GRADE 9
K to 12 BEC

DepED
DEPARTMENT OF EDUCATION

Science

Quarter 1 – Module 1: Week 1-2
Respiratory and Circulatory Systems, Working with Other Organ Systems

SCHOOLS DIVISION OF ANTIQUE

Science – Grade 9
Alternative Delivery Mode
Quarter 1 – Module 1: Respiratory and Circulatory Systems, Working with Other Organ Systems
First Edition, 2020

Published by the Department of Education, Schools Division of Antique

Development Team of the Module

Writer: May Heidi I. Maghari

Content Editor: Anita S. Gubalane, EdD

Language Editor: Charlotte G. Chan, EdD

Illustrator: Conrad Ladislee B. Tua III

Layout Artist: Zail Jeriyah O. Catbagan, Mavie Joy P. Mallorca, Glorymie M. Polido

Management Team: Felisa B. Beriong, CESO VI
Corazon c. Tingson
Gaudencio C. Riego, PhD
Schubert Anthony C. Sialongo
Anita S. Gubalane, EdD
Phoenix Allanah Zandria Q. Salcedo-Tordesillas
Marian Rose B. Sarmiento

Printed in the Philippines by _____

Department of Education – Region VI – Schools Division of Antique

Office Address: Binirayan, San Jose de Buenavista, Antique
Telefax: (036) 540-9837
E-mail Address: antique@deped.gov.ph

9

Science

Quarter 1 – Module 1: Week 1-2
Respiratory and Circulatory Systems, Working with Other Organ Systems

Introductory Message

For the facilitator:

Welcome to the **Science 9** Alternative Delivery Mode (ADM) Module **Respiratory and Circulatory Systems, Working with Other Organ Systems**!

This module was collaboratively designed, developed and reviewed by educators both from public and private institutions to assist you, the teacher or facilitator in helping the learners meet the standards set by the K to 12 Curriculum while overcoming their personal, social, and economic constraints in schooling.

This learning resource hopes to engage the learners into guided and independent learning activities at their own pace and time. Furthermore, this also aims to help learners acquire the needed 21st century skills while taking into consideration their needs and circumstances.

In addition to the material in the main text, you will also see this box in the body of the module:

Notes to the Teacher

This contains helpful tips or strategies that will help you in guiding the learners.

As a facilitator you are expected to orient the learners on how to use this module. You also need to keep track of the learners' progress while allowing them to manage their own learning. Furthermore, you are expected to encourage and assist the learners as they do the tasks included in the module.

For the learner:

Welcome to the **Science 9** Alternative Delivery Mode (ADM) Module **Respiratory and Circulatory Systems, Working with Other Organ Systems!**

The hand is one of the most symbolized part of the human body. It is often used to depict skill, action and purpose. Through our hands we may learn, create and accomplish. Hence, the hand in this learning resource signifies that you as a learner is capable and empowered to successfully achieve the relevant competencies and skills at your own pace and time. Your academic success lies in your own hands!

This module was designed to provide you with fun and meaningful opportunities for guided and independent learning at your own pace and time. You will be enabled to process the contents of the learning resource while being an active learner.

This module has the following parts and corresponding icons:

 ***Aiming at the Target***	This will give you an idea of the skills or competencies you are expected to learn in the module.
 ***Trying the Challenge***	This part includes an activity that aims to check what you already know about the lesson to take. If you get all the answers correct (100%), you may decide to skip this module.
 ***Connecting to the Past***	This is a brief drill or review to help you link the current lesson with the previous one.
 ***Gearing Up to Start***	In this portion, the new lesson will be introduced to you in various ways such as a story, a song, a poem, a problem opener, an activity or a situation.
 ***Hitting the Target***	This section provides a brief discussion of the lesson. This aims to help you discover and understand new concepts and skills.
 ***Strengthening the Grasp***	This comprises activities for independent practice to solidify your understanding and skills of the topic. You may check the answers to the exercises using the Answer Key at the end of the module.
 ***Wrapping Up to Go***	This includes questions or blank sentence/paragraph to be filled in to process what you learned from the lesson.
 ***Relating to Real Life***	This section provides an activity which will help you transfer your new knowledge or skill into real life situations or concerns.
 ***Checking the Target***	This is a task which aims to evaluate your level of mastery in achieving the learning competency.
 ***Enriching the Skill***	In this portion, another activity will be given to you to enrich your knowledge or skill of the lesson learned. This also tends retention

	of learned concepts.
 ***Finding the Score***	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!

Aiming at the Target

This module was designed and written with you in mind. Hopefully, this will help you master the **Respiratory and Circulatory System as they Work with Other Organ Systems (S9LT-Ia-b-26**). The scope of this module allows you to use it in varied learning situations. The language used recognizes your diverse vocabulary level. The activities presented are simplified and doable that you can perform them at home. The lessons are arranged in accordance with the standard sequence of the course and the learner's module that you are now using.

The module is divided into two lessons, namely:

- Lesson 1 – The Human Breathing System
- Lesson 2 – The Circulatory System

After going through this module, you are expected to:

1. identify the parts of the respiratory and circulatory systems and their functions;
2. describe the gas exchange process in respiration; and
3. explain how the circulatory system transport nutrients, gases and other molecules to the different parts of the body

Trying the Challenge

Direction: Write **TRUE** if the statement is correct and **FALSE** if otherwise. Use the answer sheet provided at the end of this module.

_____1. Bronchi are tiny-bubble like bunch of structures at the terminal of the bronchioles.
_____2. The air first enters the windpipe before moving down the trachea.
_____3. The nose and nasal passages clean the entering air from unknown particles.
_____4. The main stem of the bunch of grapes corresponds to the alveoli.
_____5. Another name for bronchi is bronchial tubes.
_____6. Inhaling moves the diaphragm down.
_____7. Exhaling relaxes the diaphragm muscles.
_____8. The ribs move up when you breathe out.
_____9. The chest cavity expands when you breathe in.
_____10. The pressure is great inside the lungs when breathing out.
_____11.When the diaphragm goes lower and the ribs shift up, more breathing space is provided in the chest.
_____12.During inhalation, the air molecules are either crowded inside and tend to get out of the lungs.
_____13.During exhalation, the lungs thrust in causing the gas to be exhaled.
_____14.The air we breathe carries the gas oxygen.
_____15. The pharynx is what we commonly call the voice box.

