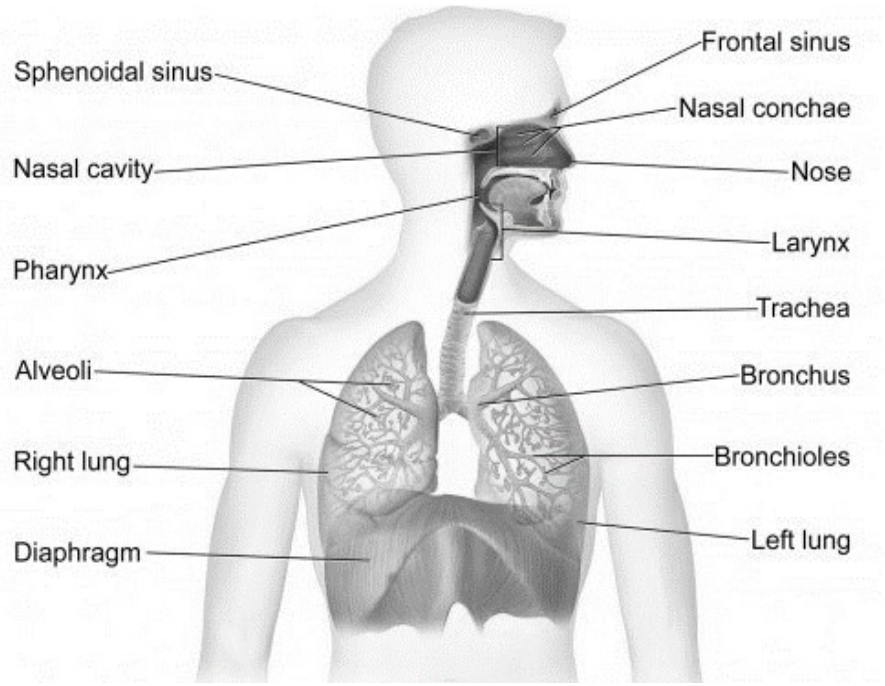
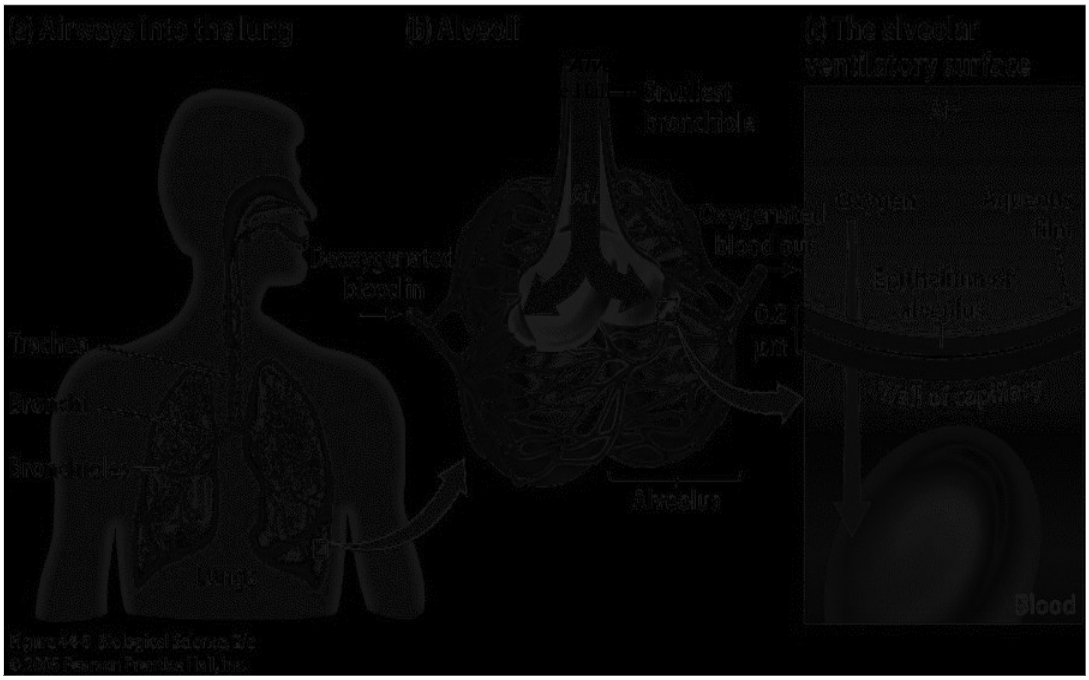


Figure 1.1 The Human Respiratory System
Source: https://www.onlinebiologynotes.com/wp-content/uploads/2018/03/respiratory-system-496x381.jpg

The main function of the respiratory system is to supply blood with oxygen through the breathing process. Oxygen enters the respiratory system through the **mouth** and the **nose**. Then oxygen passes through the pharynx, larynx and trachea. The **pharynx** is commonly called the throat, it connects the nose with the windpipe. The **larynx**, commonly known as the *voice box*, is located in between the pharynx and the trachea. The **trachea** is the empty tube that serves as passageway of air into the chest cavity, and from there, it splits into two smaller tubes called the bronchi (plural for bronchus). Bronchi are the two branching tubes that connect the trachea to the lungs. At the lungs, bronchioles are the hairlike tubes that connect to tiny sacs called alveoli. Alveoli are the airsacs that allow gas exchange in the lungs.

The alveoli are surrounded with capillaries. The inhaled oxygen passes into the alveoli and then diffuses through the capillaries into the arterial blood. As this happens the waste-rich blood from the veins also releases carbon dioxide into the alveoli. The carbon dioxide gas that is given off by the body passes through the same path out of the lungs when we exhale.



The **diaphragm** which is a sheet of muscles that lies across the bottom of the chest, pumps the carbon dioxide out of the lungs, the pulls the oxygen gas into the lungs. As the diaphragm contracts and relaxed, breathing takes place.

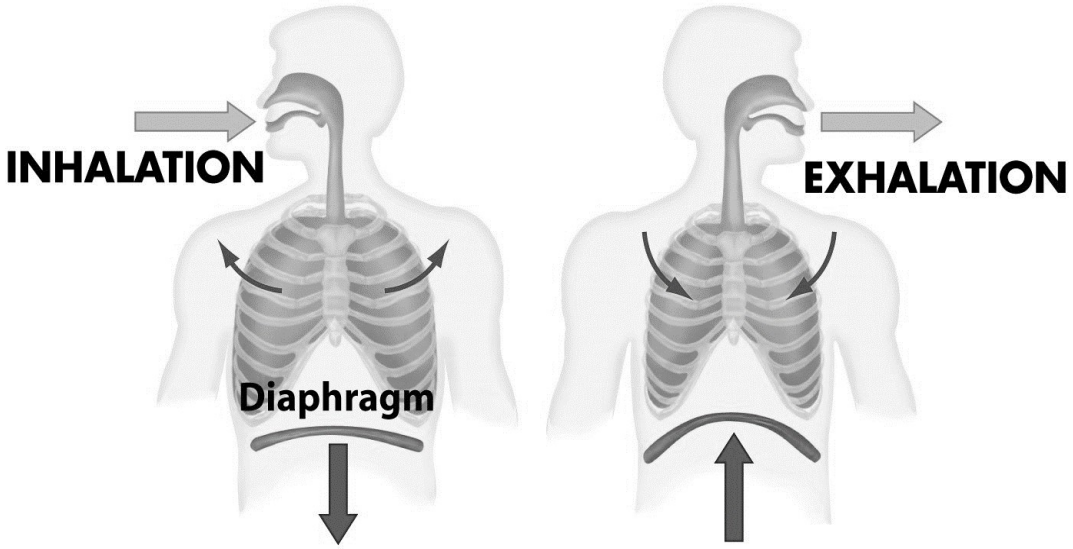


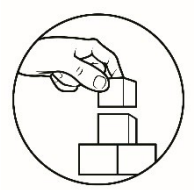
Figure 44-9a Biological Science, 2/e
© 2005 Pearson Prentice Hall, Inc.

