Lesson 4.15: Life Science – Health: Body Systems

Weekly Focus: Reading Comprehension
Weekly Skill: Group Presentations

Lesson Summary: This week students will begin to study health with a concentration on the systems of the human body. Students have a reading to introduce them to Human Body Systems. It is followed by a second passage that will allow students to be "experts" in some systems and present in a jigsaw or group presentation format.

Materials Needed:

- Comprehension Reading **Unit 4.15 Handout 1** (6-way Paragraphs , Introductory Level, #92, pages 184 – 185)
- Jigsaw Reading & Group Presentations **Unit 4.15 Handout 2**
- Extra Work/Homework **Unit 4.15 Handout 3** (Spectrum Science, Grade 7, pages 48 – 49)

Objectives: Students will be able to…

- Read comprehension passages with vocabulary related to the human body systems
- Practice effective communication skills to present information from a reading passage to classmates

College and Career Readiness Standards: RI, RST, WHST, LS

ACES Skills Addressed: EC, LS, ALS, CT, SM

Notes: Please review and be familiar with classroom routine notes for: reading for fluency strategies (**Routine 2**), 6-way Paragraph reading techniques (**Routine 3**), summarizing techniques (**Routine 4**), self-management skills (**Routine 1**). The notes for the different activities will help with making a smooth transition to each activity.

GED 2014 Science Test Overview – For Teachers and Students

The GED Science Test will be 90 minutes long and include approximately 34 questions with a total score value of 40. The questions will have focus on three content areas: life science (~40%), physical science (~40%), and Earth and space science (~20%). Students may be asked to read, analyze, understand, and extract information from a scientific reading, a news brief, a diagram, graph, table, or other material with scientific data and concepts or ideas.

The online test may consist of multiple choice, drop down menu, and fill-in-the-blank questions. There will also be two short answer questions (suggested 10 each) where students may have to design an experiment or identify errors in a conducted experiment, summarize, find evidence (supporting details), and reason or make a conclusion from the information (data) presented.

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The work students are doing in class will help them with the GED Science Test. They are also learning skills that will help in many other areas of their lives.

Activities:

Warm-Up: Human Body Systems List	Time: 5 - 10 minutes

- As students enter the class, have the following written on the board or overhead: **"The human body consists of many interacting systems. What human body systems do you already know? Write a list of the systems in your journal or in a notebook. Then, write what you believe is the role or job of each system."**

Activity 1: Comprehension Reading (Unit 4.15 Handout 1)	Time: 40 - 45 minutes

1) Hand out **Unit 4.15 Handout 1** to students.
2) Explain to students they will begin to study Health: The Human Body and Its Systems. This information is important foundational knowledge for questions that may be on the 2014 GED Science module.
3) Discuss with students that when reading for comprehension, there are many strategies to use: read the title to predict what the reading is about; look at the subheadings to get a better idea of what each section is about; if there are images, look at them to gain understanding; while reading remember to ask "What is this all about?"
4) Use Classroom Routine 3 for examples on how to use the 6-way Paragraphs reading passages in class.
5) Have students read the passages independently while answering the questions at the end.
6) Circulate class while they are reading to make sure they understand the information presented and see if there are any questions.
7) Review answers as a whole class. Ask students to point to the evidence from the reading passage that helped them determine the answer(s).
8) If there is time, students can read for fluency in pairs and/or summarize the reading or paraphrase (write in their own words) the main idea.

Break: 10 minutes

Activity 2: Jigsaw Reading Presentations (Unit 4.15 Handout 2)	Time: 45 - 50 minutes

1) Put students into groups of 4 and label each group: **A, B, C, D**.
2) Hand out **Unit 4.15 Handout 2** and have students note which groups will present which sections:
Group A: Circulatory, Respiratory, & Digestive Systems
Group B: Endocrine, Immune, & Lymphatic Systems
Group C: Muscular & Nervous Systems
Group D: Reproductive, Skeletal, and Urinary Systems
3) Ask students to read only their section individually in order to become experts of the material for their group.
4) Have students turn their papers over and discuss within their group what their section is about and the human body systems represented in the reading material. Tell students they should also

discuss how they, as a group, will present the material to the other students in the class. Circulate to make sure students understand the objective and ask them to begin the discussion.

