

Structure, Function, and Information Processing Body Systems, Subsystems and Interactions

Teacher Pages

Purpose

The purpose of this station is to reinforce students' ability to understand that cells form tissues and tissues form organs specialized for particular body functions. Body systems and the normal functioning of those systems are composed of subsystems that interact with other body systems. They include circulatory, excretory, digestive, respiratory, muscular, reproductive, and nervous systems.

Essential Understandings

- The body is a system of interacting subsystems composed of groups of cells.
- Cells form tissues and tissues form organs specialized for particular body functions.
- The interaction of subsystems within a system and the normal functioning of those systems interact with other body systems.
- Interactions occur among the circulatory excretory, digestive, respiratory, muscular, reproductive, and nervous systems.

Materials

The following materials are included in the blackline masters for this station.

Cells to Systems sheet
Body System Functions sheet
Body System Functions cards
Interactions of Systems cards
System cards
Subsystem cards
Station Information Sheet

Advance Preparation

1. Print one copy of all the blackline masters for this station using a color printer. Color is essential to the station activities. Make one copy of the Student Pages (including the glossary) for each student.
2. Laminate the Cells to Systems sheet, Body System Functions sheet, Body System Functions cards, System cards, Subsystem cards, and Interaction of Systems cards.

3. Cut apart the Functions of Body System Functions cards, System cards, Subsystem cards, and Interactions of Systems cards and place them in envelopes labeled appropriately.

Station Setup

1. Tape the Station Information Sheet to the station table. Students will use this to confirm the station is set up correctly.
2. Set out the envelopes containing the Functions of Body System Functions cards, System cards, Subsystem cards, and Interactions of Systems cards.
3. Place laminated copies of the Station Information Sheet, Cells to Systems sheet, and Body System Functions sheet at the station.

Procedures

1. Tell students to check the station setup against the Station Information Sheet when they arrive at the table. If anything is missing or out of place, they should notify you.
2. Pass out a copy of the Student Pages to each student. Instruct students to work through the procedures and answer the questions with their teammates.
3. As students work through the station activity, circulate around the room, checking their work and responding to questions.

Guide to Student Responses

Note—The suggested student responses presented below in italics represent the best possible answers to the student questions; actual student responses may vary.

Essential Question

The body is a system that is made up of several systems. Each system is made up of subsystems that function together so that the system can complete its tasks. How do the subsystems of the circulatory system enable it to pump blood, deliver nutrients to cells and waste products for removal from the body, fight off germs in our body, and help maintain an even body temperature?

The circulatory system is made up of the heart, which pumps the blood. The arteries and veins are the tubes through which the blood, carrying oxygen and nutrients, travels to all parts of the body. The blood contains cells that fight off germs that could make the body ill and it distributes heat created in the body evenly so that the body maintains a constant temperature.

Part I: Cells to Systems

Procedure

1. Locate the **Cells to System sheet** at your station. Examine the information on the sheet with your partner.

2. What are the relationships that exist among the cell, cell tissue, organ, and system shown on the card?

Cells make up tissue, in this case cardiac or heart muscle cells, that functions together and becomes the tissue found in an organ, the heart. Along with other structures such as veins or arteries, the heart is part of a larger subsystem called the circulatory system that functions to pump blood throughout the body.

3. In the human body, what are other cell-tissue-organ-system relationships?

Students may list any 4 or 5 of the following: integumentary, reproductive, digestive, respiratory, excretory, muscular, skeletal, immune, nervous, or endocrine.

4. Read and discuss the following claim about systems and subsystems. Use any of the body systems as an example as you provide evidence that supports this statement and reasoning for your evidence.

Claim: The body is a group of interacting subsystems composed of groups of cells.