When you **breathe in**, or **inhale**, the diaphragm muscle contracts. Inhaling moves the diaphragm down and expands the chest cavity. 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 a higher air pressure. It pushes into the lungs where there is a 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. There is now

Figure 1.2 The alveoli

less space and greater air pressure inside the lungs. It pushes the air outside where there is lower air pressure.

Gas exchange is the delivery of oxygen (O_2) from the lungs to the bloodstream and the elimination of carbon dioxide (CO_2) from the bloodstream to the lungs. It occurs in the lungs between the alveoli and the pulmonary capillaries. This happens as a result of increased concentration of oxygen and a decrease of carbon dioxide. Through the process of **diffusion,** gas exchange is possible.



What's More

Activity 1.1 The Human Respiratory System

Directions: Refer to the diagram and check your understanding of the breathing system by labelling each part and giving its functions in the box corresponding to the part.

1

2

3

4

5

6

Activity 1.2 Human Breathing

Directions: The table presents the part of the respiratory systems on the first column, and two processes during the breathing. Fill in the box with the events during inhalation and exhalation. One is done for you. (*copy the table in your answer sheet*)

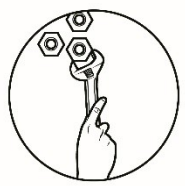
Part of the Respiratory System	Inhalation	Exhalation
Diaphragm muscle	*Ex. contracts*	1.
Rib cage	2.	3.
Chest Cavity	4.	5.
Spaces of the lungs	6.	7.
Level of air pressure inside the lungs	8.	9.

What I Have Learned

Directions: Fill in the missing word or group of words to complete the statement.

I Learned that…

1. The respiratory system is responsible in supplying _____ to the lungs.
2. The _____ is an empty tube that serves as passageway of air into the lungs.
3. The two branching tubes that connect the trachea to the lungs are called _____.
4. The _____ are hairlike tubes that connect to the alveoli.
5. _____ are the airsacs that allow gas exchange in the lungs.



What I Can Do

Breathing Exercise

Background Information:

Normal Breathing rates range from 12-15 times per minute. In this activity you will compare your breathing rate at rest to your breathing rate after exercise.

When counting a breath, in and out is 1.

Procedure:

1. Sit quietly and breathe for one minute. While you are doing this count the number of breaths (in and out is 1) you take. Record this number in the data table.
2. Run in place for 30 seconds. Then sit down again and count the number of breaths you take for 1 minute. Record this number in the data table.
3. Run in place for 1 minute. Sit down and count the number of breaths in 1 minute. Record this number in your data table. (copy the table in your answer sheet)

Observations:

Activity	Rate
Resting	
After 30 s of exercise	
After 1 min of exercise	

Analysis:

1. Did your exercise affect your breathing rate? How?

_____
_____
_____
_____

Assessment

Directions: Choose the letter of the best answer.

1. Which is the pathway of oxygen to the lungs?
   A. nose → bronchus → trachea → larynx → pharynx → alveolus
   B. mouth → larynx → pharynx → alveolus → bronchus → bronchiole

C. mouth → pharynx →larynx → trachea → bronchus → bronchiole → alveolus
D. mouth → trachea → bronchiole → alveolus → pharynx → bronchus →larynx

2. All these statements describe the trachea except _____?
   A. it is also called the voice box
   B. it carries air to and from the lungs
   C. its lower end branches into smaller tubes
   D. it contains rings of cartilage that prevent it from collapsing

3. Arrange the following structures in correct order in which air passes through breathing.
   1. Alveoli 2. Bronchus 3. Larynx 4. Trachea
   A. 3,4,2,1, C. 4,3,2,1
   B. 1,2,3,4 D. 2,1,3,4

4. The movement of both oxygen and carbon dioxide in the body is accomplished by _____?
   A. diffusion C. exocytosis
   B. endocytosis D. osmosis

5. Which system is responsible for the exchange of oxygen and carbon dioxide between the air and the cells?
   A. Circulatory C. Digestive
   B. Excretory D. Respiratory

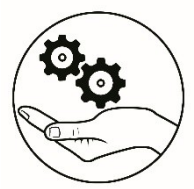
6. Where does exchange of gases take place?
   A. alveoli C. bronchi
   B. bronchioles D. diaphragm

7. When we breathe in, we inhale many gases, including oxygen. What happens to the gases that the body can't use?
   A. They are exhaled
   B. They are changed into oxygen by the lungs
   C. They circulate through the body and are disposed of later
   D. They are absorbed into the digestive system and used to create energ
8. Which of the following serves as a passageway for both air and food?
   A. Nose C. Larynx
   B. Pharynx D. Trachea

9. Which of the following is the site of gas exchange in the lungs?
   A. Alveoli C. Trachea
   B. Bronchioles D. Larynx

10. During inhalation, the diaphragm contracts so that
   A. More air enters in the chest cavity.
   B. More nutrients will be processed by the body.
   C. Less air enters in the chest cavity.

D. Space inside the lungs lessened for gas exchange.



Additional Activities

Crossword puzzle.

