

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

Ms. Randall A & P

## Lab activity Menstrual Cycle

**Background:** The ovary releases a new egg each month. The uterine lining prepares the uterus for possible fertilization. Hormones control these changes

**Objective:**

To show how the levels of hormones affect the female reproductive system

**Materials:** Colored pencils (4), lab packet, textbook and/or notes.

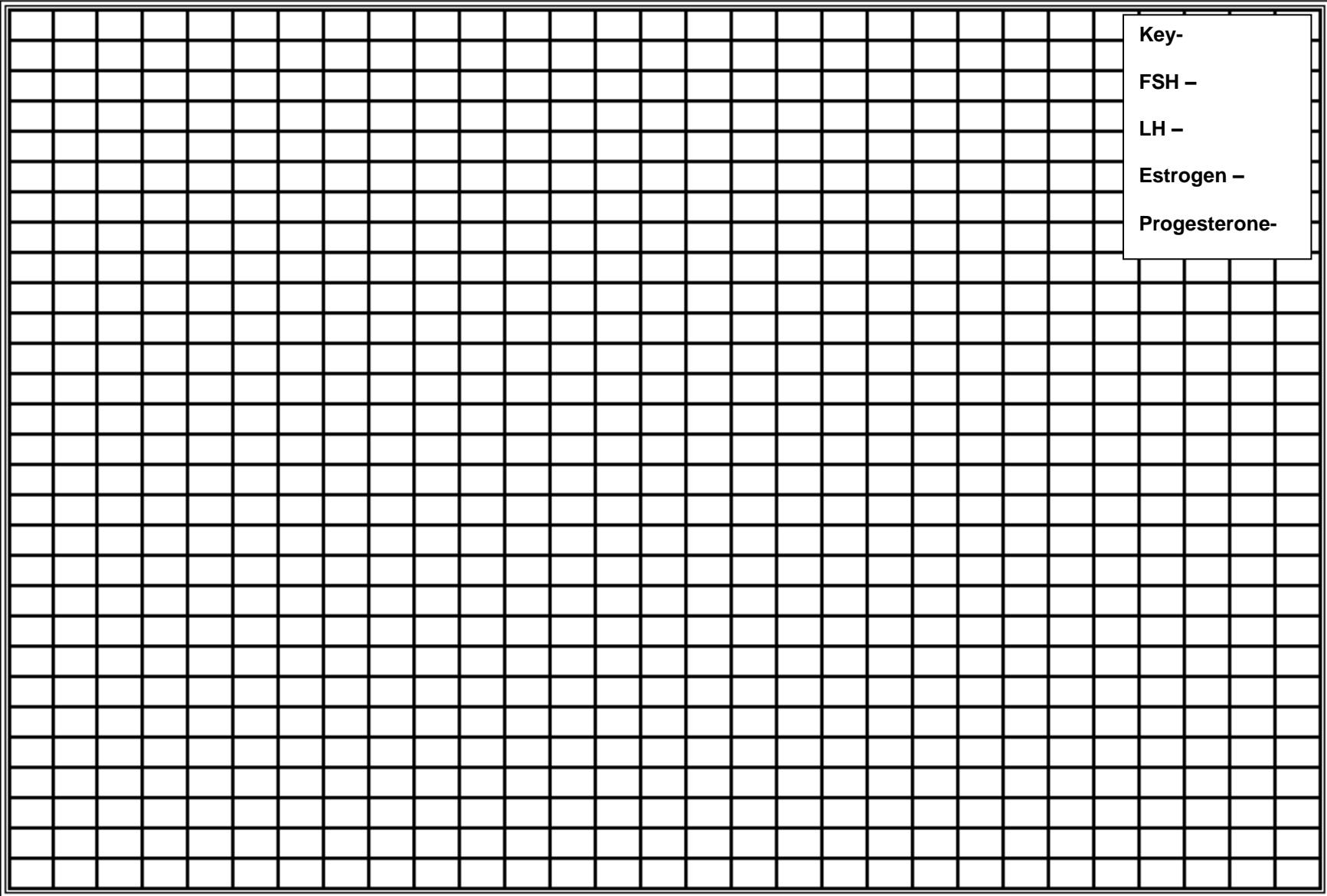
**PART 1:**

1. Refer to the data in the chart on the following page.
2. Make a graph of the hormonal changes during the average 28 day menstrual cycle.
3. Title the graph: Hormonal changes during Menstrual Cycle
4. Label the X axis: Days
5. Label the Y axis: Relative hormone levels
6. On the same graph, plot the changes of each of the 4 hormones, using a different color for each hormone. (*Don't forget to use a key to identify the hormones.*)

## Part 1: Menstrual Cycle Hormone Graph

Hormonal Changes during the Menstrual Cycle				
Day	FSH Level	LH Level	Estrogen Level	Progesterone Level
1	1.0	1.0	2.5	0.5
2	2.0	1.0	2.5	0.5
3	2.5	1.0	2.5	0.5
4	3	1.0	2.5	0.5
5	2.8	1.0	2.5	0.5
6	2.2	1.0	2.5	0.5
7	2.0	1.0	3.0	0.5
8	1.5	1.0	4.0	0.5
9	1.5	1.0	5.0	0.5
10	1.2	1.5	6.0	0.5
11	1.0	2.0	5.0	0.5
12	1.0	4.0	4.5	0.5
13	1.0	8.0	4.0	0.5
14	1.0	4.0	3.5	1.0
15	1.0	2.0	3.0	3.0
16	1.0	1.5	3.0	4.0
17	1.0	0.5	3.0	5.0
18	1.0	0.5	3.8	5.5
19	1.0	0.5	4.0	6.0
20	1.0	0.5	4.5	6.5
21	1.0	0.5	4.5	7.0
22	1.0	0.5	4.2	6.5
23	1.0	0.5	4.0	6.0
24	1.0	0.5	3.5	5.0
25	1.0	0.5	3.0	3.5
26	1.0	0.5	2.5	2.0
27	1.0	0.5	2.2	1.2
28	1.0	0.5	2.0	0.5

