

PURPOSE

To develop students' knowledge that ovulation is a regularly repeating process with a purpose: to support the health of the whole body.

To reiterate the importance of the four female hormones FSH, Estrogen, LH, and Progesterone for the entire cycle and overall health.

LEARNING OBJECTIVES

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

1. Understand that ovulation is a sign of health.
2. Understand the female body has a regularly occurring cycle, including menstruation.
3. Understand the effect hormones have on the development of the female brain and body.

MATERIALS & RESOURCES

- Lesson 4 teenFEMM powerpoint
- Worksheet: Ovulation + Menstruation + Answer Key
- Activity: "Entry Ticket"

VOCABULARY

- **Hormones:** Chemical signals that travel in the bloodstream, directing the activity of every system in the body.
- **Reproductive System:** The group of organs in the lower belly/pelvis that work together: in women, to mature an egg (the female cell of reproduction) and in the future to support a pregnancy; and in men, to produce sperm (the male cell of reproduction).
- **Ovulation:** When a mature egg is released from the ovary. Ovulation is not just for reproduction but is a sign of health for women.
- **Ovulation Cycle:** Approximately once a month, an egg is released from the ovary. Because this process repeats, it is called a cycle.

- **Menstruation:** Each cycle, hormones cause the lining of the uterus (the **endometrium**) to thicken. At the end of the cycle, the lining of the uterus breaks down and sheds, which is experienced as menstrual bleeding. (This is also referred to as the 'period.')

PREPARATION

- ☐ Print copies of the **Entry Ticket Activity** to have one ticket for each student.
- ☐ Print the **Ovulation + Menstruation Worksheet** for each student.
- ☐ Print the **Ovulation + Menstruation Worksheet** for each student + **Answer Key**

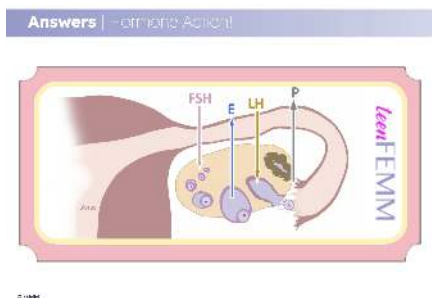
PROCEDURE

Step 1 (5 minutes): Entry Ticket Activity: Hormone Action!

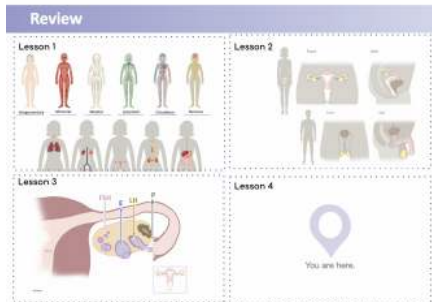
Hand out **Entry Ticket Activity: Hormone Action!** Have students label the 4 Main Female Reproductive Hormones and draw the egg and follicle as it grows and matures.



Give students a couple of minutes and then show the next slide with the answers.

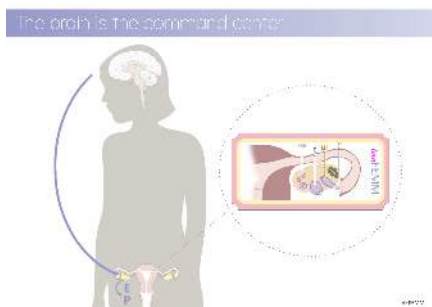


Step 2 (10 minutes): Review lessons 1-3 and introduce this lesson.



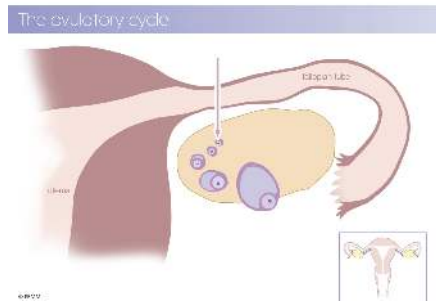
In teenFEMM, we began Lesson 1 by learning about the body systems and how they work together. In Lesson 2, we zoomed in on the female reproductive system and the female and male anatomy. In Lesson 3, we looked at the process of ovulation, and the four main female reproductive hormones produced through the ovulatory cycle: Follicle Stimulating Hormone (FSH), Estrogen, Luteinizing Hormone (LH), and Progesterone.

Today, in Lesson 4, we will talk more about why the ovulatory cycle is so important to your overall health and the specific impacts of estrogen and progesterone in the body.



The brain is the command center for your body, directing hormones that impact your overall health. *Ask:* Which two of the four main female hormones are produced in the brain? That's right: FSH and LH.

