

PURPOSE

To teach students the connection between the brain and hormones and to read hormonal biomarkers as a basic sign of reproductive health.

LEARNING OBJECTIVES

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

1. Understand the connection between hormones and the brain.
2. Know the specific impact of estrogen and progesterone on their body.
3. Learn basic charting to understand their body and health.

MATERIALS & RESOURCES

- **Review Game: Ask the Experts** (preparation needed)
- **Lesson 5 teenFEMM** powerpoint
- **Worksheet: FEMM Five** (preparation needed)+ Teachers' Answer Key

VOCABULARY

- **Charting:** A way to write down health observations.
- **Biomarkers:** Signs of hormonal and other changes in your body. Can take the form of menstrual bleeding, cervical fluid, and other physical or emotional signs that help you understand your body.
- **Cervical Fluid (mucus):** Fluid secreted by the cervix which changes in consistency (dry/moist) based on changing hormone levels.
- **Menstruation/Period:** At the end of each cycle the lining of the uterus sheds, which causes bleeding.

PREPARATION

- ☐ For the **Review Game**, provide three chairs, three markers, and a couple pieces of paper for each student who participates in the game.
- ☐ Print the **FEMM Five Worksheet** for each student.

PROCEDURE

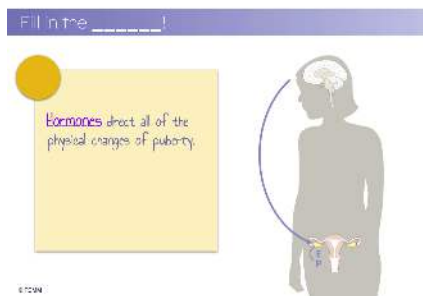
Step 1 (10 minutes): Review Game: Ask the Experts

Start by placing three chairs in the front of the classroom. Choose three students to be the 'experts' sitting in the chairs. Give each expert a piece of paper and a marker, to write down their answer.

Explain that the teacher will ask a question, and the experts will write down their answer, but hold their paper to their chest so no one else can see. When asked, the experts will reveal their answer. If the expert is correct, they can remain in their chair for the next round. If an expert is incorrect, any student in the class can raise their hand to give the correct answer and join the new panel of experts.

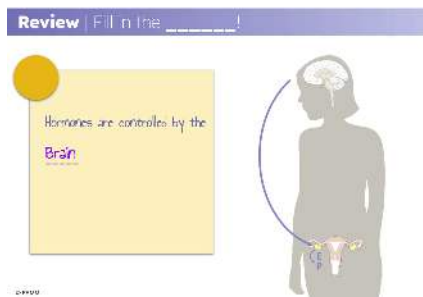
NOTE: Clicking on the slide will reveal the answer(s).

1. _____ direct all of the physical changes of puberty.



Answer: **Hormones**

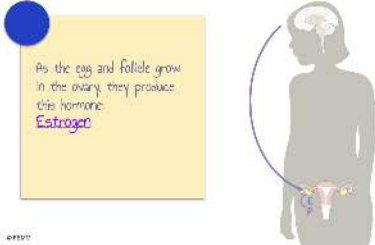
2. Hormones are controlled by the _____.



Answer: **Brain**

3. As the egg and follicle grow in the ovary, they produce this hormone:

Review | Fill in the _____!

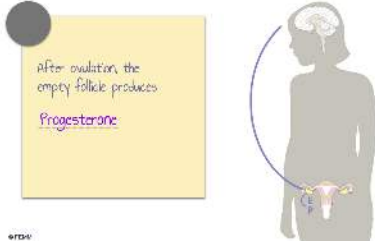


As the egg and follicle grow in the ovary, they produce this hormone: Estrogen

Answer: **Estrogen**

4. After ovulation, the empty follicle produces _____

Review | Fill in the _____!

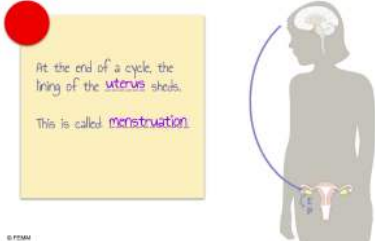


After ovulation, the empty follicle produces: Progesterone

Answer: **Progesterone**

5. At the end of a cycle, the lining of the _____ sheds. This is called _____

Review | Fill in the _____!