Evidence: *Answers will vary*

Reasoning: *Answers will vary*

Part II: Systems and Subsystems

Procedure

1. Locate the **Body System Functions sheet** and the envelope labeled **Body Systems Function cards** at your station. Observe the information on the sheet and written on the cards with your partner.
2. Select the card that describes a function of one of the body systems. Place the function card on the system it best describes. Record your selections in the table below.

Body System	Functions of System	Subsystem
	<i>Responsible for providing nutrient to body, removing excretory wastes, fighting infection, and distributing heat</i>	<i>Heart</i>
	<i>Responsible for digestion and absorption of food</i>	<i>Intestines</i>

Body System	Functions of System	Subsystem
Excretory System	Responsible for the production, storage, and elimination of urine.	Kidney
Muscular System	Responsible for movements that are under our control and those we do not control	Muscles
Nervous System	Responsible for controlling and coordinating systems of the body	Brain
Respiratory System	Responsible for exchange of gases between the body and the surroundings	Lungs
Reproductive System	Responsible for continuation of living organisms	Ovaries

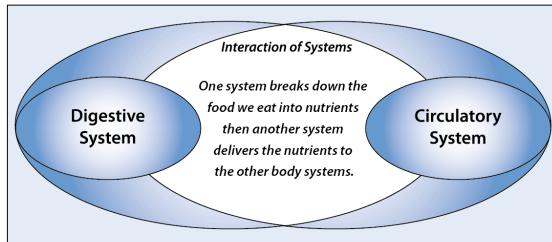
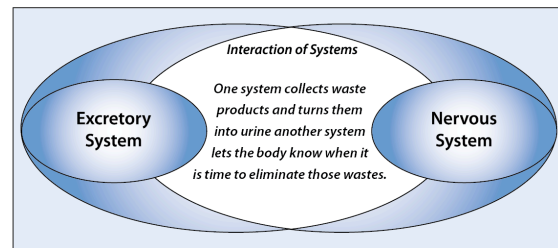
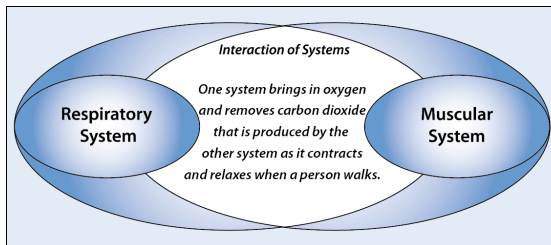
- Each system is composed of smaller systems called subsystems that work together to make up a larger system. Locate the envelope containing the **Subsystem cards**. Examine each of the cards with your partner.
- Select one of the subsystem cards and place it on the Interaction of Systems card that describes the system to which it belongs. Record your decisions in the table above.

Note: Return the Functions of Body Systems cards and Subsystem cards to the envelope before continuing.

Part III: System Interactions

Procedure

- The systems of the body interact with one another so that we maintain our health. Each system has specific functions and is interconnected and dependent on other systems.
- Locate the three **Interactions of Systems cards** and the **System cards** in the labeled envelope? Examine the information on the Interaction of Systems cards with your partner.
- Select the two systems cards that interact together as described on the interactions of systems cards. Place the two system cards on the interactions of systems card in the appropriate place.
- Record your choices for the cards below.



Note: Return the Interaction of Systems cards and the System cards to the envelope before continuing.