As we know, the hormonal axis (the purple arc on the slide) is a visual representation of the hormonal communication between the brain and your reproductive system. This communication is constant and produces the ovulatory cycle.



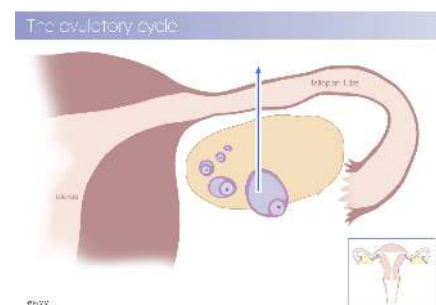
Ask: In the first part of the cycle, which hormone, produced in the brain, sends a message to the ovaries to stimulate an egg to grow and develop?

Follicle Stimulating Hormone (FSH).

Click on the slide to reveal the answer.

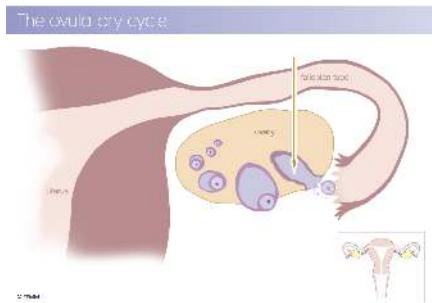
Ask: In the ovary, the egg is surrounded by a special, protective tissue, called?
A follicle. Hence the name, Follicle Stimulating Hormone.

Ask: As the egg and follicle grow in the ovary, they make which hormone? *Click on the slide to reveal the answer.* **Estrogen.**



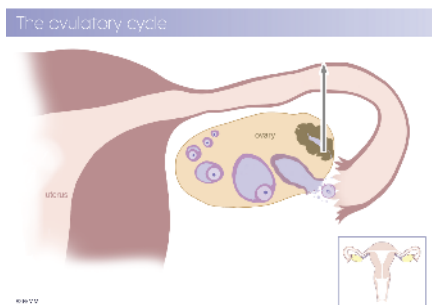
The bigger and more mature the egg and follicle get, the more **estrogen** they make. When the egg has grown to full maturity, it produces peak levels of estrogen. This high level of estrogen in the ovary feeds back to the brain to say: “stop producing Follicle Stimulating Hormone!”

Ask: Which hormone, sent from the brain, triggers ovulation? *Click on the slide to reveal the answer.* **Luteinizing Hormone (LH).**



LH causes the egg to burst from its follicle. The egg then travels into the fallopian tube.

In the ovary, the now-empty follicle becomes a new tissue called the **corpus luteum**. The word comes from the Latin '*corpus*' for 'body' and '*luteus*' for 'yellow' as the cells lining the follicle (under a microscope) are yellow in color.



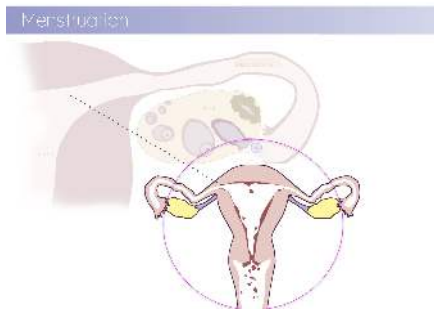
*Ask: The corpus luteum secretes (makes) which hormone? Click on the slide to reveal the answer. **Progesterone**.* Progesterone is a super awesome hormone that every strong female body needs! Progesterone promotes mental well-being, sleep, and relaxation!

Now, maybe you're thinking: wait, *what happens to the egg after ovulation, again?*

On its own, the egg simply dissolves in the fallopian tube after 12-24 hours.

Progesterone levels peak and then after 10-14 days the corpus luteum becomes inactive and the lining of the uterus sheds.

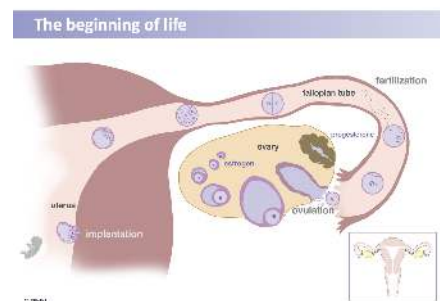
*Ask: What's the shedding of the uterine lining called? **Menstruation**.*



Menstruation typically lasts from 3-7 days in a normal and healthy cycle. This shedding of the uterine lining is what is happening inside of you when you get your period.

Debilitating pain or heavy bleeding is not normal or healthy and you can talk to your parents about reaching out to a FEMM doctor to receive care.