Lesson 1

The Human Breathing System

Respiratory system is made up of the organs in the body that help us to breathe. Just remember that the word **respiration** is linked to breathing. On the other hand, **Circulatory system** is responsible for distributing materials throughout the body. Take note that **circulation** means transportation or movement in circles. Both systems are essentially meant for each other. The common purpose could not be attained without the other system.

Connecting to the Past

In the illustration of a bunch of grapes below, identify which part of the grapes corresponds to the parts of the human breathing system. Copy the box on your answer sheet and write your answer on the blank spaces.

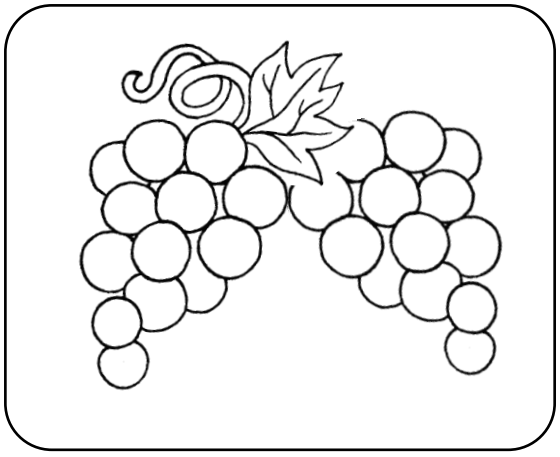


Figure 1. The bunch of grapes model of the breathing system

Table 1. Comparison of the Parts of Grapes Model and the Breathing System

Parts of the "Bunch of Grapes"	Corresponding Part in the Human Breathing System
Main stem	
Large branching stems	
Little stems	
Individual grapes	

Gearing Up to Start

The Respiratory Poem
by Kyndra and Hanna

Here I am about to tell you a story,
About a little thing called the respiratory

It's a system like no other,
And it likes to take cover
Where ventilation,
Is key to respiration.

It starts in your mouth,
Or right through your nose
Down in your trachea,
Yeah that's where it goes.
The pharynx connected to the larynx
Will help bring the air, for your organs to share.

Do you know the parts of your respiratory system mentioned in the poem? Do you know how each part works? Refer to the diagram and check your understanding by labelling each part and giving its functions.

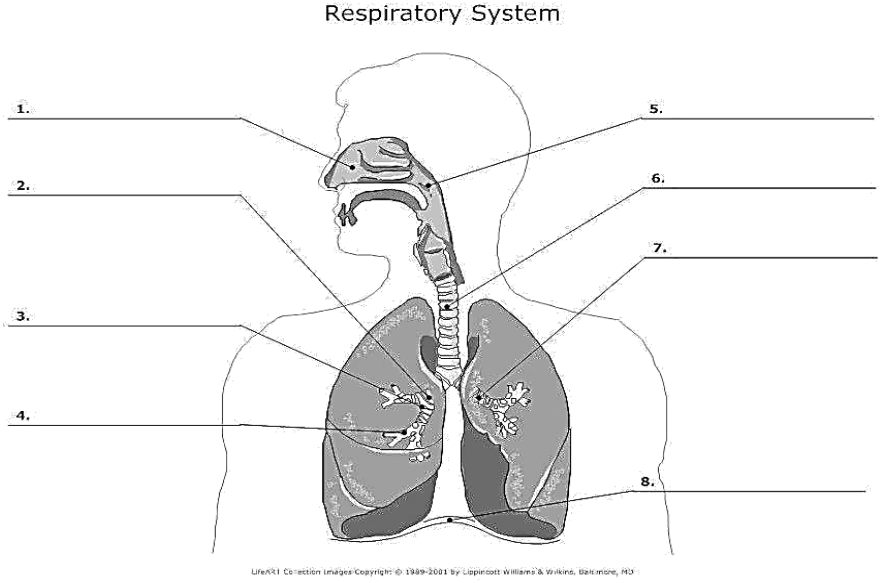


Figure 2. The Parts of the Respiratory System

Source: Pinterest, Human Body: Respiratory System, retrieved on June 12, 2020, https://www.pinterest.ph/pin/502995852117972366/

Hitting the Target

The Human Breathing System

The parts of the respiratory system that are in charge of supplying oxygen are the nose, nasal passageways, pharynx, larynx, windpipe, lungs and diaphragm. In the nose and nasal passages, the air that enters is warmed, humidified, and cleaned. The air then moves down through the pharynx, larynx, trachea, bronchi, bronchioles, and alveoli. **Pharynx or throat** is a cone-shaped passageway leading from the nasal cavity to the larynx that regulate the passage of air. **Larynx**, also called **voice box** is a tube connected to the top of the windpipe. **Trachea or windpipe** is the empty tube that serves as passageway of air into the lungs. **Bronchi** are the two branching tubes that connect the trachea to the lungs. **Bronchioles** are the hair like tubes that connect to the alveoli. **Alveoli** are the **air sacs** that allow gas exchange in the lungs.

Mechanism of the Lungs and the Diaphragm

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

Strengthening the Grasp

Activity 1.

Direction: Breathe in and out. Observe how your chest and belly move.

Fill in Column 2 and 3 with the correct process undertaken by the parts of the respiratory system in Column 1. Write your answer on a separate sheet.

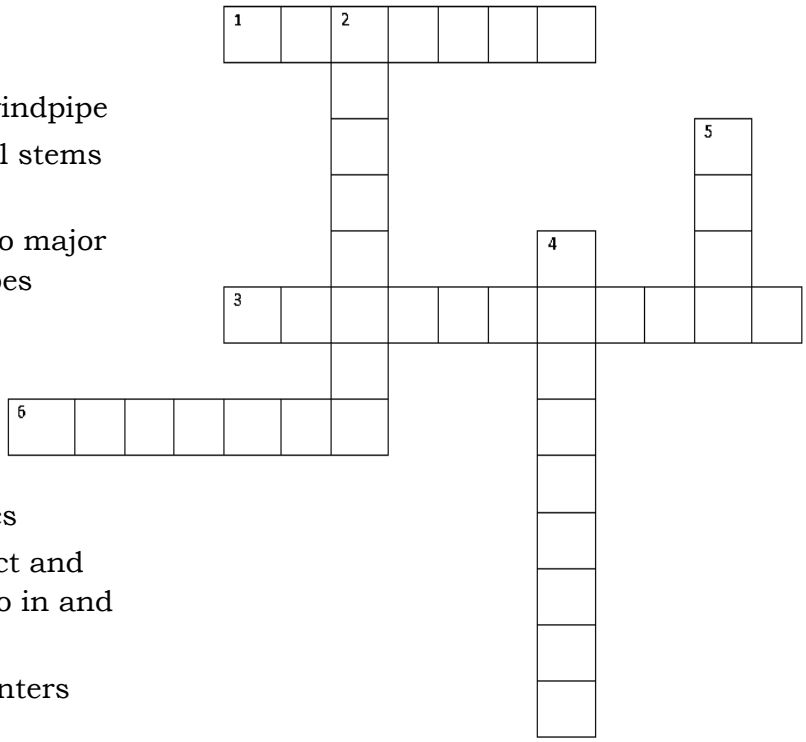
Table 2. The Parts of the Respiratory System Work and How They Work