At the end of a cycle, the lining of the uterus sheds. This is called menstruation.

Answers: **uterus menstruation**

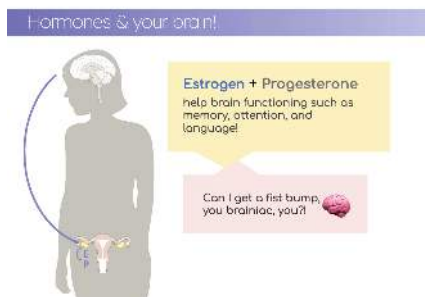
Step 2 (15 minutes): Hormones, Biomarkers and Charting

Hormones influence the development of your brain, bones, body systems and more!

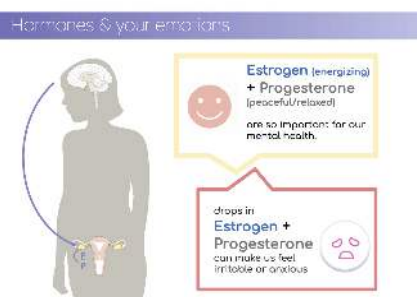
Estrogen & Progesterone		
	estrogen	progesterone
uterus	tones, contracts	relaxes
uterine lining	grows	maintains
breasts	grows	normalizes
bones	forms	maintains
blood vessels	dilates, increases flow	relaxes, normalizes clotting
brain cells	stimulates	maintains and heals
well-being	normal levels promote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

Estrogen & Progesterone have a HUGE impact on the whole body!

Hormones are controlled by the brain.



Your brain and your hormones are constantly in communication. The hormones estrogen and progesterone *shape your brain*. Together, they help with memory, attention and language!



It is very common to experience mood changes as you go through puberty. After all, we have learned a lot about how much hormones influence your brain! Even minor drops in estrogen can make us feel irritable or anxious. Progesterone, which is produced after ovulation, calms us down and can help us sleep better. But you don't want only progesterone as you need estrogen, too! Remember: estrogen and progesterone balance each other out, through the different points in the cycle.

Now, you may be thinking, *if only there was a way that you could see what your hormones were doing inside your body?*

Hormones & Biomarkers

Estrogen & Progesterone produce certain effects in your body.

These effects are called **biomarkers**.
'bio' = life
'marker' = sign

Biomarkers provide health information.

Estrogen and progesterone produce different effects on the body. These 'effects' are called biomarkers (bio = life, markers = signs) and they can help you understand the hormonal activity taking place inside your body. It's kind of like a superpower that you have as a woman!

Charting hormonal changes

Biomarkers

- Red - bleeding
- Yellow - pasty
- Blue - moist
- Grey - dry

These are the four colors we use to track the hormonal changes occurring in our bodies: red, yellow, blue and gray. Each color represents a different biomarker: bleeding, pasty, moist and dry. These four biomarkers tell us what our hormones are doing in our body.

Charting hormonal changes

- Red - bleeding
- Yellow - pasty
- Blue - moist
- Grey - dry

FEMM

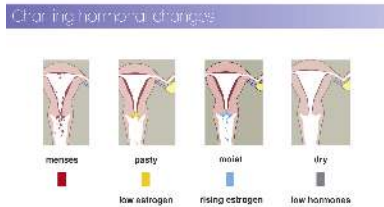
name:

date:

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
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This is called a chart. Charting is a way to write down hormonal health observations. A chart can be as simple as a piece of paper with your name, the date and the different biomarkers and their colors. In this example, Kyla started charting her biomarkers on

April 5th, so she wrote down her first observation under day 1.



The most obvious biomarker to see is bleeding. Bleeding tells us that the uterine lining has built up and is now shedding. On the chart, we mark this with **red**. Tracking your bleeding pattern will be easy and obvious and is something that every woman does to understand and manage her body.

