

PURPOSE

Students will learn about the eleven body systems and their function in the body, recognizing that the reproductive system has a major impact on overall health.

LEARNING OBJECTIVES

By the end of the lesson students will be able to:

1. Identify 11 body systems and their components.
2. Understand that every system in the body must function properly for the whole body to be healthy.
3. Identify the four primary female reproductive hormones: estrogen, progesterone, follicle stimulating hormone, and luteinizing hormone.

MATERIALS & RESOURCES

- Lesson 1 teenFEMM powerpoint
- Body Systems Worksheet
- “Who Am I?” Activity

Supplemental Video: [What is Homeostasis?](#)

VOCABULARY

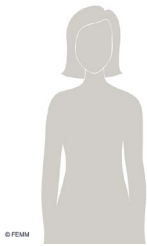
- **Body system:** Groups of organs working together for a certain purpose.
- **Hormones:** Chemical signals that travel in the bloodstream, directing the activity of every system in the body.
- **Puberty:** Time when physical and sexual characteristics mature due to hormonal changes (typically between 9-14 years old for a girl, and 10-17 years for a boy).
- **Maturity:** The growth to full development of the body, brain, and emotions.
- **Endocrine System:** The glands throughout the body that produce and release hormones.
- **Homeostasis:** A state of balance between interdependent systems.

- **Hormonal Axis:** The system of communication between a woman's brain and ovaries; it regulates female hormones that affect the reproductive system and overall health.

PROCEDURE

Step 1 (5 minutes): *Introduce teenFEMM health program*

Introducing teenFEMM



FEMM is a health program that will help you understand your body & track your health as you grow to full maturity.

You will learn about the reproductive system, the hormonal axis, why ovulation is a sign of health, how daily lifestyle choices affect health, & how to continue tracking your health.


teenFEMM is a health program that will help you understand your body and track your health as you grow and mature. Through this course, you will learn that ovulation is an important sign of health. You will also continue to learn about how important it is to chart and create a health record for yourself. Identifying your body's ovulation within two years of the onset of your first menstruation is important as ovulation is a sign of overall health and wellness.

This course will also teach you about the many fascinating things that hormones do. You probably already know about estrogen and progesterone, but there are two other extremely important reproductive hormones, called: Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH). For women and men, hormones impact every system in the body. So, we have a lot to cover!

teenFEMM classes will continue every year through grade 12. There are 6-8 lessons per year, 45 mins to an hour each. By the time you're ready to graduate, you will be a health expert!

Step 2 (2 minutes): *Healthy Body*

Healthy body



The body is made up of systems.
A few you already know are:

- musculoskeletal
- nervous
- respiratory
- digestive
- circulatory
- endocrine
- urinary
- reproductive

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As you know, your body is made up of many organs. Each organ has a particular and important job to do, and all of your organs need to work together for your body to be as healthy as possible. When certain parts work together for a similar purpose, they are called a **system**.

Write the following vocabulary definition on the board:

Body system: Groups of organs working together for a certain purpose.

Your body has many **systems**, all working together to make sure you function well.

Step 3 (10 minutes): *Review 9 systems from grade 7, and introduce 2 new systems.*

We learned nine systems in class last year:

- **The muscular and skeletal systems (also known as the musculoskeletal system):** Sometimes these two systems are listed as one because they are so interconnected. The muscles, bones, and joints are attached to each other by different tissues. Ligaments are found at your joints, and their job is to hold bones together. Tendons are found at the ends of muscles, and their job is to connect muscles to bones.
- **The nervous system:** The nervous system controls everything you do, including breathing, walking, thinking, and feeling. This system is made up of your brain, spinal cord, and all the nerves of your body. The brain is the control center and the spinal cord is the major highway to and from the brain. The nerves carry the messages to and from the body, so the brain can interpret them and take action.