5) Explain that students will present only their portion of the reading to the class. While they are presenting, the other groups will take notes of the material and ask questions if they do not understand. *(For guided note taking, instruct students to keep their pencils down while each group is presenting, and then afterwards discuss as a class what the key information is. Finally, give students an opportunity to write down what was discussed in their own words before the next group presents.)*

6) When all student groups are finished presenting, students should answer the questions independently on the last page of the handout. (**Note**: there is one "cheat sheet" that can be used as a class summary of the presentations – you can hand it out at the end of the group presentations.)

7) Review the answers as a whole class.

Wrap-Up: Summarize	**Time: 5 minutes**
Have students turn to a partner (or write in their journals) about what they have learned today about the human body and its systems. Ask them to tell a partner one thing they learned today in one or two sentences. *Note: Use Routine 4 Handout*	

Extra Work/Homework: Unit 4.15 Handout 3	**Time: 30 - 45 minutes outside of class**
Students can continue to read about human body systems with a Spectrum Science reading passage on homeostasis. This is a great extension of today's topic.	

Differentiated Instruction/ELL Accommodation Suggestions	**Activity**
If some students finish early, they can turn their paper over and summarize the reading passage.	**Activity 1**
Teachers should be aware that ELLs could have some difficulty with some of the vocabulary and pronunciation encountered in the handouts for Activity 1 & 2. Encourage them to look for context clues in the reading that will help them with interpreting the main idea of each reading passage.	**Activity 1 & 2**

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Online Resources:

If students have Internet connection, they can try online activities related to human body systems. A few that stand out are:

http://www.innerbody.com/ (click on the body system to take a "virtual tour")

http://sciencenetlinks.com/media/filer/2011/10/13/allsystems.swf (drag and drop basic parts of a body systems)

http://www.softschools.com/science/human_body/diagram/ (click on the part of the human body listed – it can be a bit tricky to get to the correct part)

http://studyjams.scholastic.com/studyjams/jams/science/index.htm?topic_id=hb (students can click and decide which human body system to explore – there are tests, too – note: students have to click on system, click on "slide show" and use arrows on right side to navigate)

Suggested Teacher Readings:

- GED Testing Service – GED Science Item Sample (to get an idea of what the test *may* be like)

http://www.gedtestingservice.com/itemsamplerscience/

- Assessment Guide for Educators: A guide to the 2014 assessment content from GED Testing Service:

http://www.riaepdc.org/Documents/ALALBAASSESSMENT%20GUIDE%20CHAPTER%203.pdf

- Minnesota is getting ready for the 2014 GED test – website with updated information on the professional development in Minnesota regarding the 2014 GED.

http://abe.mpls.k12.mn.us/ged_2014_2

- Essential Education's 2014 GED Test Curriculum Blueprint (PDF)

http://www.passged.com/media/pdf/educators/curriculum-blueprint.pdf

Unit 4.15 Handout 1

TEACHER ANSWER KEY

Main Idea:

1. a. **B**road Idea

b. **N**arrow Idea

c. **M**ain Idea

2. C

3. A

4. C

5. A

6. B

4.15 Handout 2 – total 7 pages (distribute pages 1 – 4 to appropriate student groups – pages 5, 6, 7 to all)

Group A = Circulatory, Respiratory, and Digestive Systems

The Circulatory System

The **circulatory system** is the body's transport system. It is made up of a group of organs that transport blood throughout the body. The heart pumps the blood and the arteries and veins transport it. Oxygen-rich blood leaves the left side of the heart and enters the biggest artery, called the aorta. The aorta branches into smaller arteries, which then branch into even smaller vessels that travel all over the body. When blood enters the smallest blood vessels, which are called capillaries, and are found in body tissue, it gives nutrients and oxygen to the cells and takes in carbon dioxide, water, and waste. The blood, which no longer contains oxygen and nutrients, then goes back to the heart through veins. Veins carry waste products away from cells and bring blood back to the heart, which pumps it to the lungs to pick up oxygen and eliminate waste carbon dioxide.