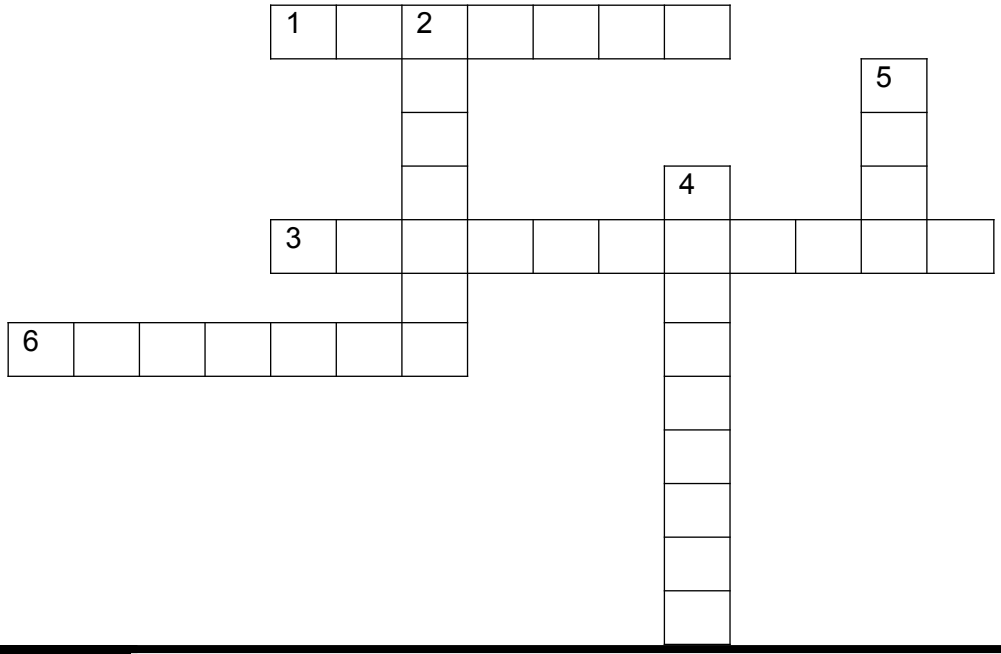
Directions: Read the clues and put the answers into the puzzle.

Across

1. Also called as the windpipe
3. Analogous to the small stems of grapes
6. Analogous to the two major branch of grapes

Down

2. Also called as the airsacs
4. Thin muscles that contracts and relaxes to help air go in out of the lungs
5. The organ which starts the passage of air



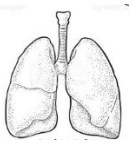
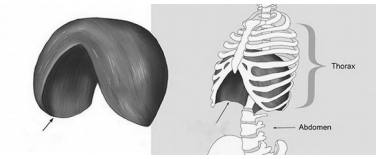
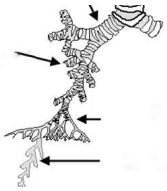
Lesson 2 The Circulatory System

The Circulatory system is also referred to as the *transport system. But aside from transporting important gases and nutrients of the cells of the body, the circulatory system carries metabolic waste such as carbon dioxide (CO_2)* and salts to organs of excretion such as the lungs, kidneys and skin.

The circulatory system also plays two important roles in maintaining homeostasis. First, by exchanging molecules, the circulatory system controls the makeup of the environment in which the cells live. Second, the circulatory system controls the chemical makeup of the blood by continuously transporting it through organs such as the liver and the kidneys.

What's In

Match the names in Column A with the pictures in Column B. Write your answer on the blank provided.

Column A		Column B	
_____ 1.	Alveoli	A.	
_____ 2.	Trachea	B.	
_____ 3.	Diaphragm	C.	
_____ 4.	Lungs	D.	
_____ 5.	Bronchioles	E.	

What's New

ZUMBA TIME

The learners will have 2-3 minute exercise by following the Zumba video to determine the effects of this activity to our circulatory system.

If we do this kind of exercise regularly, this exercise helps us to be physically fit. Link. https://www.youtube.com/watch?v=QIboYmNLe9Q

The learners will describe his/her feeling after the zumba.

Questions:

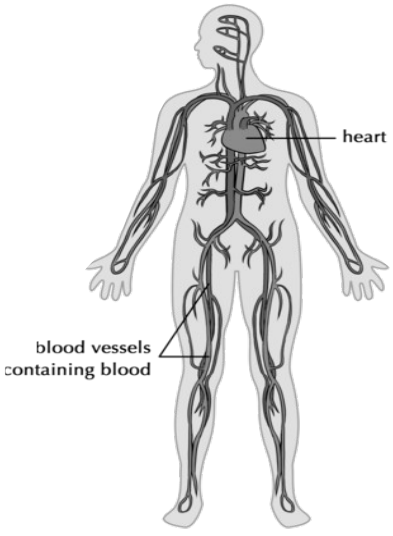
1. How do you feel after the zumba time?

Circulatory System

e activity?

The **circulatory system** is the life support structure that nourishes your cells with nutrients from the food you eat and oxygen from the air you breathe. It can be compared to a complex arrangement of highways, avenues and lanes connecting all the cells together into a neighborhood. Sequentially, the community of cells sustains the body to stay alive. Another name for the circulatory system is the cardiovascular system.

oximately how many heart beat



The circulatory system functions with other body systems to deliver different materials in the body. It circulates vital elements such as oxygen and nutrients. At the same time, it also transports wastes away from the body.

Figure 2.1. The human circulatory system

Source:https://www.siyavula.com/read/science/grade-9/systems-in-the-human-body/images/gr9ll02-gd-0006.png

The following are the three major parts of the circulatory system, with their roles:

1. **Heart –** pumps the blood throughout the body

Look at your fist. Note its size. Your HEART (Figure 5) is a bundle of muscles about the size of your fist. The heart is shaped like a cone. It is located in the center of your chest between the lungs. It is tilted to one side and points downward to the left.

Your heart is a living pump. It is really two pumps in one, a pump on the left side and a pump on the right side separated by a Septum. Each side is divided across into two chambers. The top chamber is called the ATRIUM (plural: atria). The bottom chamber is called the VENTRICLE. Both sides of the heart are divided in the same way.

Note its size. gure 5) is a about the size eart is located in the center of your chest between the lungs. It is tilted to one side and points downward to the left.

Your heart is a living pump. It is really two pumps in one, a pump on the left side and a pump on the right side separated by a Septum. Each side is divided across into two chambers. The top chamber is called the ATRIUM (plural: atria). The bottom chamber is called the VENTRICLE. Both sides of the heart are divided in the same way.

Figure 2.2. The human heart

There is a VALVI icle to prevent the blood from flowing back way doors that keep the blood moving in o

2. **Blood ves** he body
   - **Arte** ay from the heart to the cells
   - **Vein** e heart

Figure 2.2. The human heart

- **Capillaries** - the smallest blood vessels in the body, connecting the smallest arteries to the smallest veins. The actual site where gases and nutrients are exchanged

3. **Blood** – carries the materials throughout the body. The blood has two different parts. The nonliving, liquid part is called PLASMA. It is a yellowish fluid that makes up 55 percent of your blood. The remaining 45 percent is made up of three kinds of cells: red blood cells, white blood cells and platelets.

Circulation

Circulation is the movement of blood through the vessels of the body. It is induced by the pumping action of the heart. It serves to distribute nutrients and oxygen to all parts of the body and remove waste products as well.