Estrogen and progesterone also have signs that you can see in your body. Estrogen causes the cervix, the small canal at the base of the uterus, to produce a cervical fluid. Low levels of estrogen produce low levels of cervical fluid. As this fluid travels down the vaginal canal it can mix with the normal, slight shedding of tissue in the body. You might notice this as a pasty or crumbly observation on the inside of your underwear. To chart this, we would mark this low level of estrogen in the body with the color **yellow**.

As estrogen levels get higher, you might feel a sensation of moistness when you wipe after using the bathroom. Higher levels of estrogen in the ovary produce higher levels of cervical fluid. To chart this, we would mark this higher level of estrogen, with the color **blue**.

On other days, when you are not on your period and you do not feel a moist sensation from estrogen, you will feel the sensation you might feel most of the time right now: dry. We chart that with the color **gray**.

As you get older, and your hormone levels are higher, with ovulation, dryness will represent the hormone progesterone. But for now, if you have not yet begun to menstruate, you have likely not yet begun to ovulate. The dryness you feel is healthy for early puberty as your hormones are just starting to “wake up” in your body.

Making sense of your cycle in puberty

2. In puberty, the brain & ovaries are just beginning to communicate.

The egg + follicle inside the ovary (grows a little – but not enough to ovulate)

2. You might think not much is happening

Low estrogen in the ovary (as ovaries start) produces little cervical mucus.



Charting would look like this:

You can see how the anatomy of the reproductive system and hormones fit together.

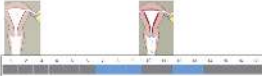
At the beginning of puberty, the brain and ovaries are just starting to communicate. On the slide, you can see the egg in the top level -- still small, but growing a little. This little bit of growing produces only low levels of estrogen. Even if you think not much is happening, charting will help you to anticipate changes in your body as your hormonal cycle matures.

Making sense of your cycle in puberty

3. As you mature, your brain & ovaries communicate better.



4. More estrogen produces more cervical mucus.

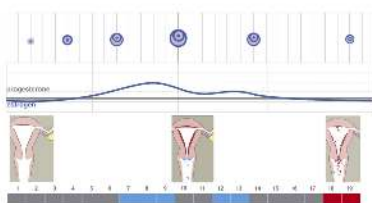


5. You get your period for the first time – it will likely be short/light.

Cycle by cycle, as your body matures, the communication between the brain and the ovaries strengthens. The egg and follicle start to grow and produce more estrogen. This increased estrogen acts on the cervix producing moist cervical mucus. This is charted with the color **blue**.

Eventually, you will bleed for the first time. During your first period, it will most likely be short and light. You will chart this with the color **red**.

Making sense of your cycle in puberty



This slide shows different hormonal activity. In the top row, we see an illustration of the egg growing larger in the ovary. The second row shows a graph of estrogen (blue line) and progesterone (gray line). In the third image, we see the impact of estrogen on the level of the uterus (thickening the lining of the uterus). Lastly, the chart shows us how these hormonal changes would be observed in the body's biomarkers.

Step 3 (10 minutes): FEMM Five Worksheet

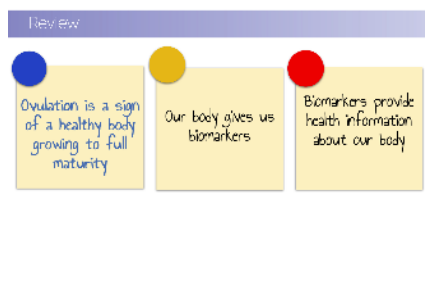
Learning to chart your hormonal activity is a powerful way to understand the changes you are experiencing, both physically and emotionally.

*Hand out the **FEMM Five Worksheet** to students. Give students a couple of minutes to complete the five questions.*



Review using the slide. Click on the slide to reveal the answers.

CONCLUSION



Our hormones are an important part of the health of our entire body. Our body gives us biomarkers: these can help us tell what is happening in our body and whether it is normal and healthy. Charting our biomarkers helps us to know and feel confident about our body.

REFERENCES

teenFEMM Course Materials, Lessons 1-6

Vigil, P., Ceric, F., Cortés, M.E., & Klaus, H. (2006). Usefulness of monitoring fertility from menarche. *Journal of Pediatric Adolescent Gynaecology*, 19(3), 173-9.
<https://doi.org/10.1016/j.jpag.2006.02.003>