The Respiratory System

The **respiratory system** is made up of organs and tissues that help you breathe. The main parts of this system are the airways, the lungs, and linked blood vessels, and the muscles, such as the diaphragm and abdominal muscles that enable breathing. Your lungs make up one of the largest organs in your body, and they work with your respiratory system to allow you to take in fresh air, get rid of stale air, and even talk.

The Digestive System

The **digestive system** is made up of organs that break down food into protein, vitamins, minerals, carbohydrates, and fats, which the body needs for energy, growth, and repair. After food is chewed and swallowed in the oral cavity (mouth), it goes down the esophagus and enters the stomach, where it is further broken down by powerful stomach acids. From the stomach the food travels into the small intestine. This is where your food is broken down into nutrients that can enter the bloodstream through tiny hair-like projections. The excess food that the body doesn't need or can't digest is turned into waste and is eliminated from the body.

Group B = Endocrine, Immune, and Lymphatic Systems

The Endocrine System

The **endocrine system** is made up of a group of glands that produce the body's long-distance messengers, or hormones. Hormones are chemicals that control body functions, such as metabolism, growth, and sexual development. The glands, which include the pituitary gland, thyroid gland, parathyroid glands, adrenal glands, thymus gland, pineal body, pancreas, ovaries, and testes, release hormones directly into the bloodstream, which transports the hormones to organs and tissues throughout the body.

The Immune System

The **immune system** is our body's defense system against infections and diseases. Organs, tissues, cells, and cell products work together to respond to dangerous organisms (like viruses or bacteria) and substances that may enter the body from the environment. There are three types of response systems in the immune system: the **anatomic response**, the **inflammatory response**, and the **immune response.**

The anatomic response physically prevents threatening substances from entering your body. Examples of the anatomic system include the mucous membranes and the skin. If substances do get by, the inflammatory response goes on attack.

The inflammatory system works by excreting the invaders from your body. Sneezing, runny noses, and fever are examples of the inflammatory system at work. Sometimes, even though you don't feel well while it's happening, your body is fighting illness.

When the inflammatory response fails, the immune response goes to work. This is the central part of the immune system and is made up of white blood cells, which fight infection by gobbling up antigens. About a quarter of white blood cells, called the lymphocytes, migrate to the lymph nodes and produce antibodies, which fight disease.

The Lymphatic System

The **lymphatic system** is also a defense system for the body. It filters out organisms that cause disease, produces white blood cells, and generates disease-fighting antibodies. It also distributes fluids and nutrients in the body and drains excess fluids and protein so that tissues do not swell. The lymphatic system is made up of a network of vessels that help circulate body fluids. These vessels carry excess fluid away from the spaces between tissues and organs and return it to the bloodstream.

Group C = Muscular and Nervous Systems

The Muscular System

The **muscular system** is made up of tissues that work with the skeletal system to control movement of the body. Some muscles—like the ones in your arms and legs—are voluntary, meaning that you decide when to move them. Other muscles, like the ones in your stomach, heart, intestines and other organs, are involuntary. This means that they are controlled automatically by the nervous system and hormones—you often don't even realize they're at work.

The body is made up of three types of muscle tissue: skeletal, smooth and cardiac. Each of these has the ability to contract and expand, which allows the body to move and function.

Skeletal muscles help the body move.

Smooth muscles, which are involuntary, are located inside organs, such as the stomach and intestines.

Cardiac muscle is found only in the heart. Its motion is involuntary

The Nervous System

The **nervous system** is made up of the brain, the spinal cord, and nerves. One of the most important systems in your body, the nervous system is your body's control system. It sends, receives, and processes nerve impulses throughout the body. These nerve impulses tell your muscles and organs what to do and how to respond to the environment. There are three parts of your nervous system that work together: the central nervous system, the peripheral nervous system, and the autonomic nervous system.