3 Types of Circulation

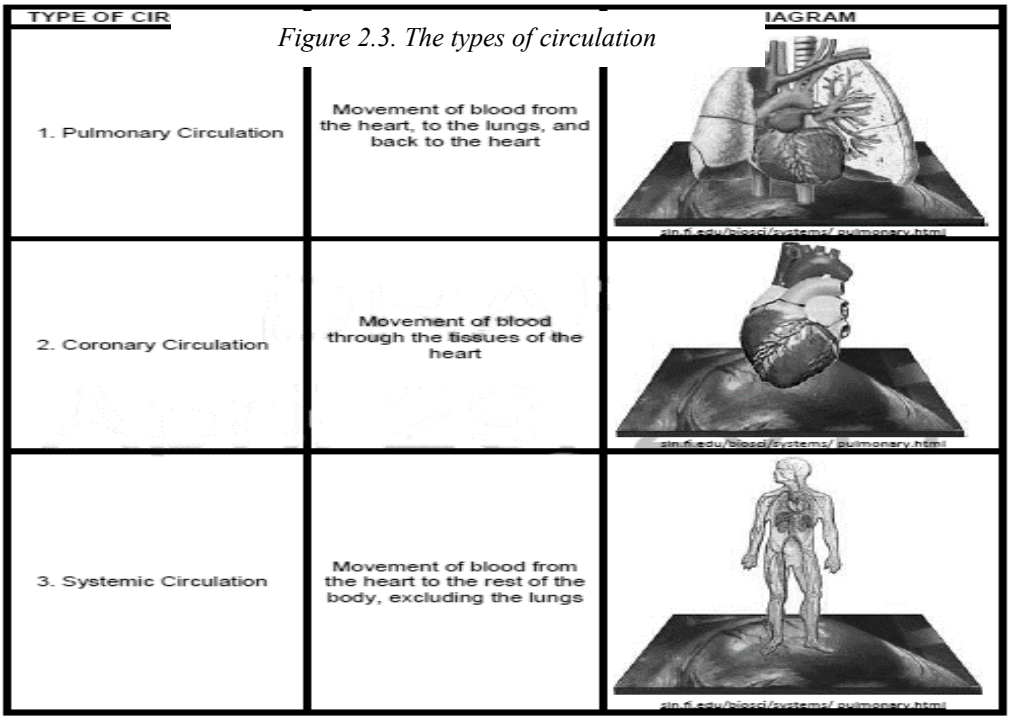


Figure 2.3. The types of circulation

Tracing the Flow of Blood through the Heart

The path the blood takes through the heart is listed below. Write the letter for each step in the proper place in drawing of the heart.

a. Blood returning from the body travels through a blood vessel connected to the heart.
b. The blood enters the right atrium.
c. After the right atrium fills, the atria contract. This pushes the blood past a one-way valve.

d. The blood fills the right ventricle.
e. The ventricles contract and push the blood which passes another valve into a blood vessel.
f. This blood vessel goes to the lungs where the blood picks up oxygen.
g. Blood from the lung travels through a blood vessel to the heart.
h. The blood enters the left atrium.
i. After the left atrium is filled, it contracts. This pushes the blood to a one-way valve.
j. The blood fills the left ventricle.
k. The ventricles contract and push the blood to a valve into a blood vessel.
l. This blood, rich in oxygen, goes to the body.

The cycle is repeated over and over to complete the whole circulatory process. Remember, one cycle is over **20 seconds**. That is how fast the system works.

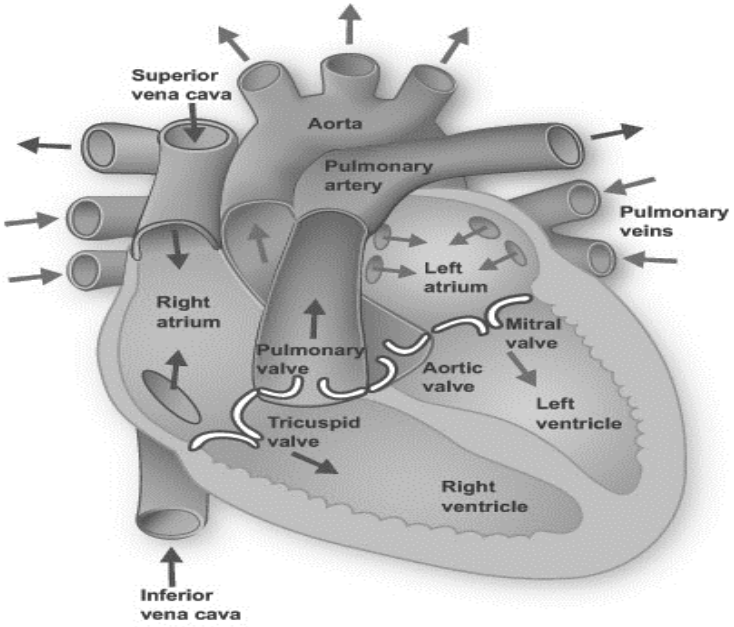


Figure 2.4 Blood flow through the heart

What's More

Activity 2.1 The Human Heart

Directions: Matching type. Listed in column A are the parts of the h
while column B, their function. Write the letter of the correct answer f
column B on your answer sheet.

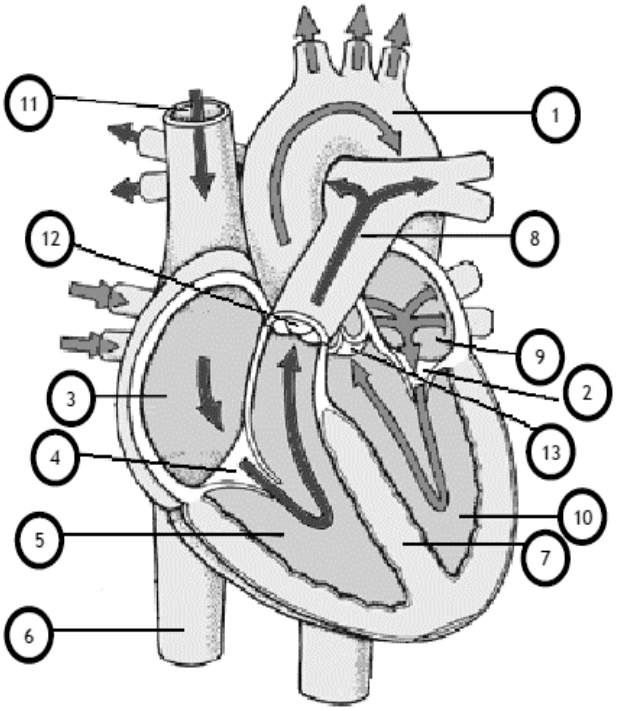
Septum
Superior Vena Cava
Aortic Valve
Inferior Vena Cava
Left ventricle
Bicuspid Valve
Right Ventricle
Right Atrium
Left Atrium
Pulmonary Valve
Pulmonary Artery
Tricuspid Valve
Aorta

Figure 2.4 Blood flow through the heart *it*

Column A	Column B
1. Left Ventricle	A. One-way door that keep blood to flow in one direction
2. Right Ventricle	B. Receiver of oxygen-rich blood
3. Left Atrium	C. Pumps oxygen-rich blood throughout the body
4. Right Atrium	D. Pumps oxygen-poor blood to the lungs
5. Valve	E. Receiver of oxygen-poor blood

Activity 2.2 Heart Label

Directions: Label the parts of the human heart. Choose your answers from the words in the box.