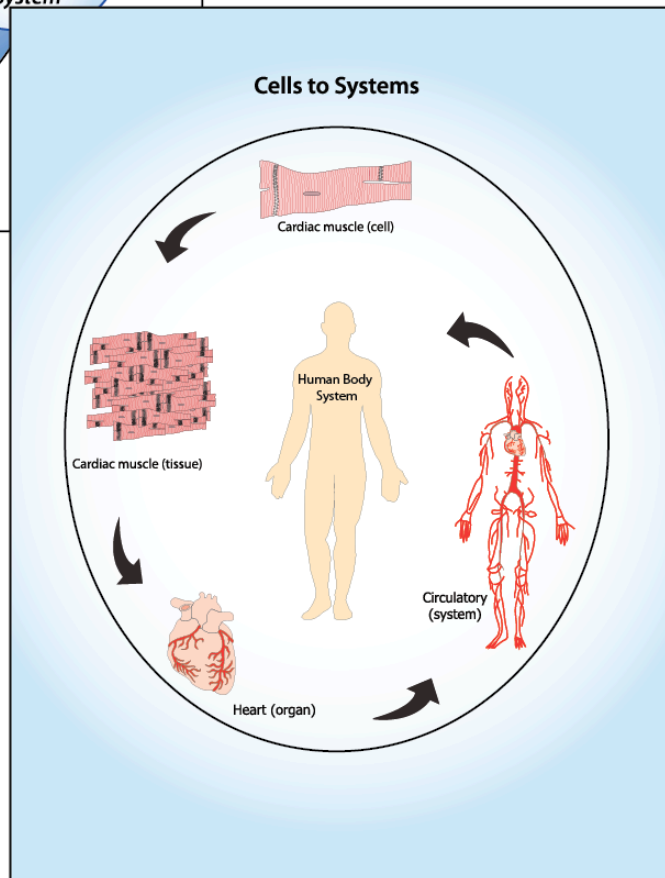
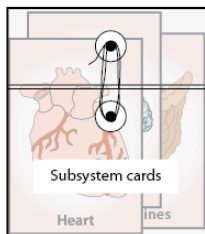
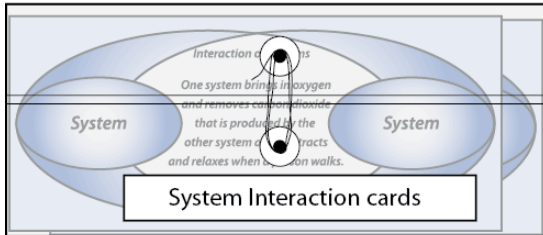
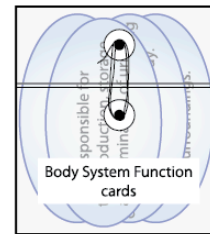
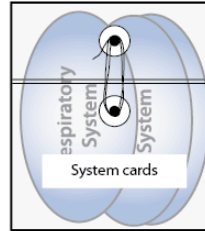
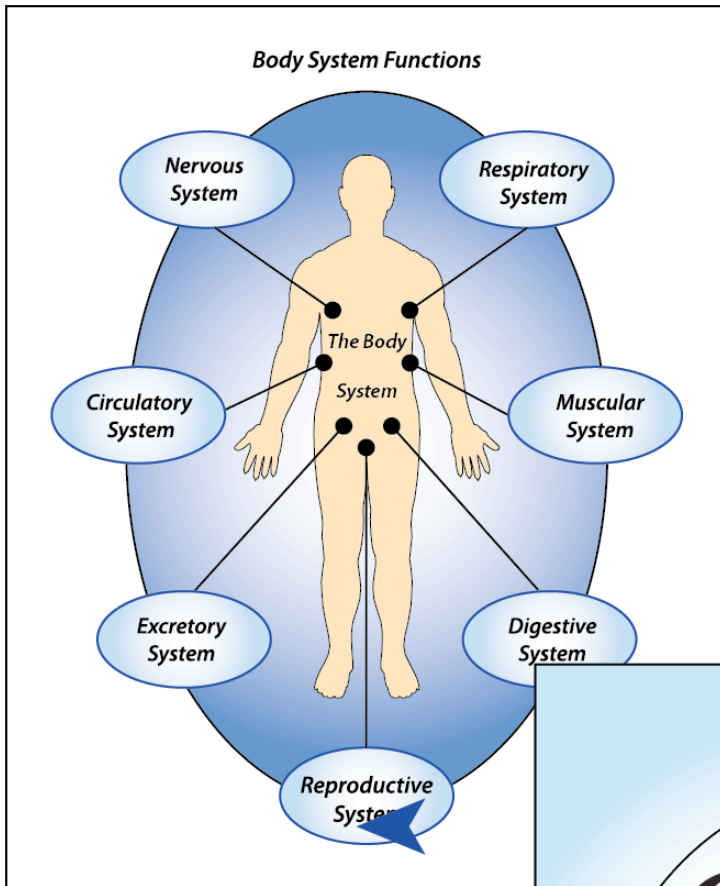
- Select any two combinations of systems that are not on the interaction of systems cards, for example circulatory and respiratory and describe how they interact in the body.