The central nervous system consists of the brain and spinal cord. It sends out nerve impulses and analyzes information from the sense organs, which tell your brain about things you see, hear, smell, taste and feel.

The peripheral nervous system includes the craniospinal nerves that branch off from the brain and the spinal cord. It carries the nerve impulses from the central nervous system to the muscles and glands.

The autonomic nervous system regulates involuntary action, such as heart beat and digestion.

Group D = Reproductive, Skeletal, and Urinary Systems

The Reproductive System

The **reproductive system** allows humans to produce children. Sperm from the male fertilizes the female's egg, or ovum, in the fallopian tube. The fertilized egg travels from the fallopian tube to the uterus, where the fetus develops over a period of nine months.

The Skeletal System

The **skeletal system** is made up of bones, ligaments and tendons. It shapes the body and protects organs. The skeletal system works with the muscular system to help the body move. Marrow, which is soft, fatty tissue that produces red blood cells, many white blood cells, and other immune system cells, is found inside bones.

The Urinary System

The **urinary system** eliminates waste from the body, in the form of urine. The kidneys remove waste from the blood. The waste combines with water to form urine. From the kidneys, urine travels down two thin tubes called ureters to the bladder. When the bladder is full, urine is discharged through the urethra.

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Take notes as student groups present their portion of the material on the human body systems.

Group A = Circulatory, Respiratory, and Digestive Systems

Group B = Endocrine, Immune, and Lymphatic Systems

Group C = Muscular and Nervous Systems

Group D = Reproductive, Skeletal, and Urinary Systems

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Questions from Group Presentations
Directions: Answer the questions from the information presented by classmates.

1. What are the smallest blood vessels?

_____

2. What is the tissue located inside bones that produces red blood cells?

_____

3. What is an example of a function of the autonomic nervous system?

_____

4. What are the basic parts of the nervous system?

_____

5. What are two glands within the endocrine system?

_____

6. What are the three response systems within the nervous system?

_____

7. Which type of muscles is involuntary and where are these muscles located?

_____

8. What are two organs in the digestive system?

_____

9. Write a question from the material presented for a classmate to answer:

_____

Human Body: Organization

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Biology

Big Picture

The body is organized on several different levels, from organ systems to cells. Groups of cells form tissues, and groups of tissues form organs. Organs then form organ systems. All parts of the body work together to maintain homeostasis, or keep internal conditions stable. Failure of homeostasis can be fatal.

Key Terms

Cell: Basic unit of structure and function.

Tissue: A cluster of cells with similar functions.

Organ: A group of tissues working together.

Organ System: A group of organs working together.

Homeostasis: Process where the body tries to keep internal conditions stable.

Homeostasis

- All systems of the body work together to maintain **homeostasis**.
- Hormones and the endocrine system play a large role in maintaining homeostasis.
- If homeostasis fails, the person can get sick and die.

Levels of Organization

Humans are organized at different levels in order of most general to most complex:

- organism, **organ system**, **organ**, **tissue**, **cell**

The cell is a basic unit of life, as it is the smallest unit capable of carrying out the functions of life.

- We have specialized cells that are suited to perform a specific task
  - Examples: blood cells, bone cells, neurons

Connected cells performing a similar function form a tissue.

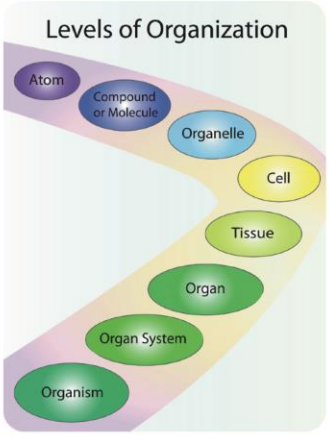
Four basic types of tissues:

- Connective tissue connects different structures to form overall structure of the body
- Epithelial tissue covers body surfaces to protect organs; also secretes and absorbs substances
- Muscle tissue can contract to move bones
- Nervous tissue carries electric nerve signals

Organs are then made up of two or more types of tissues working together.