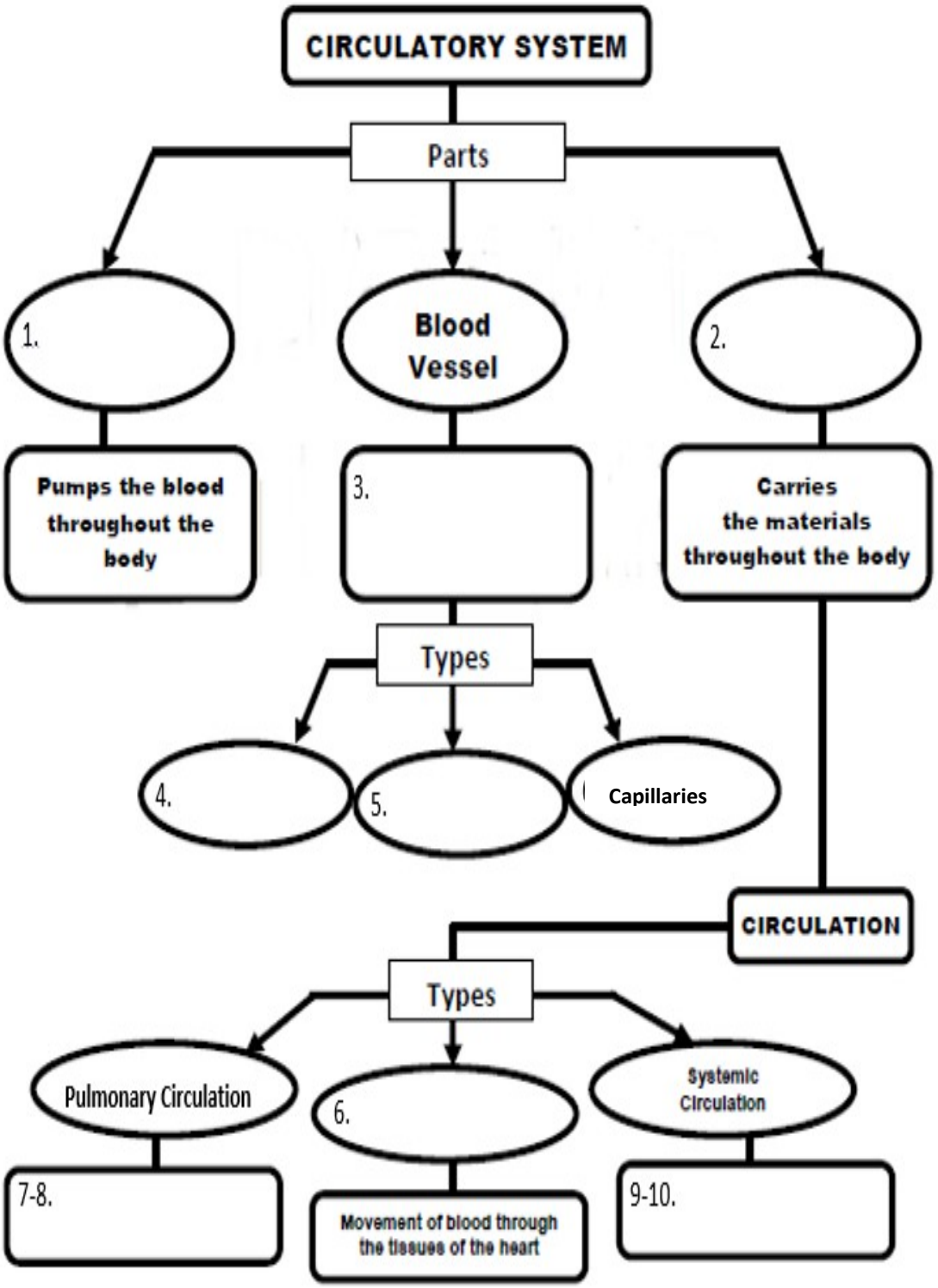


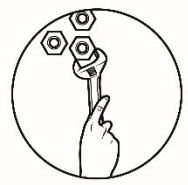
Septum
Superior Vena Cava
Aortic Valve
Inferior Vena Cava
Left ventricle
Bicuspid Valve
Right Ventricle
Right Atrium
Left Atrium
Pulmonary Valve
Pulmonary Artery
Tricuspid Valve
Aorta

What I Have Learned

I learned that…

Septum
Superior Vena Cava
Aortic Valve
Inferior Vena Cava
Left ventricle
Bicuspid Valve
Right Ventricle
Right Atrium
Left Atrium
Pulmonary Valve
Pulmonary Artery
Tricuspid Valve
Aorta





What I Can Do

Directions: Measure the pulse rate of their parents or siblings when they are at rest and after running, walking c

Figure 2.4 Blood flow through the heart

- Sit quietly for a few minutes before beginning the activity.
- When you are ready, place your first two fingers either on your neck or on the inside of your wrist and locate your pulse.
- Once you find your pulse, start the watch, and for 60 seconds, count the number of beats you feel. That is your pulse. After the activity, copy the table below and record your observations in your answer sheet.
- Compare their pulse rate (heart rate) when they are at rest and after doing hard activity for 2 minutes.

Table 1

Activities	Your Pulse Rate	Siblings/ Parents Pulse Rate
Resting		
Walking		
Running/ Jumping		

1. Do they have the same result as what you did with your siblings/ parents?

   _____
   _____

2. How would you differentiate your heart rates in resting, in walking and in jumping/ running?

   _____
   _____

Assessment

Directions: Choose the letter of the best answer.

3. Which type of blood vessels carries blood away from the heart?
   A. Arteries B. Veins C. Capillaries D. Plasma

4. What is the function of blood vessels and capillaries?
   A. They pump the blood to the heart
   B. They carry blood to all parts of the body
   C. They filter impurities from the blood
   D. They carry messages from the brain to the muscles

5. What is the point of reference of the size of the person's heart?
   A. The size of his hand
   B. The distance between his thumb and his forefinger
   C. The size of his closed fist
   D. The size of his open palm

6. Which statement is true about arteries?
   A. Arteries carry oxygen-poor blood.
   B. Arteries move blood toward the heart.
   C. Arteries connect to the atria of the heart.
   D. Arteries move blood away from the heart

7. Which statement is correct about pulmonary circulation?
   A. Arteries carry only oxygenated blood.
   B. Both veins and arteries carry oxygenated blood
   C. Arteries carry only deoxygenated blood.
   D. Both veins and arteries carry deoxygenated blood.