Column 1	Column 2	Column 3
Part of the Respiratory System	Inhalation	Exhalation
Ex. Diaphragm muscle	**contracts**	
Chest cavity		
Space of the lungs		

Column 1	Column 2	Column 3
ribs		
Air pressure level inside the lungs		

Activity 2. Crossword Puzzle

Read the clues below. Copy the boxes and write the letter of your answer inside the box.



Across

1. It is also called as the windpipe
3. Comparable to the small stems of grapes
6. It corresponds to the two major branches of the grapes

Down

2. Also called as the air sacs
4. Thin muscle that contract and relaxes to help the air go in and out of the lungs
5. The organ in which air enters first

Source: P. A. Sales, (2020) Respiratory and circulatory systems: working with other organ systems. *Workbook Science 9.* Retrieved on June 12, 2020 from Department of Education-Commons

Wrapping Up to Go

Complete each statement.

I have learned that...

1. The respiratory system is responsible in supplying _____to the lungs.
2. _____ is released by the body as waste during respiration.
3. The entering air becomes _____, _____ and _____in the nose and nasal passages.
4. The two branching tubes that connect the trachea to the lungs are called_____.
5. _____ are hair like tubes that connect to the alveoli.
6. Gas exchange occurs in the air sacs of the lungs which are called _____.

7. When the air molecules are too crowded outside, the air molecules tend to go inside. This is called _____.
8. The diaphragm muscle _____ when a person breathes out or exhale.
9. The air is pushed outside where there is lower _____inside the lungs.
10. When the diaphragm muscle _____, the lungs is filled with air.

Relating to Real Life

Direction: Answer the following questions briefly in your answer sheet.

How does the movement of your diaphragm cause the air to go in and out of the lungs?

What do you think will happen if one part of your respiratory system fails to carry out its function properly? _____

Checking the Target

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

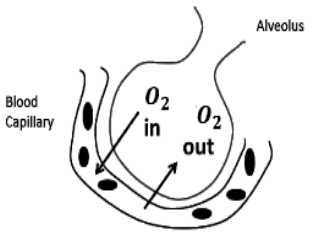
1. The air we breathe goes through the nose, nasal passages and then through the trachea which separates into two branches called _____.
   a. Windpipe
   b. Bronchioles
   c. bronchial tubes
   d. alveoli

2. Which of the following is an empty tube that serves as passageway of air into the lungs?
   a. Trachea
   b. Bronchi
   c. Bronchioles
   d. Alveoli

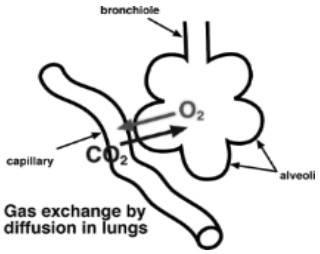
3. Which of the following describes the function of the alveoli?
   a. It filters bacteria out of the air that enters the lungs.
   b. it moistens the air before it diffuses into the capillaries.
   c. it provides a large surface area for gas exchange.
   d. it separates oxygen from carbon dioxide in the air that enters the lungs.

4. Which illustrations below correctly describes how gases are exchanged in the lungs?

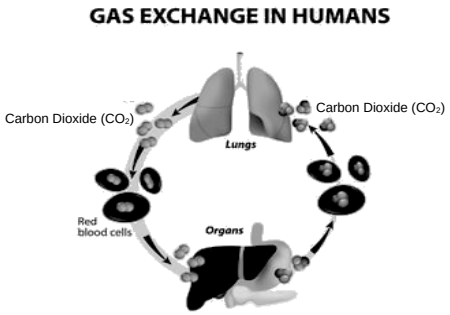
a.



c.



b.



d.

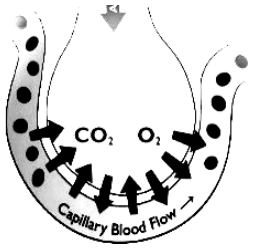


Photo credit: a) https://www.researchgate.net/figure/The-mechanism-of-respiration_fig1_325399012, b) https://www.shutterstock.com/search/gas+exchange, c) https://smabiology.weebly.com/main-page/what-is-gas-exchange, d) https://www.tes.com/teaching-resource/gas-exchange-11493880

5. How does the respiratory system work with the circulatory system so that there is coordination between them and homeostasis is achieved by the body?

   a. the respiratory system provides carbon dioxide to the body which is being delivered to the different blood vessels

   b. the respiratory system distributes oxygenated and deoxygenated gases in the heart

   c. the respiratory system receives the blood from the heart and in return distributes oxygen throughout the body.

   d. the respiratory system allows the exchange of gases in the alveoli and the capillaries of the heart

6. Which options can best describe how your diaphragm muscles move when you breathe out or exhale?

   a. it contracts
   c. it relaxes
   b. it expands
   d. remains the same

7. What happens to the air pressure inside the lungs when you breathe in or inhale?

   a. increases
   c. remains the same
   b. decreases
   d. undetermined

8. Which of the following statements is TRUE about the process of respiration?

a. the diaphragm muscles contract when we breathe in and out
b. the diaphragm muscles experience high and low pressures during respiration
c. the diaphragm muscles vibrate and expand during respiration
d. the diaphragm muscles contract when we inhale and relaxed when we exhale

9. If solid and liquid wastes are removed from the body through defecation and urination, what waste does the body removes during respiration?