Title: \_\_\_\_\_



## Part 2: “Menstrual Cycle Reading” and Analysis

### Menstrual Cycle Reading

When a female is born, her ovaries already contain all the eggs she will ever need. This is very different from males who start making sperm at puberty and don't stop until their 80's. When females reach puberty (about ages 12 to 14) hormones are released that allow one egg to mature each month. Usually one egg matures every 28 days. This process is called the **menstrual cycle**.

At birth, a woman's ovaries may contain over 400,000 eggs. Each egg is contained in a sac called a **follicle**. When the egg is fully mature it bursts out of the follicle into the oviduct (Fallopian tube). This process is called **ovulation**.

Cilia sweep the egg down the oviduct, which leads to the uterus. If a sperm cell meets the egg in the oviduct, **fertilization** occurs. (Of course for sperm to meet egg the two people are probably married because there is no badda bing without the ring.)

If the egg remains unfertilized egg it will be shed along with the lining of the uterus. The process of shedding the egg and the lining of the uterus is called **menstruation**, commonly called “having your period”, since it happens periodically every 28 days.

The menstrual cycle is controlled by hormones from both the pituitary gland and the ovarian glands (ovaries). The pituitary communicates with the ovaries through negative feedback – when pituitary hormones are high, ovarian hormones are low and vice versa.

The menstrual cycle occurs about once every 28 days in females beginning at puberty. Once a month a follicle releases an egg and if the egg is not fertilized in the oviduct, the cycle continues by shedding the uterine lining and beginning the next cycle. The pituitary gland and ovaries control this process by releasing proteins called hormones.

The menstrual cycle occurs in stages. The following describes each stage:

#### **Stage 1: Follicle Stage (10 days)**

This is the preparation stage in which one egg is developed to be released.

1. The pituitary gland releases the hormone **FSH (follicle stimulating hormone)**
2. FSH causes one egg in its follicle to mature
3. The ovary releases a hormone called **estrogen**
4. Estrogen shuts off FSH by the process of negative feedback

#### **Stage 2: Ovulation (1 day)**

This is the release stage in which one mature egg bursts from the follicle.

1. The pituitary gland releases the hormone **LH (luteinizing hormone)**
2. LH causes an egg to be released from the ovary into the oviduct (Fallopian tube)

### **Stage 3: Corpus Luteum Stage (14 days)**

This is the thickening stage in which the lining of the uterus thickens with blood.

1. The ovary releases **progesterone**
2. Progesterone shuts off LH by negative feedback
3. In addition, progesterone stimulates the uterus lining to become thick to prepare for the embryo
4. Estrogen also stimulates the thickening of the uterus

### **Stage 4: Menstruation**

This is the shedding stage in which the lining of the uterus and unfertilized egg is released.

1. Occurs if there is no fertilization
2. The uterus lining breaks down
3. Uterus lining and unfertilized egg leave through vagina
4. All hormones are low

**Analysis:** Refer to your graph and the “Menstrual Cycle Reading”.

1. The menstrual cycle can be simply described as the following four stages: Egg develops, Egg released, Uterine lining develops, Uterine lining released.

For each of these stages use the word bank to fill in the boxes.

Stages	Scientific Name	Major Hormones	Action of the hormone
Egg develops	Follicle Stage	Hint: 2 Hormones	Hint: 2 Actions
Egg released		Hint: 1 Hormone	
Uterine Lining Develops	Corpus Luteum Stage	Hint: 2 Hormones	Hint: 2 Actions
Uterine Lining Released		NONE	

**Word Bank**

Use words only once unless otherwise indicated

Releases Egg	Estrogen (2)	FSH	LH
Matures Egg	Ovulation	Shuts off LH	Thickens Uterine Lining
Shuts off FSH	Menstruation	Progesterone	Sheds Uterine Lining

2. How is the way a hormone affects its target organ like a **lock and key** mechanism? (HINT: explain why shape is important.)
  
3. Where is the pituitary gland located in your body?
  
4. Name two hormones that the pituitary gland releases: \_\_\_\_\_ and \_\_\_\_\_
  
5. How do the hormones get to their target glands?
  
6. How do the relative levels of estrogen and progesterone affect the thickness of the uterine lining?
  
7. Constant low levels of estrogen and progesterone may cause infertility.  
What endocrine gland malfunction could be causing this?
  
8. Researchers believe that a relationship exists between the levels of **LH and progesterone**.  
State a possible hypothesis (**if ... then statement**)
  
9. Birth control pills contain a combination of estrogen and progesterone hormone.  
How could these steady, high levels of estrogen and progesterone prevent pregnancy?
  
10. Give one example of negative feedback as it occurs in the menstrual cycle.  
(*Negative feedback: increasing or high levels of one substance cause the secretion of another substance to be reduced or stopped.*) Refer to your graph.

11. Where does fertilization take place?

12. A female has just ovulated. In the next few days, her uterine lining will most likely: (Circle one)

Thicken

Shed

Be Released

Stay the Same

13. A woman and her happily married husband are trying to have a baby. The woman just started menstruating yesterday. When should she try to conceive? (Circle one)

Tomorrow

In 1 Week

In 2 Weeks

One month from now

Explain your answer to question