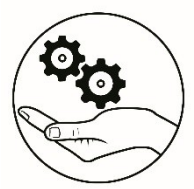
8. What is the function of the valves in the veins?
   A. prevent back flow of blood
   B. filter the blood
   C. direct the blood flow
   D. all of the above

9. In which order does the blood pass from the body through the heart chambers?
   A. left atrium → left ventricle → right atrium → right ventricle
   B. left atrium → right atrium → left ventricle → right ventricle
   C. right atrium → right ventricle → left atrium → left ventricle
   D. right ventricle → right atrium → left ventricle → left atrium

10. Oxygen-rich blood passes through all the arteries in the body except through one type. Which of the following arteries differs from the rest?
   A. aorta
   B. coronary arteries
   C. pulmonary arteries
   D. renal arteries

11. Which chamber of the heart pumps oxygenated blood to the different parts of the body?
   A. right ventricle
   B. left ventricle
   C. right atrium
   D. left atrium

12. How long is one complete cycle of blood circulation in our body?
   A. 20 seconds B. 30 seconds C. one-minute D. five minutes



Additional Activities

Activity: FIND ME

Objective:

Give the components of the circulatory system.

Direction: Choose from the words in the box which organs are involved in the circulatory system

.

MOUTH	VEIN	HEART
TRACHEA	STOMACH	
BRONCHUS	LARYNX	LUNGS
NOSE	ARTERY	
CAPPILARY	ALVEOLI	BLOOD

Lesson 3 Preventing Diseases and Healthy Lifestyle

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Figure 2.2. The human heart

The circulatory and respiratory system interact in a a complex manner in order to perform their physiological functions. Only by working together can they keep the body functioning properly. They are so interrelated and interdependent upon one another such that, what is harmful to one is also harmful to the other.

What's In

Directions: Identify the given words if it is an organ/part of respiratory write **R** and write **C** if it is an organ/part of the circulatory system.

1. Blood
2. Lungs
3. Heart
4. Veins
5. Diaphragm
6. Trachea
7. Arteries
8. Alveoli
9. Valve
10. Nose

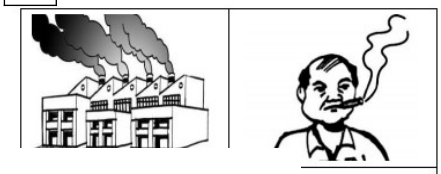
What's New

Activity 1: What's the Word?

Directions: All four pictures in each given set depict negative ways of living. They are connected by one common word that indicates the effect of one's lifestyle on the functioning of the respiratory and

circulatory systems. The expected answers are illnesses that are brought about by the negative lifestyles.

1



What's the word?

A _ _ _ _ A

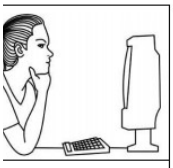
Smoking

The circulatory and respiratory system are so interrelated and interdependent upon one another such that, what is harmful to one is also harmful to the other.

What's the word?

H _ _ _ _ _ _ _ _ _ _ N

One practice that is harmful to both systems is smoking. Tobacco smoke contains well over 60 known carcinogens or cancer causing agents. Each inhalation contains a mixture of thousands of compounds. These carcinogens belong to a class of polycyclic aromatic hydrocarbons (PAHs). Tar, is one such toxic product inhaled during smoking. Tobacco also contains lead-210, which is a radioactive carcinogen.



What's the word?

A _ _ _ _ A

Cigarette smoking harms nearly every organ in the body, causing many illnesses and affecting health in general. The negative effects of smoking on circulatory system include increased heart rate and blood pressure, coronary heart disease, arteriosclerosis, and vascular diseases. The respiratory diseases caused by smoking are chronic bronchitis, emphysema, asthma, cough, colds, tuberculosis, lung cancer, and other respiratory infections due to the chemical content which harms blood cells.

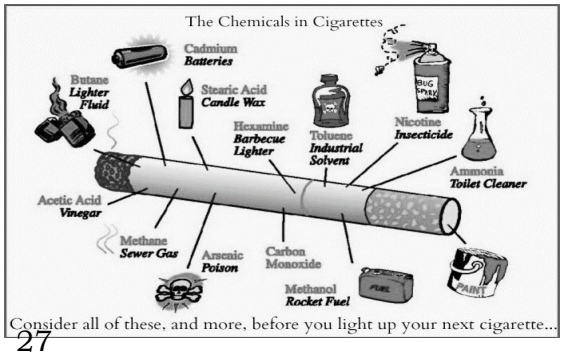


Figure 3.1 Chemicals in Cigarettes

Source:https://dainfographics.files.wordpress.com/2011/01/cigarette_chemicals.jpg

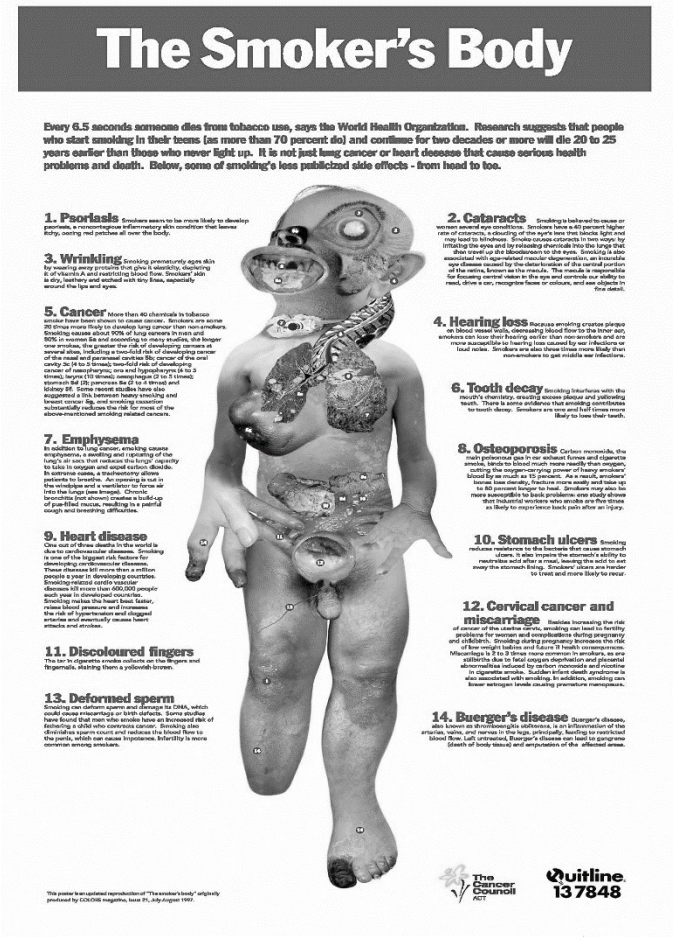


Figure 3.2 The Smokers Body

Source: http://cronkitehhh.jmc.asu.edu/wp-content/uploads/2016/02/smokers-body-950x1344.jpg

Diseases Affecting the Circulatory System

The diseases that affects the circulatory system reduce its overall ability to function by physically damaging the heart and the blood vessels or by obstructing the flow of blood.

Here are some diseases associated with circulatory system.

1. **Anemia** - It is characterized by a decrease in the number of red blood cells as a result of a severe hemorrhage.

Figure 3.2 The Smokers Body

2. **Leukemia** - It is developed when there is an excessive production of abnormal white blood cells.
3. **Septicemia** – blood poisoning and caused by the spread of microorganisms and toxins through the blood.