The whole ovulatory cycle: from growing and releasing an egg, producing the hormones estrogen and then progesterone, to menstruation, repeats every 24-36 days. This cycle is a normal and important process that tells us a lot about a woman's health and the health of her hormones.



Now, if the egg joins with the male cell of reproduction (sperm) through sexual intercourse, it becomes a fertilized egg, also known as a zygote. This newly formed life travels to the uterus, where it embeds in the uterine lining.

If pregnancy occurs, progesterone will continue to rise, maintaining the lining of the uterus, in order to make it a nourishing place for a baby to grow for the next 9 months.

But back to right now. It's important to remember that the ovulatory cycle is not just relevant to a far-away reproductive goal. Ovulation is a general indicator of your body's health. Estrogen and progesterone work together to build and strengthen bones, ensure breast development, impact skin and hair, and influence your brain and emotions.

Step 4 (5 minutes): *Expand upon the term "cycle."*

Pop quiz! What are the 2 main jobs of the **ovaries**?

Pop quiz

What are the 🙌 main jobs of the ovaries?

1

To grow and release an egg



2

Produce **estrogen** + progesterone

To grow and release an egg (ovulation) each cycle.

To make the hormones estrogen and progesterone.

Every woman has a cycle

Every woman has a cycle
from puberty until around age 50

It is called the **ovulation cycle**
since ovulation is the most important event

It can be called the **menstrual cycle**
since menstruation is the most obvious sign

Every woman has a cycle, beginning in puberty until around age 50. We call it the **ovulation cycle** rather than the *menstrual cycle*, because ovulation is the main event. The word ovulation comes from the latin word "ova" which means egg. Ovulation means the process by which the egg is released.

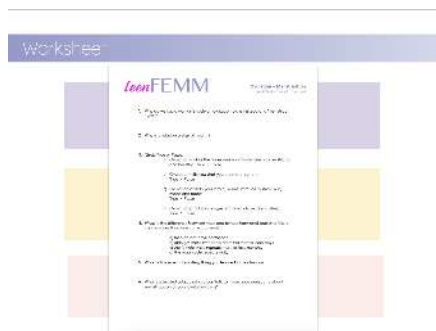
As you learn more about your hormones, and their patterns and effects, you will see how helpful it is to recognize this cyclical pattern. There may be times in your cycle that you're really energetic and other times when you want to rest. This repeating, monthly pattern will become so important to creating a health record, knowing yourself, and recognizing what makes you unique.

Did you know? Men have hormonal cycles, too? However, in men, the hormone pattern repeats daily, as opposed to monthly. Typically, testosterone levels are higher in the morning and lower at night. So, the next time someone says women are “hormonal”, you can remind them that the male hormone testosterone can also lead to outbursts, irritability and fluctuations in mood, too. ;)

For both males and females, lifestyle impacts hormones and their effects. In addition to managing symptoms as they come, finding ways to relieve stress is important as the body matures through these hormonal changes. We’ll talk about this in later lessons.

Step 5 (5 minutes): Worksheet: Ovulation + Menstruation

Hand out the **Worksheet: Ovulation + Menstruation**. Give students a couple of minutes to complete.



Review the answers by using the **Answer Key** provided in the lesson folder.

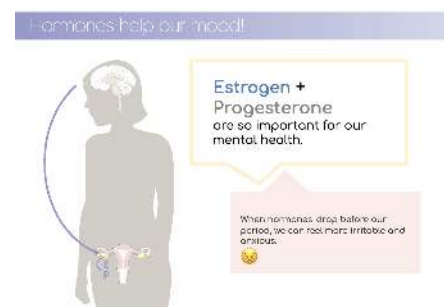
Step 6 (10 minutes): Expand on the effects of estrogen and progesterone

Have you ever noticed that you feel different at different times in your cycle? Let’s look at this chart, to examine the specific effects of estrogen and progesterone on the body.

Estrogen & progesterone for your health		
	estrogen	progesterone
uterus	tones, contracts	relaxes
uterine lining	grows	maintains
breasts	grows	normalizes
bones	forms	maintains
blood vessels	dilates, increases flow	relaxes, normalizes clotting
brain cells	stimulates	maintains and heals
well-being	normal levels promote well-being; high levels increase anxiety	promotes sleep and relaxation; decreases anxiety

Have you ever noticed that you feel different at different times in your cycle? That's because of the effects of estrogen and progesterone on the body.