- **The respiratory system:** The respiratory system consists of the airways, the lungs and the respiratory muscles that move air in and out of the body.
- **The digestive system:** Digestion (your body using food for energy and growth) takes place in a series of organs that together are called the alimentary canal, or digestive tract. The digestive system consists of a group of connected organs—the mouth, pharynx, esophagus, stomach, small and large intestines, and anus. Through these structures, food is processed via mechanical and chemical action into usable nutrients and expendable waste. Although the liver, gallbladder, and pancreas play a critical role in digestion, they are not part of the digestive tract itself.
- **The cardiovascular (or circulatory) system:** The circulatory system is made up of blood vessels that carry blood away from and towards the heart. Arteries carry blood away from the heart and veins carry blood back to the heart. The circulatory system carries oxygen, nutrients, and hormones to cells, and removes waste products, like carbon dioxide.
- **The endocrine system:** controls and regulates body processes by means of chemical messengers called hormones. The system is composed of a group of ductless glands located throughout the body that produce hormones in response to the body's needs. Once released, hormones may act on nearby structures, or they may travel in the blood to distant target organs.
- **The urinary system:** The various activities of the body create waste by-products that must be expelled in order to maintain health. To excrete certain fluid wastes, the body has a specialized filtering and recycling system known as the urinary system.
- **The reproductive system** is key to our overall health, as healthy hormone levels have an impact on our whole body. It is also responsible for bringing about a new life. In women, it includes the ovaries, fallopian tubes, the uterus, vagina, and


breasts. In men, the reproductive system includes the testes, scrotum, penis, and all the tubes through which sperm travels.

There are two additional body systems to learn about, bringing us to a total of 11 systems:

Healthy body

The body is made up of systems.
Two new ones are:

- musculoskeletal
- nervous
- respiratory
- digestive
- circulatory
- endocrine
- urinary
- Reproductive
- Integumentary
- lymphatic



Lymphatic
ORIGIN
late 16th century; from Latin
lymphā, lympha "water".

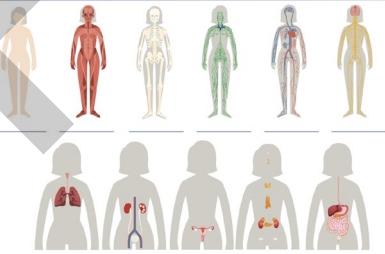
Integumentary
ORIGIN
early 17th century; from Latin
integere "to cover".

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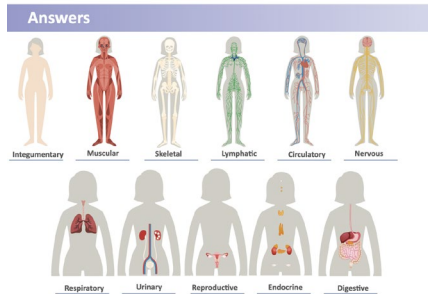
- The **integumentary system** is made up of the organs which form the outermost layer of our bodies. These organs are the skin, hair and nails. This system has many important functions which include providing protection, sensing the world around us, regulating body temperature, preventing moisture loss, and synthesizing vitamin D. As you know by now, this system goes through some big changes during puberty. Increased oil production by glands in the skin during puberty due to hormonal changes is one of the more noticeable (and sometimes frustrating) things teenagers often face.
- The **lymphatic system** is a network of organs which works to balance body fluid and fight against infection. It is part of the immune system. It consists of lymph vessels which connect to all of the lymph nodes throughout the body.

Now let's look at all of the body systems and name them.
*Hand out the **Body Systems Worksheet** for students.*

Body Systems Worksheet



Give students a few minutes to fill in the blanks and name as many systems as they can on their own. Then, go over the **answers** together as a class using the next slide.



The body is made up of many systems. Every system of the body must function properly for the body to be healthy.

Step 4 (5 minutes): Who Am I? Activity

Cut out the cards on the dotted line on the **“Who Am I?” Worksheet**

Who am I? Worksheet



- Ask for 10 student volunteers for an activity
- Provide each volunteer with one card containing a riddle
- Have each volunteer read their card aloud to the class and ask the class to guess the system. *Answers are at the bottom of the worksheet page.*

Step 5 (5 minutes): Introduce the concept of homeostasis.

When all of the body systems are functioning well, we feel really good and healthy! The maintenance of an organism's internal environment (*i.e. our body*) is called homeostasis. When all systems are working together, despite changes in our external world, this is called **homeostasis**. (*Homeo* comes from the Greek for “similar” and *stasis* means “stable.”)

What is homeostasis?

Homeostasis

homeo = similar

stasis = steady

When all systems are working together, despite changes in our external world, our body is in a state of **homeostasis**.