4. **Atherosclerosis** – occurs when the arteries become narrow and blood cannot flow. This is caused by the accumulation of plaques, caused by fatty matter and even cholesterol or calcium. As it progresses in the coronary arteries, it restricts blood flow and damages heart muscles resulting to *heart attack*.

5. **Congestive heart failure (CHF)** – weakening of the heart muscle rendering it to unable to pump the necessary amount of blood flow into the system. (chronic or acute)

6. **Hypertension** - It is sometimes called high blood, happens when the force pushing against the walls of the arteries as the heart pumps blood is too high.

7. **Stroke** – condition in which the brain cells suddenly die because of lack of oxygen.

Diseases Affecting the Respiratory System.

1. **Nosebleeding** – occurs when the nasal membranes dry up and crack. It is very common when the temperature of the day is very warm.
2. **Allergic rhinitis** – a form of allergy which causes the inflammation of the nasal tissues.

3. **Asthma** – caused by allergic reactions to irritants. This is characterized by periodic episodes of contractions of the bronchial muscle which restrict air movement.

4. **Bronchitis** – refers to inflammation of the bronchi caused by bacteria or viruses. There is increased mucus production which leads to coughing.
5. **Pneumonia** – involves inflammation of the lungs caused by bacteria or viruses in the microscopic air sacs called alveoli.
6. **Tuberculosis – (TB**) is an infectious disease that is caused by *Mycobacterium tuberculosis.*
7. **Lung Cancer** – also known as carcinoma of the lungs and caused by uncontrolled growth of cell tissues in the lungs.

8. **Emphysema** – a diseases often referred to as *chronic obstructive pulmonary disease* (COPD) results from gradual destruction of the walls of alveoli or air sacs.

Prevention and Treatment of Circulatory and Respiratory Diseases

The best way to prevent diseases in the respiratory and circulatory system is to have a healthy lifestyle, which includes a balanced diet, regular exercise, adequate rest, proper hygiene, and avoiding vices such as cigarette smoking and alcoholic drinking.

Source : https://www.vectorstock.com/royalty-free-vector/flat-healthy-lifestyle-poster-vector-20618754

Respiratory and circulatory diseases can easily be detected with regular healtcheck-up and physical screening. Perhaps, air pollution can be discussed as well, which one's respiratory system.

Promoting a Healthy Lifestyle

A healthy lifestyle guarantees an effective cardiovascular and respiratory system.
Here are some ways to promote a healthy lifestyle.

1. Get plenty of Exercise
2. Eat a healthy, well balance Diet
   A heart-healthy diet aims the following:
   - *A healthy eating pattern*. Aside from adhering to dietary guidelines and limiting intake of fats, a healthy eating pattern encourages a diet rich in carbohydrates that provide fiber and minerals, which help protect a person against cardiovascular diseases.
   - *A healthy body weight*. Obesity is associated with elevated blood lipids, hypertension, and diabetes. Dietary guidelines recommend controlled energy intake per day coupled with regular exercise to keep weight in check.
   - *A desirable blood cholesterol level*. To achieve a healthy level of blood cholesterol, dietary guidelines recommend a total fat intake of less than 30 percent of the daily energy requirement.
   - *A normal blood pressure*. For blood pressure to be normal, health authorities recommend weight control, reduced salt intake, increased potassium intake, limited alcohol intake, and a diet that contains adequate amounts of calcium and magnesium.
3. Do not smoke
4. Avoid alcohol consumption.
5. Avoid stress

Source: http://cronkitehhh.jmc.asu.edu/wp-content/uploads/2016/02/smokers-body-950x1344.jpg

What's More

Activity 3.1 Classifying Diseases

Directions: Identify the diseases of respiratory and circulatory system. Choose from the word bank below

Asthma	Atherosclerosis	Hypertension
Bronchitis	Coronary heart disease	Tuberculosis
Stroke	Pneumonia	Lung cancer
Anemia		

Circulatory Diseases	Respiratory Diseases
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Activity 3.2

Directions: Identify what word/s is referred to by the following statements.

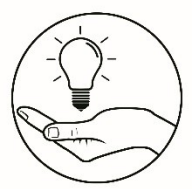
_____ 1. The addicting substance in cigarettes.

_____ 2. The sticky brown substance found in cigarettes that can cause discoloration of the teeth, the fingernails and even the lungs.

_____ 3. This disease is characterized by periodic episodes of contractions of the bronchial muscle which restrict air movement caused by allergic reactions to irritants

_____ 4. Number of carcinogens does Tobacco smoke contains.

_____ 5. Disease that is characterized by the buildup of fatty materials on the artery wall.



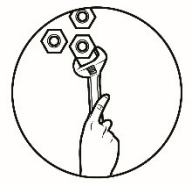
What I Have Learned

Directions: Fill in the missing word or group of words to complete the statement.

I Learned that…

Cigarette ___(1)___ harms nearly every ___(2)___ in the body, causing many ___(3)___ and affecting health in general. The negative effects of smoking on ___(4)___ include increased heart rate and blood pressure, coronary heart disease, arteriosclerosis, and vascular diseases. The ___(5)___ caused by smoking are chronic bronchitis, emphysema, asthma, cough, colds, tuberculosis, lung cancer, and other respiratory infections due to the chemical content which harms blood cells.

The best way to ____(6)___ in the respiratory and circulatory system is to have a __(7)____, which includes a balanced diet, regular exercise, adequate rest, proper hygiene, and avoiding vices such as ____(8)___and ___(9)_____. Respiratory and circulatory diseases can easily be detected with regular ___(10)___and physical screening. Perhaps, air pollution can be discussed as well, which one's respiratory system.



What I Can Do

On a short size bond paper, design a wall poster or placard that will make members of your house aware of how they can effectively take care of their respiratory and circulatory systems. You may use any medium for your artwork.

Example

Poster Making: Information Dissemination on How to Take Care of the Respiratory and Circulatory Systems

Rubrics

Category	4	3	2	1
Presentation	The poster clearly communicates the main idea and strongly promotes awareness	The poster communicates some of the important ideas and slightly promotes awareness	The poster indirectly communicates the idea and hardly promotes awareness	The poster does not sufficiently communicate any idea that can promote awareness
Creativity and Originality	All of the graphics used on the poster reflect an exceptional degree of student ingenuity in their creation.	Most of the graphics used on the poster reflect student ingenuity in their creation.	The graphics were made by the student but were copied from the designs or ideas of others.	The graphics were not made by the student
Accuracy and Relevance of the Content	All graphics in the poster are accurate and related to the topic.	Most graphics in the poster are accurate and related to the topic.	Some graphics in the poster are accurate and related to the topic.	The graphics in the poster are neither accurate nor related to the topic.
Required Elements .	The poster includes all required elements as well as additional information.	All required elements are included.	Few required elements are included.	Required elements are missing

Assessment

Directions: Choose the letter of the best answer.