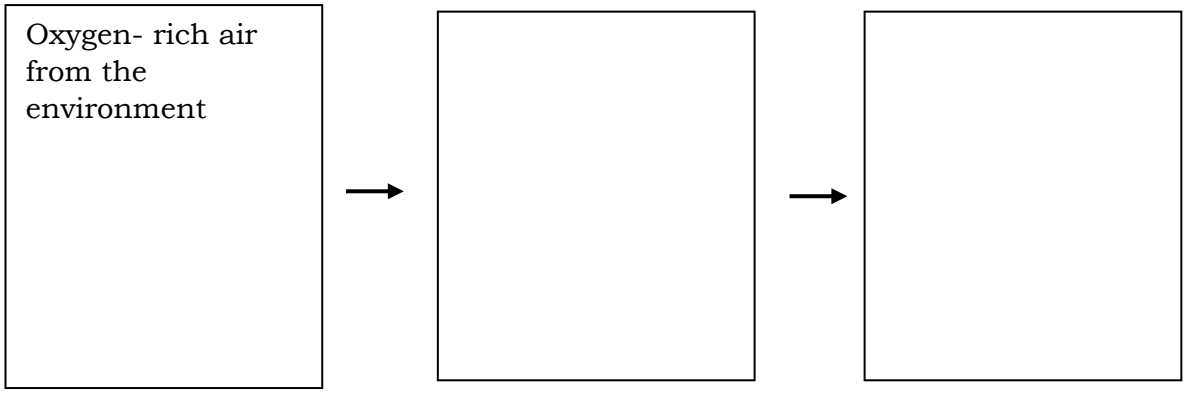
a. Oxygen
b. carbon dioxide
c. blood
d. water

10. How does the diaphragm move relative to the upward movement of the ribs and the expansion of the chest cavity when we breathe in?

a. the diaphragm moves down
b. the diaphragm moves up
c. the diaphragm moves up and down
d. the diaphragm vibrates

Enriching the Skill

Make a complete flow chart of how oxygen and carbon dioxide move in and out of the respiratory system. A sample has been provided for you.



Finding the Score

Gearing Up to Start

1. Nasal cavity – makes the entering air warm, damp and free from unknown particles
2. Bronchi – connects the trachea to the lungs
3. Bronchioles- connect the bronchi to the alveoli
4. Alveoli- site of gas exchange
5. Pharynx- regulates the passage of air
6. Trachea- passageway of air into the lungs
7. Bronchi- connects the trachea to the lungs
8. Diaphragm- contracts and relaxes during respiration

Connecting to the Past

Parts of the "Bunch of Grapes"	Corresponding Part in the Human Breathing System
Main stem	Trachea
Large branching stems	Bronchi
Little stems	Bronchioles
Individual grapes	Alveoli or airsacs

Trying the Challenge

1. False
2. False
3. True
4. False
5. True
6. True
7. True
8. False
9. True
10. True
11. True
12. False
13. True
14. True
15. False

Strengthening the Grasp (Activity 2)

1. Trachea
2. Alveoli
3. Bronchioles
4. Diaphragm
5. Nose
6. Bronch

Strengthening the Grasp (Activity 1)

Column 1	Column 2	Column 3
Part of the Respiratory System	Inhalation	Exhalation
Ex. Diaphragm muscle	contracts	relaxes
Ribs	Moves up	Moves down
Chest cavity	expands	contracts
Space of the lungs	More space	Less space
Level of air pressure inside the lungs	Less air pressure	Greater air pressure

Checking the Target

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

Relating to Real Life

1. The space inside the chest cavity is either increased or decreased by the air pressure that is due to the movement of the diaphragm. When the space in the chest cavity changes air can go in or out of the lungs.

2. If one part of the respiratory system fails to carry out its function properly the other parts will be affected and will not be able to carry out their functions as well. The person may get sick or suffer from a certain respiratory disease.

Note: Answers may be rephrased or re stated but the idea should remain.

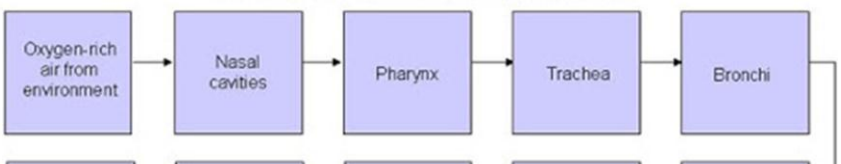
Wrapping Up to Go

1. Oxygen
2. Carbon dioxide
3. Warm, damp and clean of unknown particles
4. Bronchi
5. Bronchioles
6. Alveoli
7. Inhalation
8. Relaxes
9. Pressure
10. Contracts or moves

Enriching the Skill

Sample Answer for flow chart. Students' design may vary but the content should be similar to the one in the sample.

Movement of Oxygen and Carbon Dioxide In and Out of the Respiratory System



References

K to 12 Curriculum Guide in Science

Larynx/Anatomy (2010). *Encylopaedia Britannica online*. Retrieved on June 23, 2020 from https:www.britannica.com/science/larynx

P. A. Sales, (2020) Respiratory and circulatory systems: working with other organ systems.*Workbook Science 9.* Retrieved on June 12, 2020 from Department of Education-Commons

Pharynx/Definition, Location, Function, Structure and Facts(2010). *Encylopaedia Britannica online*. Retrieved on June 23, 2020 from

https:www.britannica.com/science/pharynx

Pinterest, Human Body: Respiratory System, retrieved on June 12, 2020,

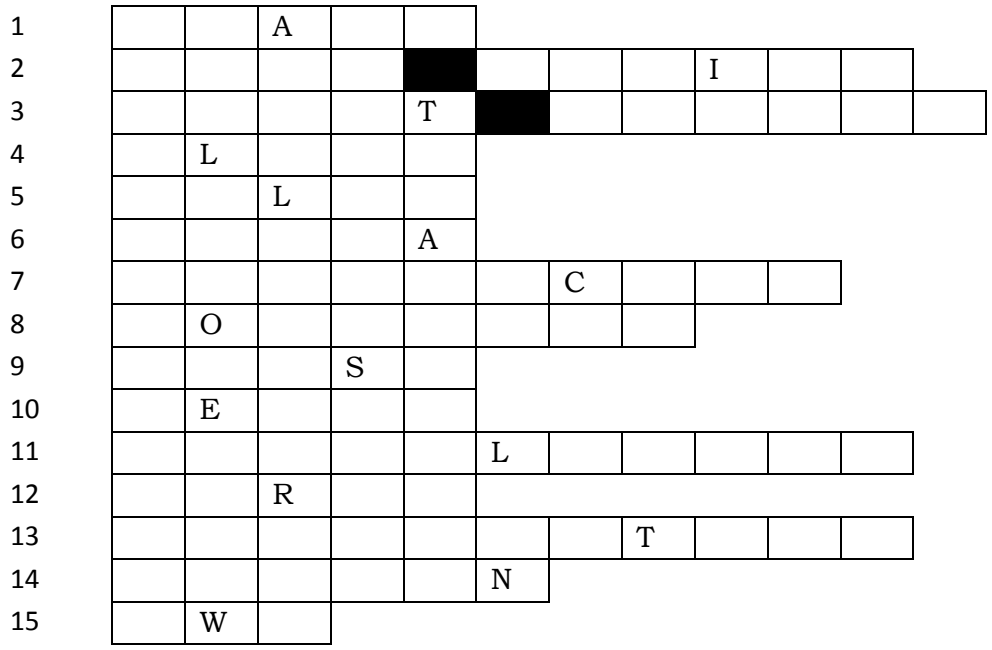
Science Learner's Module in Grade 9, pp.2-8