Answers will vary depending on the combination of systems they select.

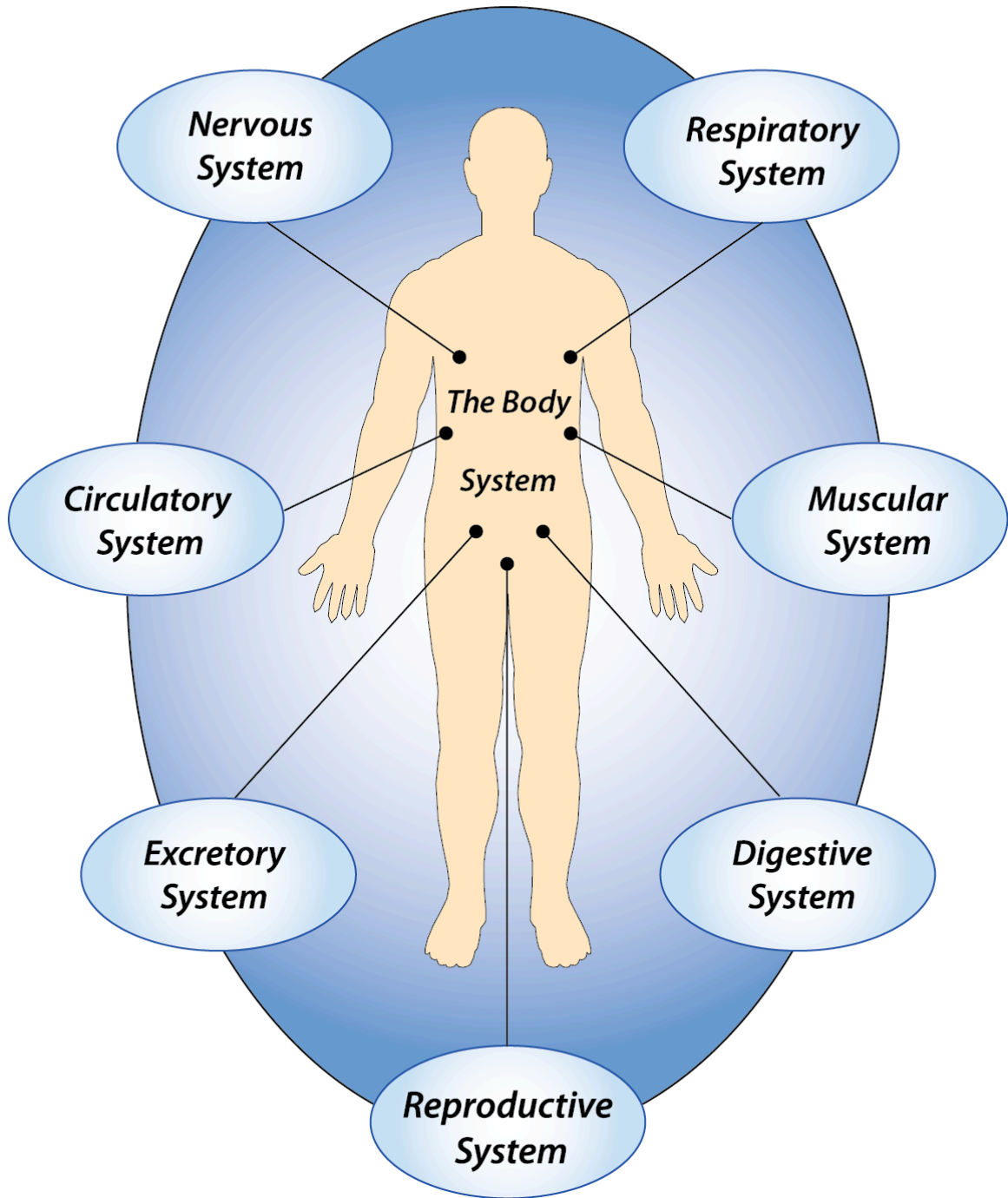
- Now that you have completed these exercises, return to the Essential Question. Would you like to modify or change your answer? Write any modifications to your answer below.