- Examples: heart, brain, lungs, skin

The organs can be organized into an overall organ system that performs a more complex job.



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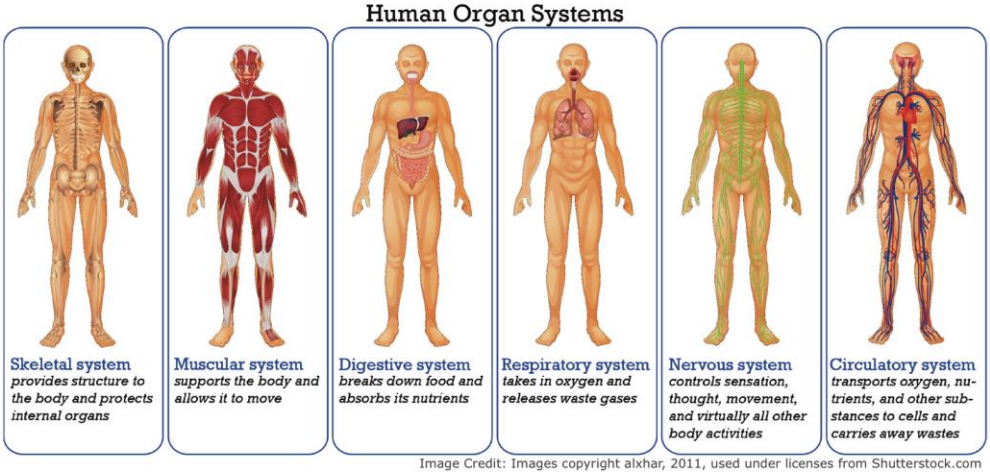
Human Organ Systems



Skeletal system *provides structure to the body and protects internal organs*

Muscular system *supports the body and allows it to move*

Digestive system *breaks down food and absorbs its nutrients*

Respiratory system *takes in oxygen and releases waste gases*

Nervous system *controls sensation, thought, movement, and virtually all other body activities*

Circulatory system *transports oxygen, nutrients, and other substances to cells and carries away wastes*

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This guide was created by Amy Shen and Jin Yu. To learn more about the student authors, visit http://www.ck12.org/about/about-us/team/interns.

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Lesson 4.15: Life Science – Health: Body Systems

Unit 4.15 – Handout 2

TEACHER ANSWER KEY

1. What are the smallest blood vessels?

   Capillaries

2. What is the tissue located inside bones that produces red blood cells?

   Marrow

3. What is an example of a function of the autonomic nervous system?

   It regulates heat beat or digestion and other things that are involuntary.

4. What are the basic parts of the nervous system?

   The basic parts are the brain, nervous, and spinal cord.

5. What are two glands within the endocrine system?

   The glands are the pituitary gland, thyroid gland, parathyroid glands, adrenal glands, thymus gland, pineal body, pancreas, ovaries, and testes.

6. What are the three response systems within the nervous system?

   They are the anatomic response, the inflammatory response, and the immune response.

7. Which type of muscle is involuntary and where are they located?

   They are the smooth muscles and they are located inside organs.

8. What are two organs in the digestive system?

   Organs in the digestive system are the pharynx, esophagus, stomach, liver, pancreas, small intestine, large intestine,

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4.15 Handout 3

TEACHER ANSWER KEY

1. **C**

2. **C**

3. ***Answer will vary - Possible answer:*** Bad food could poison your body, so your body's natural reaction due to homeostasis is to get the food out of your system.

4. ***Answer will vary - Answers should be similar to*:** No – If a cell reaches equilibrium, then no oxygen or food is going in to create energy, and not waste is going out, so the cell is no longer living.

5. ***Answer will vary – possible answer*:** You would never know when your body needed to eat, drink, or sleep, so you would become unhealthy.

Unifying Concepts and Process:

***Answer will vary – possible answer*:** Entropy means that two areas with different concentrations of matter will naturally mix until they are equalized with matter always moving from higher to lower concentrations. This law is why diffusion occurs.