Source: K to 12 Grade 9 Learner's Material in Science, 2014. Retrieved on June 12, 2020 from slideshare.net/lhoralight/science-37094718

Teacherrojas, Respiratory System Labelling Interactive. Retrieved on June 9, 2020, https://www.purposegames.com/game/respiratory-system-labeling-interactive-game

Trying the Challenge

Direction: Answer the clues and put your answers in the grid. Some letters have been put into the grid to start you off.



Clues:

1. organ composed of a hollow muscle and is as big as your fist.
2. left part of the heart where oxygen enters from the lungs.
3. delivers carbon dioxide into the right portion of the heart.
4. transports essential nutrients, oxygen and other chemicals o every cell in the body.
5. act as a one-way door that keep the blood moving in one direction only.
6. the top chambers of the heart.
7. the pumping chambers of the heart.
8. a type of circulation where the blood moves through the heart tissues.
9. the number of times your heart beats in a minute
1. 10.carry deoxygenated blood to the heart.
2. 11.this is where gases and nutrients are exchanged.
11. the main artery that carries blood away from the heart to different parts of the body.
12. life support system that nourishes cells with nutrients.
13. process the nutrients to release energy.
14. number of directions of blood flow.

The Circulatory System

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 likened to a complexly arranged highways, avenues and lanes where cells are connected together into a neighborhood. These community of cells sustains the body to stay alive. **Cardiovascular system** is another name for circulatory system.

The circulatory system works with other body systems to deliver vital elements such as oxygen and nutrients. It also transports wastes away from the body.

Connecting to the Past

Direction: From the word bank below, classify which one belongs to Respiratory and Circulatory System. Write your answer inside the box.

heart	pharynx	arteries
lungs	veins	valves
bronchi	capillary	trachea
ventricle	diaphragm	aorta
hair like tubes	nasal cavity	coronary

Respiratory System

Circulatory System

Gearing Up to Start

Are you familiar with the parts of your heart and how blood flows inside it? Try to answer this activity using the list of words given.

Left ventricle	blood to lungs	blood from body
Blood to body	right atrium	left atrium
Valves	blood from lungs	right ventricle

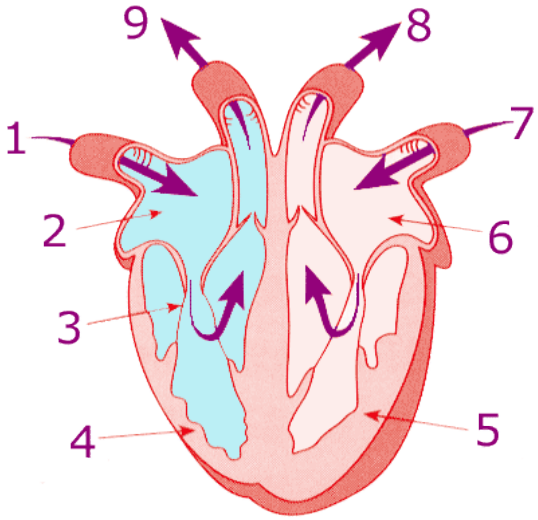


Figure 1. Blood flow inside the heart

Source: Katherine Lady Berkeley's School, The Circulatory System, retrieved on June 18, 2020, https.www.klbict.co.uk/interactive/science/heart.htm

Hitting the Target

The air that enters your lungs move into the left part of your heart. From there it is driven into the bloodstream all the way through your body. The blood which transports essential nutrients, oxygen and other chemicals to every cell in your body is pumped by the heart. Once the blood reaches the cells, oxygen processes the nutrients and energy is released. Carbon dioxide is given off during this process. The blood then delivers carbon dioxide into the right portion of your heart, from which it is pumped to the lungs. When you exhale, carbon dioxide leaves your body.

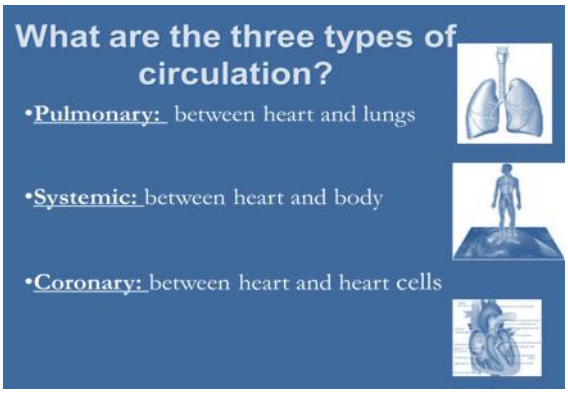
These are the three major **parts of the circulatory system** and their functions:

1. **Heart** – pumps the blood throughout the body
2. **Blood vessel** – carries the blood throughout the body

3 types of blood vessels:

- **Arteries** - carry oxygenated blood away from the heart to the cells, tissues and organs of the body
- **Veins** - carry deoxygenated blood to the 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



Source: Source: slideshareplayer.com Inc., 2020. Aim: What are the major roles of the circulatory system, retrieved on June 20, 2020 from slideplayer.com/slide/4494423

The Human Heart

The **heart** is a hollow muscle which is as big as your fist. It has four chambers: two **ventricles** and two **atria**. The **atria** are the receiving chambers of the heart, accepting blood from the body **(right atrium**) and from the lungs (**left atrium**). The **ventricles** are the pumping chambers, moving blood to the lungs (**right ventricle**) and into the body (**left ventricle**).