Answers will vary

Station Information Sheet



Body System Functions



Body System Functions cards

Responsible for controlling and coordinating systems of the body.

Responsible for digestion and absorption of food

Responsible for movements that are under our control and those we do not control

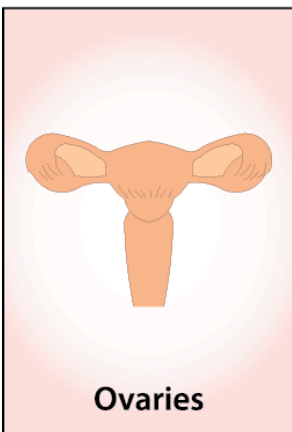
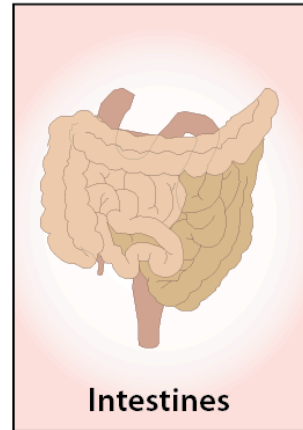
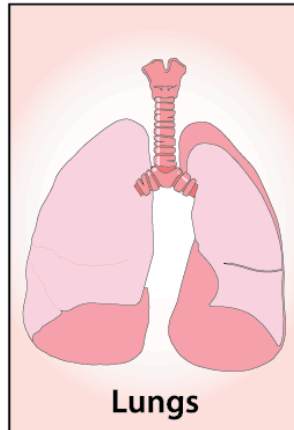
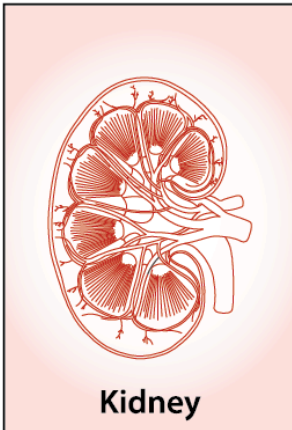
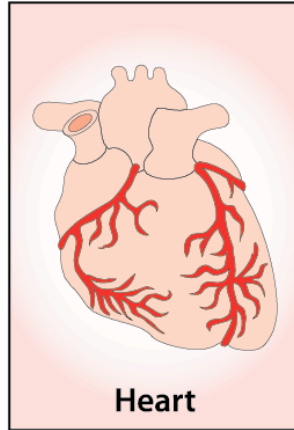
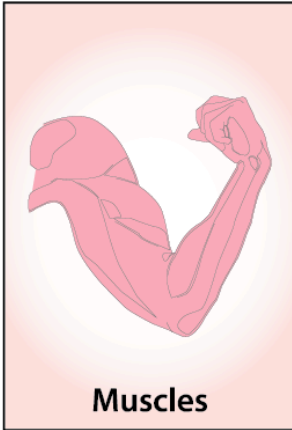
Responsible for exchange of gases between the body and the surroundings.

Responsible for the production, storage and elimination of urine.