Let's say we go outside after school on a really hot day for a sports practice; eventually we will start to sweat. *Sweating is controlled by which system? Our integumentary system!* The fact that we start to sweat is a healthy sign! Sweating is an important function of the integumentary system as if we didn't sweat, our body would overheat, causing other systems to start to malfunction. When the body gets too warm, sweat glands (located all over our body, but in particular the forehead, armpits and groin area) produce sweat. Sweat is mostly water and salt.

When the sweat evaporates from the skin's surface, the body is cooled as body heat is dissipated. However, maybe you have noticed that when you're hot, you get a bit red in the face. *Why?* It's an amazing reason, actually. When our body temperature increases, our blood vessels expand towards the skin's surface to release excess heat. This is why someone looks "flushed". It's a way that the integumentary and the circulatory system work together to bring our body temperature back to a normal range to achieve... **homeostasis!**

The reaction of our integumentary system to produce sweat, is a way of cooling off the body in order to maintain its ideal temperature. This internal balance that our body maintains (thanks to our 11 body systems), is **homeostasis**.

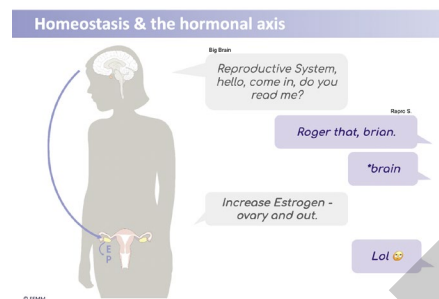
What is homeostasis?



If time permits and the concept of homeostasis requires further explanation, you may wish to play the [supplemental video: What is Homeostasis?](#)

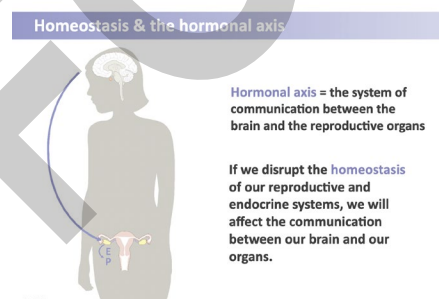
Step 6 (5 minutes): Connect homeostasis and the hormonal axis.

It's important to remember that our reproductive system is an integral part of our overall health, too. The reproductive system is not just for some far-off day in the future when we want to reproduce. It's an important system of our body that affects every other body system, too. So, just as the example of sweating is a necessary function of the integumentary system, the process of the ovulatory cycle every month in a woman's body is an indicator of the health of the reproductive system.



Our endocrine system (which controls our hormones) affects our nervous system. And our nervous system controls almost all of the body's processes! So, if all of these messages between the brain and reproductive system are not being sent or properly received, it will affect our mental and physical health, as well as our growth and development!

The special link between the brain and the reproductive system is called the **hormonal axis**.



The hormonal axis is a way of describing this invisible arc or line (as shown on the slide)

linking the brain and the ovaries in particular communication throughout a woman's life, from puberty and beyond.

Write the following vocabulary definition on the board:

Hormonal Axis: The system of communication between a woman's brain and ovaries; it regulates female hormones that affect the reproductive system and overall health.

Review

Review

- The 11 body systems work together to keep your body in a state of homeostasis.
- A healthy reproductive system is an important indicator of your body's overall health.
- Your brain and reproductive system are linked by chemical messengers. We call this the hormonal axis.
- When the hormonal axis is fully functioning, you can grow to full maturity.

CONCLUSION

Every human person has the eleven body systems we've discussed in this class. The health of every individual depends on all of these systems properly working together in the state called **homeostasis**. This is why a healthy reproductive system is an important indicator of the health for the rest of the body's systems (as one system impacts all of the others). The way that the brain and the reproductive system are linked is called the **hormonal axis**. When the hormonal axis works properly, all of its components are able to do their jobs and help adolescents grow to full **maturity**. In the next lesson, we will review female reproductive system anatomy and male reproductive anatomy.

REFERENCES

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- Billman, G.E. (2020). Homeostasis: The underappreciated and far too often ignored central organizing principle of physiology. *Frontiers in Physiology*, 11. <https://doi.org/10.3389/fphys.2020.00200>