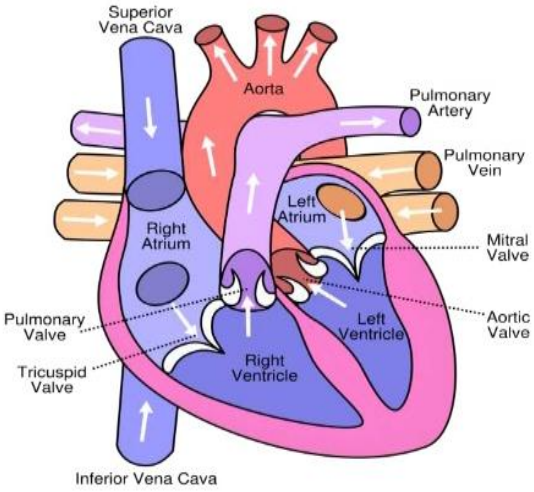


Figure 2. The parts of the human heart

Source: Dave Prodigo, 2016, Parts of the heart and their functions, retrieved on June 21, 2020 from slideshare.net/DaveProdigo1/parts-of-the-heart-and-their-functions

The heart has two pumps. Each pump has two chambers, the upper and lower chambers. The upper chamber is the atrium. The lower chamber is the ventricle. There is a valve between each atrium and ventricle to prevent the blood from flowing backwards. They act as one-way doors that keep the blood moving in only one direction. **Valves** control movement of blood into the heart chambers and out to the aorta and the pulmonary artery. **Aorta** is the main artery that carries blood away from your heart to the rest of your body.

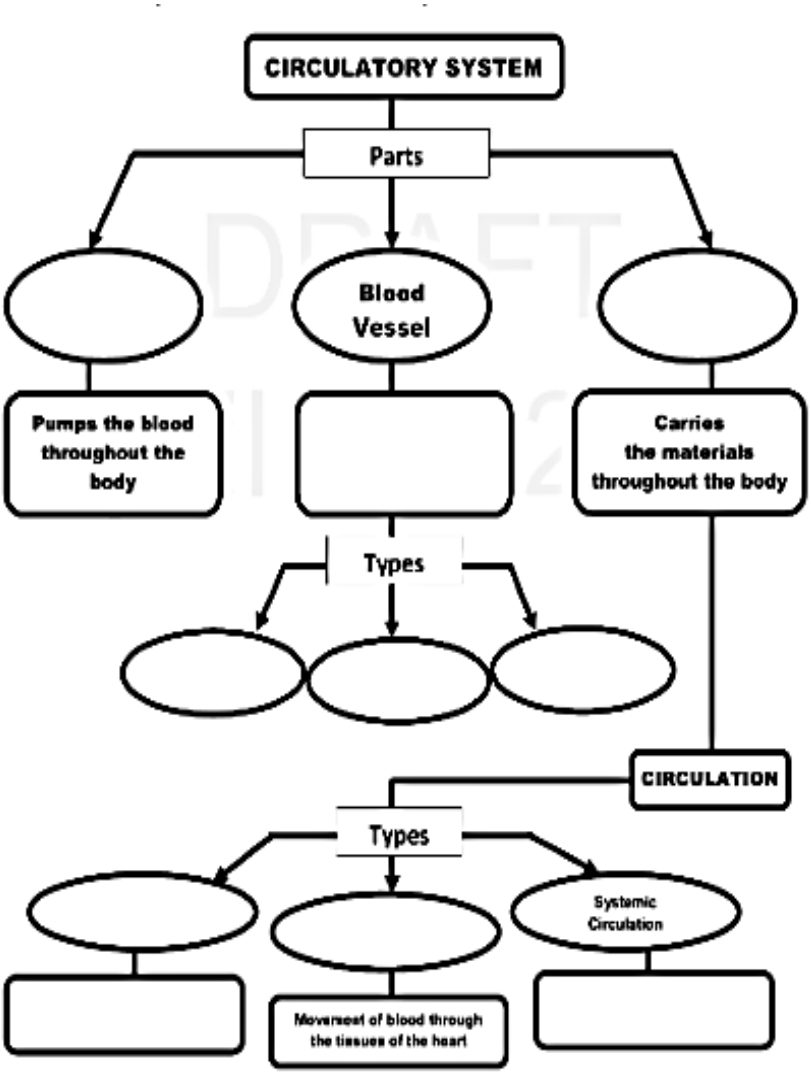
All of the muscle tissues of the heart do not contract at the same time. When the top portion contracts, the bottom relaxes. When the bottom contracts, the top relaxes. When a chamber contracts, it becomes smaller and the blood gets squeezed or pumped out.

Each time your heart beats, oxygen-rich blood is delivered to your body for it to function properly. Your **heart rate or pulse** is the number of times your heart beats in a minute (BPM or beats per minute). When you are resting, your heart rate slows down, because your body does not need as much blood as it does when you exercise.