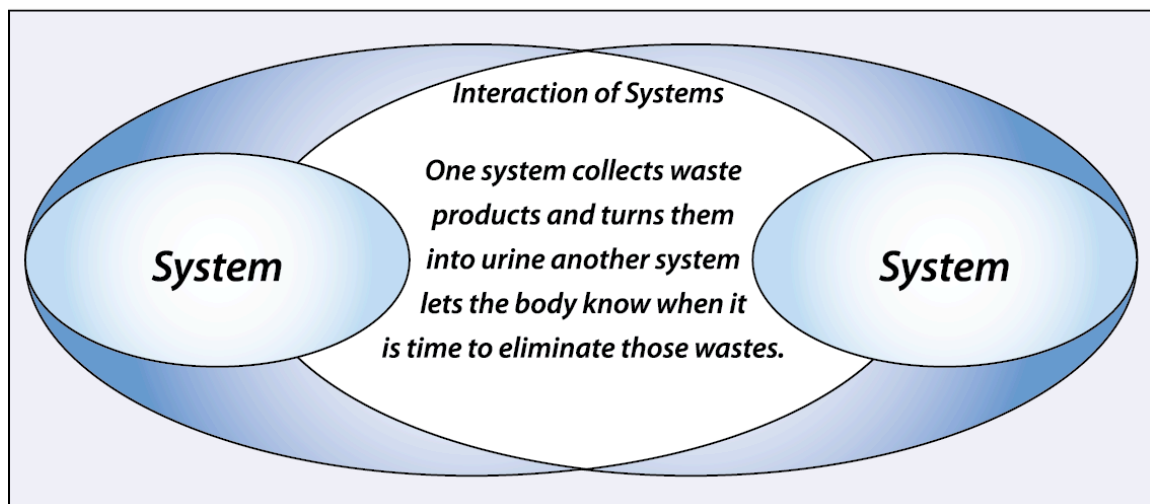
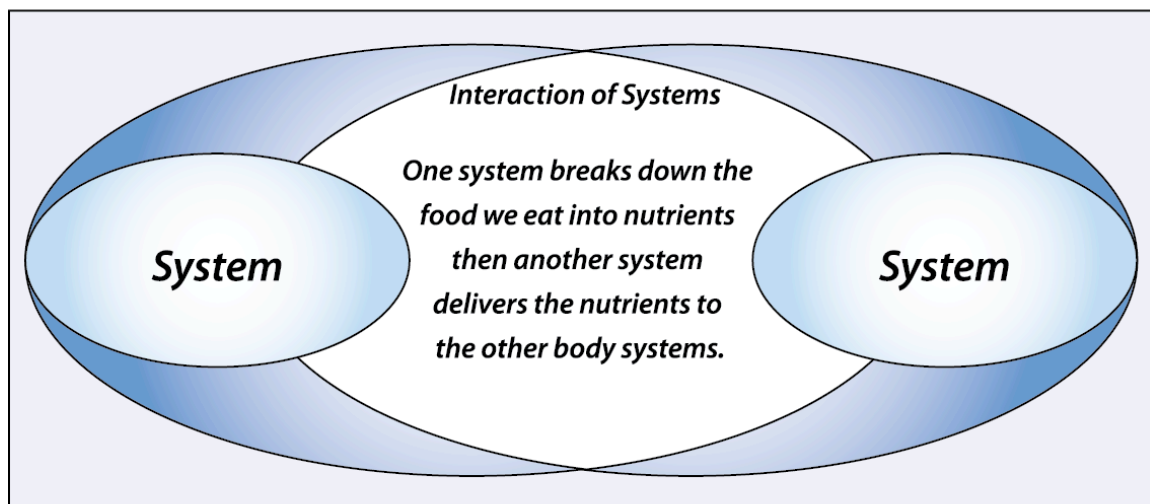
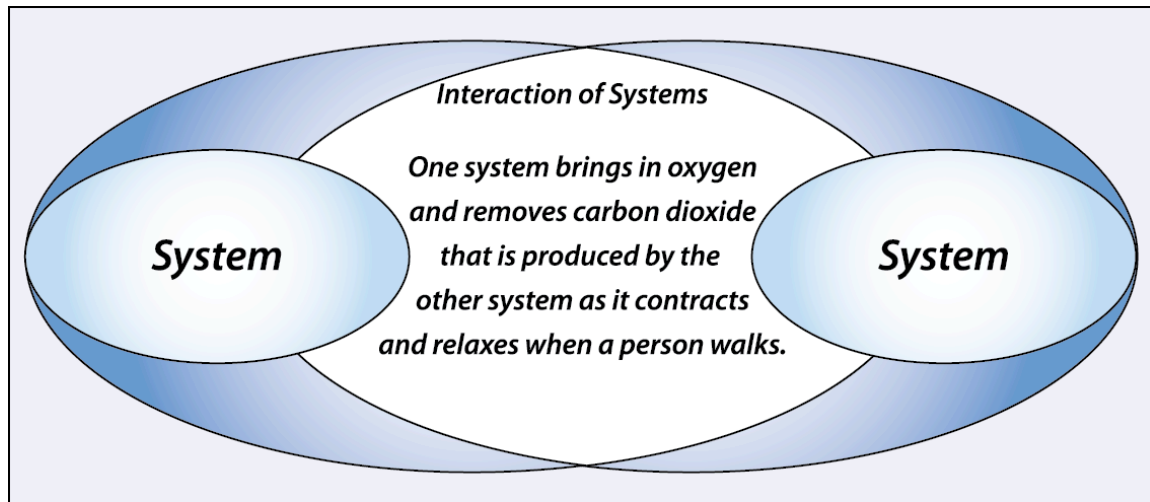
Responsible for providing nutrients to body, removing excretory wastes, fighting infection, and distributing heat.