Mood



Do you feel the same when you have your period as when you don't? Right before your period, do you feel a bit more worried or anxious than usual? That's because progesterone is dropping. *And what does Progesterone do?* **Progesterone promotes sleep, relaxation and decreases anxiety!**

It's important to make a note of these emotional and mental health changes, so that you can remember to be gentle with yourself during these times. These are patterns that will help you understand your cycle and yourself better. Hormones have a big influence on your brain. It is very common to experience mood changes as you go through puberty.

Bones (height/size and density)



As you go through puberty, your bones are growing rapidly. Your bone and mineral density is increasing. By the time you are cycling regularly, you most likely will not grow any taller. Proper hormone levels are necessary to achieve optimum bone mass so your bones stay strong and are not as susceptible to breaks.

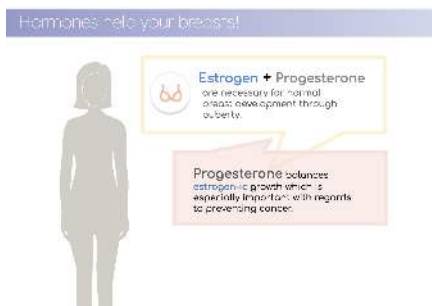
Hair

Healthy estrogen and progesterone levels improve hair thickness and prevent loss and thinning.



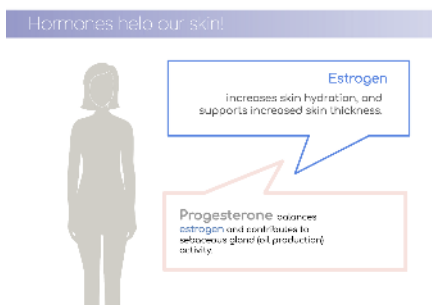
As estrogen rises during puberty, girls will also notice pubic and underarm hair growth. This is totally normal and healthy.

Breasts



Both estrogen and progesterone are necessary for normal and healthy breast development. It takes several years for breasts to fully mature. In the first stage of development, the nipple and area surrounding the nipple (called the areola) begin to expand. Then, the breasts continue to enlarge until they reach their full size. It is normal for one breast to grow faster than the other, or to experience soreness as they grow.

Skin



Hormones are working hard in your body throughout puberty. Sometimes when they work a little too hard, you can end up with acne, which is when there is an

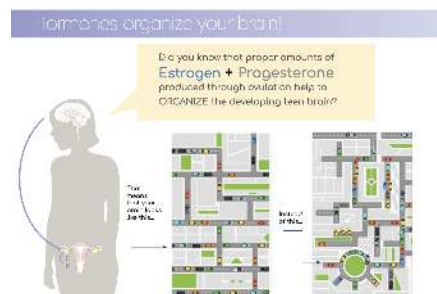
overproduction of oil in the glands in your skin. Making healthy choices with diet and exercise can help support overall hormonal health, but we'll discuss this in later lessons.

For underarm sweat, deodorant can be used, applied once in the morning; you can reapply before a sporting event or an activity that might cause more sweating. Is there a trusted adult you can talk to about your personal care routine? The timing, products, and methods can be different for each girl.

Brain



The brain is not fully developed until about age 25, for both boys and girls, and hormones play a key role in developing all of the essential brain pathways and processes.



The activity of your whole body is directed by your brain. The hormones produced naturally by your body, month to month, are necessary to the proper organization of your brain. Like a good city planner, your body's natural hormonal processes are mapping out your brain so that you have clear thinking and creative pathways for years to come.

CONCLUSION

Review

- Having an ovulation cycle is important for our overall health.
- Estrogen and progesterone have specific effects on different parts of our body.
- During the next lesson, we will learn how to chart the cycle.

The ovulatory cycle is not just an isolated event happening somewhere “down there” and relevant when you want to have a baby. The ovulatory cycle and all of the hormones it produces are vital to the proper development of every part of your body. Now that we’ve looked at what the hormones progesterone and estrogen do to balance and develop our body and brain, next lesson we will learn how we can track the specific characteristics of our cycle. Tracking this information is called “charting” and it’s helpful information to know about our bodies and our health.

REFERENCES

- del Rio, J. & Alliende, I. & Molina, N. & Serrano, F. & Molina, S. & Vigil, P. (2018). Steroid hormones and their action in women's brains: The importance of hormonal balance. *Frontiers in Public Health*, 6, <https://doi.org/10.3389/fpubh.2018.00141>
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- Vigil, P., del Rio, J., Carrera, B., Aranguiz, C., Rioseco, H. & Cortés Cortés, M. (2016). Influence of sex steroid hormones on the adolescent brain and behavior: An update. *The Linacre Quarterly*, 83, 308-329. <https://doi.org/10.1080/00243639.2016.1211863>