Strengthening the Grasp

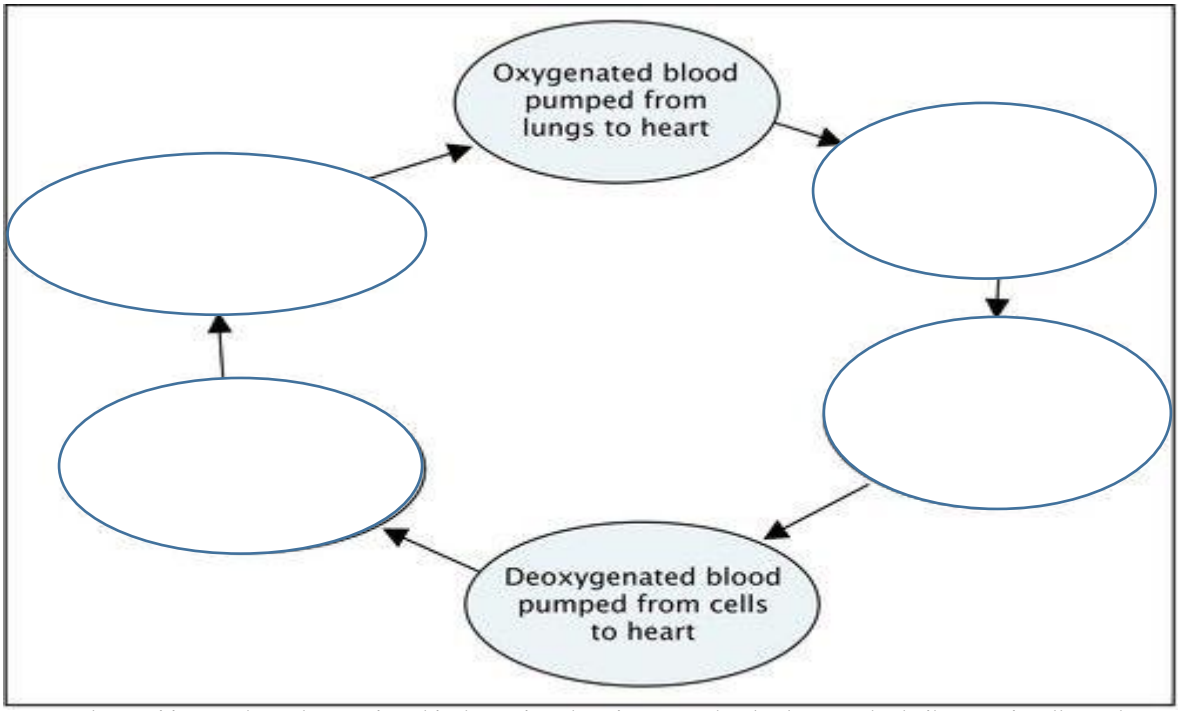
Activity 1. Let's Organize

Copy the given graphic organizer and fill in the missing parts, description, and functions to complete the entire concept



Activity 2. Let Us Try This

Explain how the circulatory system transports nutrients, gases and other molecules to the different parts of the body. Provide your answer using this graphic organizer.



Source: https://www.siyavula.com/read/science/grade-9/systems-in-the-human-body/images/gr9ll02-gd-0008.jpg

Wrapping Up to Go

I learned that….

1. The three major parts of the circulatory system and their functions are_____.
2. In order for the gases, nutrients and other molecules to be transported to the different parts of our body, the heart and lungs should_____.
3. The circulatory system delivers blood and other nutrients throughout our body in the following ways
   _____.

Relating to Real Life

Have you noticed how your heart beats after you performed several exercises or have done heavy or vigorous work for long hours? Perform the activity below to confirm your observation.

The Rhythm of My Heart

Objective:

Measure and describe your pulse (heart rate) after several activities

Materials:

Stopwatch/timer
Observation notebook

Procedure:

1. Sit quietly for a few minutes before you begin the activity.
2. When you are ready, place two fingers either on your neck or on the inside of your wrist and locate your pulse.
3. Once you find your pulse, start the watch and for 60 seconds, count the number of beats you feel. That is your pulse when resting. Record your data on your notebook.
4. Next, find a place where you can exercise vigorously for at least one minute. You may jog, run the stairs, perform skipping rope or do push-ups. You should be breathing hard when you are done with your exercise.
   REMINDER: IF YOU KNOW THAT YOU HAVE A SERIOUS MEDICAL CONDITION, DO NOT PERFORM THIS ACTIVITY.
5. Repeat procedure number two. This time record it as your pulse after exercising.

Answer the questions below:

1. What was your resting pulse?
2. What was your pulse after exercising?
3. How would you differentiate your heart rates before and after exercising?
4. How is your heart rate related to the flow of blood and oxygen inside your body?
5. Do you think doing strenuous activities is good to our heart? Why or why not?

Checking the Target

Multiple Choice. Choose the letter of the best answer. Write the chosen letter on your answer sheet.

1. Which sentence best describes how the circulatory system functions?
   a. it is responsible for the control of the body and all its organs

b. it breaks down food molecules into simpler ones which are absorbed by the body.
c. it helps the body absorb oxygen from the environment so that the organs can work
d. it is the life support structure that nourishes the cells with nutrients from the food we eat

2. Why is the heart considered as one of the most vital organs of our body?
a. It transports essential nutrients, oxygen and other chemicals to every cell of the body.
b. It processes the nutrients inside the body to release energy.
c. It delivers the waste carbon dioxide into the right portion of the body.
d. It propels the blood that carries all the vital materials and removes waste products that we do not need.

3. Through which of the following structures does blood from arteries flow?
a. capillaries
b. arterioles
c. aorta
d. veins

4. Which blood vessels carry oxygenated blood away from the heart to the cells, tissues and organs of the body?
a. veins
b. arteries
c. capillaries
d. aorta

5. The blood inside the heart flows in only one direction. Why is this so?
a. the valve allows the blood to flow in any direction.
b. the valve prevents the blood to flow backwards.
c. the aorta allows blood to flow in any direction.
d. the aorta prevents the backward flow of blood.

6. Heartbeat is the sound produced by the heart as it pumps blood. The number of times the heart beats is the heart rate or pulse that vary from person to person. How is it affected by the following activities?
a. the heart beats normally after strenuous activities were performed.
b. the heart rate slows down after the person finished 50 push-ups.
c. the heart beats faster after a 30 minutes jog.
d. the heart rate stays the same despite the vigorous works done.

7. How are blood, oxygen and other nutrients delivered in a systemic circulation?
a. the blood that carries oxygen and other nutrients is transported to the lungs and back to the heart.
b. the oxygenated blood first enters the upper chambers of the heart and out the lower chambers.
c. the blood carries oxygen and nutrients to the cells and tissues of the heart and the rest of the body excluding the lungs.

d. the deoxygenated blood is transported to the heart, then to the lungs and back to the heart.

8. Which of these statements is **TRUE** on how the heart works?
   a. all the muscle tissues of the heart contract at different times.
   b. when a chamber of the heart contracts, it becomes bigger and the blood is pumped out.
   c. when the upper chamber of the heart relaxes, so does the lower chamber.
   d. the different parts of the heart contract at the same time.

9. What happens to the oxygenated blood after it was pumped out of the lungs?
   a. the heart receives the oxygenated blood and transport it to the rest of the body.
   b. the oxygenated blood from the lungs goes to every cell of the body.
   c. the oxygenated blood will be excreted out of the body and becomes waste.
   d. the tissues and organs of the brain will receive the oxygenated blood.

10. Which of these bests explains why people that experience hemorrhage or lost too much blood during accidents faint?
   a. too much blood lost is scary and shocking
   b. the supply of oxygen in the body is insufficient when there is too much blood lost.
   c. too much loss of blood causes stress and drains the body's energy
   d. the amount of carbon dioxide in our body increases when too much blood is lost

Enriching the Skill

Deepen your knowledge about how vital elements are transported by the circulatory system in the body by answering this activity.

Go with the flow!

Indicate whether the substances inside the box are being carried by the blood away from the cells or to the cells. Group them according to the direction of their flow.