Responsible for the continuation of living organisms.

Subsystem cards



System Interaction cards



Structure, Function, and Information Processing **Body Systems, Subsystems and Interactions**

Student Pages

Purpose

The purpose of this station is to determine your understanding that cells form tissues and tissues form organs specialized for particular body functions. The body systems and their normal functioning of those systems

Cells to Systems sheet

are composed of subsystems that interact with other body systems. They include circulatory, excretory, digestive, respiratory, muscular, reproductive, and nervous systems.

Materials

Body System Functions sheet
Body System Functions cards
Interactions of Systems cards
System cards
Subsystem cards
Station Information Sheet

Before You Begin...

Check to see that all the items are present and organized according to the Station Information Sheet. If you notice a problem, notify your teacher immediately.

Essential Question

The body is a system that is made up of several systems. Each system is made up of subsystems that function together so that the system can complete its tasks. How do the subsystems of the circulatory system enable it to pump blood, deliver nutrients to cells and waste products for removal from the body, fight off germs in our body, and help maintain an even body temperature?

Part I: Cells to Systems

Procedure

1. Locate the **Cells to System sheet** at your station. Examine the information on the sheet with your partner.
2. What are the relationships that exist among the cell, cell tissue, organ, and system shown on the card?
3. In the human body, what are other cell-tissue-organ-system relationships?
4. Read and discuss the following claim about systems and subsystems. Use any of the body systems as an example as you provide evidence that supports this statement and reasoning for your evidence.

Claim: The body is a group of interacting subsystems composed of groups of cells.

Evidence:

Reasoning:

Part II: Systems and Subsystems

Procedure

1. Locate the **Body System Functions sheet** and the envelope labeled **Body Systems Function cards** at your station. Observe the information on the sheet and written on the cards with your partner.
2. Select the card that describes a function of one of the body systems. Place the function card on the system it best describes. Record your selections in the table below. Continue until you have completed all of the body systems.