1. What disease is characterized by the buildup of fatty materials on the artery wall?
   A. hypertension C. leukemia
   B. atherosclerosis D. heart failure

2. The following are respiratory diseases EXCEPT
   A. asthma C. hypertension
   B. emphysema D. pneumonia

3. Negative lifestyle affects the normal functioning of the respiratory and circulatory system. Which of the following is NOT an example of negative lifestyle?
   A. alcohol drinking C. enough rest and sleep
   B. cigarette smoking D. living in polluted places

4. Tobacco smoke contains how many carcinogens?
   A. 60 B. more than 60 C. less than 60 D. none

5. Carcinogens that are found in tobacco belong to which type of hydrocarbons?
   A. polycyclic aromatic hydrocarbon C. alkene
   B. saturated hydrocarbon D. aromatic hydrocarbon

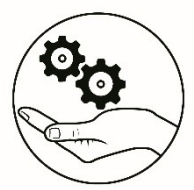
6. Exercise is a good way to help prevent heart attacks.
   A. True B. False

7. What can you do to help lower your chances of getting heart disease?
   A. Stop smoking
   B. Check your blood pressure regularly
   C. Lose weight if you are overweight or obese
   D. All of the above

8. A healthy lifestyle can be described as:
   A. Avoiding meat, eating a balanced diet, exercising everyday
   B. Eating anything you like and exercising 3 time a week
   C. Eating a balanced diet with fruit and vegetables, exercising regularly.
   D. None of these

9. Eating a healthy diet can help reduce the risk of developing heart problems, what is not an aim of healthy diet.
   A. Healthy eating pattern
   B. High Blood Pressure
   C. Healthy body weight
   D. Desirable blood cholesterol level

10. I feel healthy so it isn't important to schedule a regular check up with my doctor.
   A. True
   B. False



Additional Activities

Collage Making

Cut out different examples of unhealthy lifestyles from old magazines or newspapers and create a collage out of the cut-outs on your notebook or journal.

How to Make a Collage

1. Select photos from your cut-out materials. Choose photos with a theme to **make** use of the **collage's** storytelling power.
2. Arrange photos. Select a layout, then arrange your photos to bring your story to life.

Rubrics for Collage

Criteria	Level 1	Level 2	Level 3	Level 4
Variety of pictures ▪ **used to develop main idea**	❑ limited variety of pictures used to develop the main idea	❑ adequate variety of pictures used to develop the main idea	❑ good variety of pictures used to develop the main idea	❑ excellent variety of pictures used to develop the main idea
Ideas ▪ **originality** ▪ **interest**	❑ few original ideas in material or display are evident to stimulate interest	❑ some original ideas in material or display are evident to stimulated some interest	❑ several original ideas in material or display are evident to stimulate much interest	❑ many original ideas in material and display are evident and stimulate a great deal of interest
Relevance of material ▪ **connected to main idea**	❑ little material selected is relevant and rarely connected to the main idea	❑ some material selected is relevant and somewhat connected to the main idea	❑ material selected is mostly relevant and connected to the main idea	❑ material selected is all relevant and clearly connected to the main idea
Visual Impact ▪ **effectiveness of overall presentation**	❑ overall visual impact is limited	❑ overall visual impact is somewhat effective	❑ overall visual impact is effective	❑ overall visual impact is very effective

Figure 2.4 Blood flow through the heart

Answer Key

Lesson 1: The Respiratory System

What I Can Do

Student's answer varies. Number of breaths increases as the activity is increased and longer time used.

ActivityRateRestingAfter 30 s of exerciseAfter 1 min of exerciseYes, the breathing rate during exercise increases as compared to breathing rate during resting

Assessment

1. C
2. A
3. A
4. A
5. D
6. A
7. A
8. B
9. A
10. A

Additional Activities

Crossword Puzzle
Trachea
Alveoli
Bronchioles
Diaphragm
Nose
Bronchi

What's More

Activity 1.1 The human Respiratory System
1. Trachea
2. Bronchi/ Bronchus
3. Bronchioles
4. Alveoli
5. Nose
6. Nasal Passages

Activity 1.2 Human Breathing
1. relaxes
2. moves up
3. moves down
4. increase size
5. original size
6. more space
7. less space
8. lower air pressure
9. greater air pressure

What I Have Learned

1. oxygen
2. trachea
3. bronchus/bronchi
4. bronchioles
5. alveoli

What I Know

1. D
2. A
3. A
4. B
5. C
6. B
7. B
8. B
9. D
10. C

What's In

1. X
2. ✓
3. ✓
4. X
5. ✓

What's New

Lesson 2: The Circulatory System

What I Can Do	What's More	What's In
Poster making **What I Can Do** *Student's answer varies* **Assessment** 1. B 2. C 3. C 4. B 5. A 6. A 7. D 8. C 9. B 10. A **Assessment** 1. A **Additional Activities** 1. C 2. D 3. C 4. D 5. C *Essayer to rubrics on Collage Making* 8. C 9. B 10. A **Additional Activities** Find Me 1. Vein 2. Heart 3. Artery 4. Capillary 5. Blood	*Circulatory diseases* Activity 3.1 Classifying Diseases **What's More** 1. Atherosclerosis 2. Hypertension 3. Coronary Heart Disease 4. Stroke 5. Anemia *Respiratory diseases* 1. Asthma 2. Bronchitis 3. Tuberculosis 4. Pneumonia 5. Lung Cancer Activity 2.2 Heart Label 1. Aorta 2. Pulmonic Valve 3. Right Atrium 4. Tricuspid Valve 5. Right Ventricle 6. Septum 7. Mitral Valve 8. Inferior Vena Cava 9. Left Atrium 10. Aortic Valve 11. Superior Vena Cava 12. Pulmonary Valve 13. Septum **What I Have Learned** 1. Heart 2. Blood 3. Capillaries 4. arteries 5. veins 6. Coronary Circulation 7-8. Movement of blood from the heart to the lungs and back to the heart. 9-10. Movement of blood from the heart to the rest of the body excluding the lungs	**What's In** 1. C 2. R 3. C 4. C 5. B 6. R 7. D 8. R 9. C 10. R **What's New** **What's New** How do you feel after the zumba time? Asthma 2. Hypertension 3. Anemia *breath, etc.)* What organ systems are affected by the activity? *Respiratory and Circulatory System* Touch your chest, feel you heart. Approximately how many heart beat do you feel? *(varied answers from students)*

Lesson 3: Preventing Diseases and Healthy Lifestyle

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Coralejo, A., et al (2014) Conceptual Science and Beyond 9. K to 12 Ed. Philippines: Brilliant Creations Publishing, Inc.

Abecilla, N., et.al, (2014). Conceptual Science and Beyond 9 (K to 12 ed.). Brilliant Creations Publishing, Inc.

Online Resources
(DepEd Materials)

BEAM: Biology – Organ System – Circulatory System
EASE Biology M11 Energy Producing & Distributing Systems, Lessons 2 & 3
APEX Biology – Unit IV, The Organ Systems, Lessons 11 & 12
EASE Biology M14 Genetics: The Study of Inherited Traits, Lessons 2

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