Substances carried by the blood:

Digested food
extra waste/water
Oxygen
vitamins
Minerals
proteins
Carbon dioxide
amino acids

Carried to the cells

Carried away from the cells

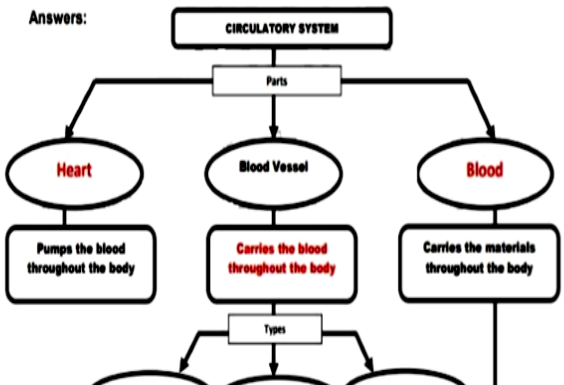
Finding the Score

Trying the Challenge

1. Heart
2. Left Atrium
3. Right Atrium
4. Blood
5. Valve
6. Atria
7. Ventricles
8. Coronary
9. Pulse
10. Veins
11. Capillaries
12. Aorta
13. Circulatory
14. Oxygen

Strengthening the Grasp (Activity 1)

Answers:



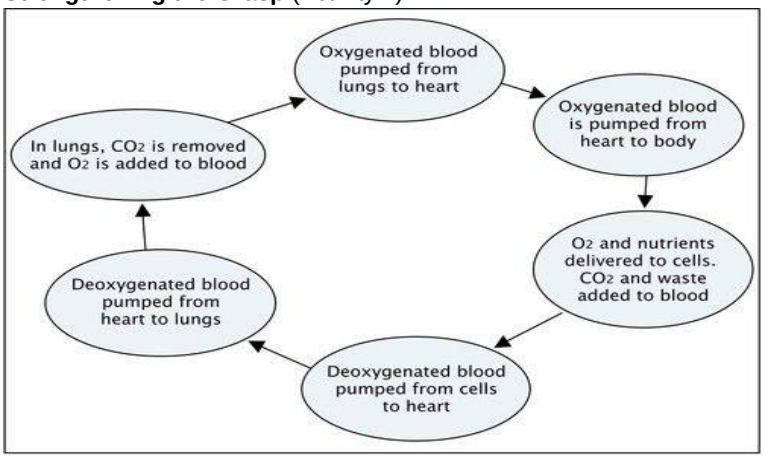
Connecting the Past

Respiratory System	Circulatory System
lungs	Heart
bronchi	ventricle
hairlike tubes	veins
pharynx	capillary
diaphragm	arteries
nasal cavity	valves
trachea	aorta
	coronary

Gearing Up to Start

1. blood from body
2. right atrium
3. valve
4. right ventricle
5. left ventricle
6. Left atrium
7. Blood from lungs
8. Blood to lungs
9. Blood to body

Strengthening the Grasp (Activity 2)



hoto credit:https://www.siyavula.com/read/science/grade-9/systems-in-the-human-body/images/gr9ll02-gd-0008.jpg

Wrapping Up to Go

1. I learned that the three major parts of the circulatory systems are:
a. heart – pumps blood throughout the body
b. blood vessels – carry the blood all over our body
c. blood – carries the materials throughout the body

2. Note: Answer may be restated/rephrased but the idea should be similar to the one below.
In order for the gases, nutrients and other molecules to be transported to the different parts of our body, the heart and lungs should be well coordinated. The heart should pump the blood that carries the inhaled oxygen to every cell of the body. The blood should also carry the waste material like carbon dioxide to the lungs. The lungs will release the waste material out of the body through **exhalation.**
Clue: in this question the student should be able to explain how the circulatory system transport gases, nutrients and other molecules to the body. (objective #3)

3. Answer may be restated/rephrased.
The circulatory system delivers blood and other nutrients throughout the body in the following ways: a. Systemic circulation where blood moves between the heart and the body, pulmonary circulation where blood moves between the heart and the lungs and coronary circulation, where the blood moves between tissues of the heart only.

Relating to Real Life

Answer to questions:
1. answer may vary
2. answer may vary
3. The heartrate before exercising is lower compared to the heart rate after exercising.
4. The heat rate is the number of times the heart beats in a minute. If the heart rate is high, it means the heart pumps blood faster in response to the body's high demand for oxygen.
5. Doing strenuous activities is not good to our heart. They make the heart beat faster, increasing our heart rate/ pulse. When the heart rate increases our body needs more oxygen. Frequent exposure to strenuous activities may lead to cardiovascular diseases.

Checking the Target

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

Enriching the Skill

Carried to the cells:	Away from the cells:
Digested food	carbon dioxide
Oxygen	extra waste/water
Minerals	
Vitamins	
Proteins	
Amino acids	

References

Clipart library, 2019, Free Unlabelled Diagram of the Human Heart, retrieved on June 9, 2020 from clipart-library.com/unlabeled-diagram-of-the-heart.html

Dave Prodigo, 2016, Parts of the heart and their functions, retrieved on June 21,2020 fromslideshare.net/DaveProdigo1/parts-of-the-heart-and-their functions

Katherine Lady Berkeley's School, The Circulatory System, retrieved on June 18, 2020, https.www.klbict.co.uk/interactive/science/heart.htm

K to 12 Curriculum Guide in Science

Siyavula Technology Powered Learning, The Circulatory System retrieved on July 12, 2020 from https://www.siyavula.com/read/science/grade-9/systems-in-the-human- body/images/gr9ll02-gd-0008.jpg

Slideshareplayer.com Inc., 2020. Aim: What are the major roles of the circulatory system, retrieved on June 20, 2020 from slideplayer.com/slide/4494423

Science Learner's Module in Grade 9, pp.8-18

Science Grade 9 Teacher's Guide p.9

SCIENCE

Quarter 1 – Module 1: Week 1-2

Respiratory and Circulatory Systems, Working with Other Organ Systems

ANSWER SHEET

School: _____ Date Answered: _____

Name of Student: _____

Grade & Section: _____

Trying the Challenge

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

Connecting the Past

Gearing Up to Start

1.
2.
3.
4.
5.
6.
7.
8
9
10.

Strengthening the Grasp (Activity 1)

Strengthening the Grasp (Activity 2)

Wrapping Up to Go

1.

2.

3.

Relating to Real Life

1.
2.
3.
4.
5.

Checking the Target

1. 6.
2. 7
3. 8.
4. 9.
5. 10.

Enriching the Skill

SCORE: _____ ***Scored by:*** _____

Student's Signature: _____ ***Date:*** _____

Parent's/Guardian's Signature: _____***Date:*** _____