Body System	Functions of System	Subsystem
Circulatory System		
Digestive System		
Excretory System		
Muscular System		
Nervous System		
Respiratory System		

 Reproductive System		
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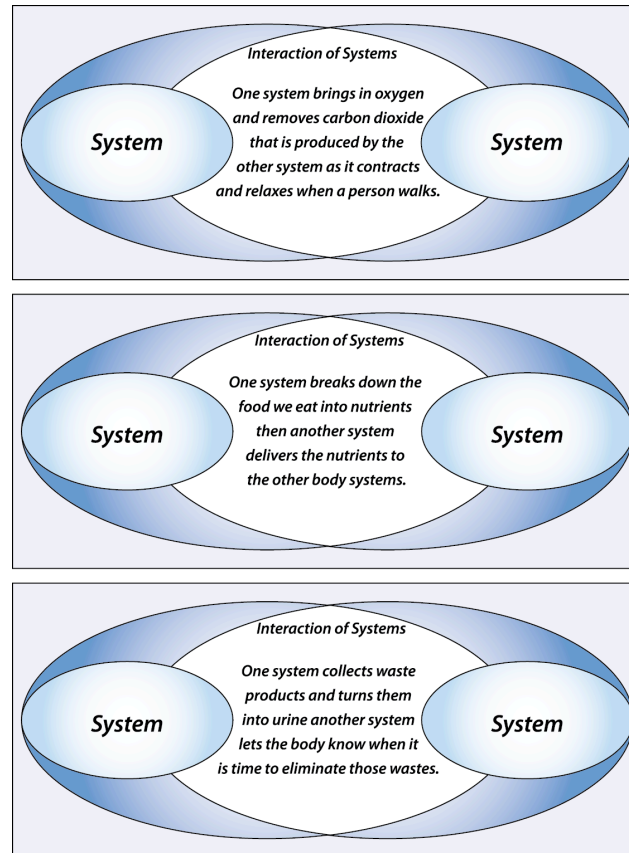
- Each system is composed of smaller systems called subsystems that work together to make up a larger system. Locate the envelope containing the **Subsystem cards**. Examine each of the cards with your partner.
- Select one of the subsystem cards and place it on the Interaction of Systems card that describes the system to which it belongs. Record your decisions in the table above. Continue until you have completed all systems.

Note: Return the Functions of Body Systems cards and Subsystem cards to the envelope before continuing.

Part III: System Interactions

Procedure

- The systems of the body interact with one another so that we maintain our health. Each system has specific functions and is interconnected and dependent on other systems.
- Locate the three **Interactions of Systems cards** and the **System cards** in the labeled envelope? Examine the information on the Interaction of Systems cards with your partner.
- Select the two systems cards that interact together as described on the interaction of systems cards. Place the two system cards on the interaction of systems card in the appropriate place. Continue until all interactions of system cards are labeled.
- Record your choices for the cards below.



Note: Return the Interactions of Systems cards and the System cards to the envelope before continuing.

5. Select any two combinations of systems that are not on the interaction of systems cards, for example circulatory and respiratory and describe how they interact in the body.
6. Now that you have completed these exercises, return to the Essential Question. Would you like to modify or change your answer? Write any modifications to your answer below.

NOTE: Because other students are going to do the activity after you, be sure to put all the materials at the station back as you found them. Sometimes there will be materials that need to be renewed or replaced. If you need assistance or have any questions, ask your teacher.

Question Card

1. Get the question card from your teacher.
2. With your teammates, discuss the question and decide how to answer it.
3. Note the answer your team came up with in your science journal, including justifications for the answer.

DRAFT

I Need to Remember . . .

Complete this part **after** class discussion of this station.

I need to remember . . .

DRAFT

Glossary for *Body Systems, Subsystems, and Interactions*

Subsystem

A subsystem is a system that is part of a larger system. The heart is a subsystem of the larger circulatory system.

System

A system is a group of organs that work together to perform some function, such as the reproductive system or endocrine system.

DRAFT