The Menstrual Cycle

LO: TBATD the roles of hormones in the menstrual cycle

SD: Name the main reproductive hormones in males and females.

HD: Can you explain any of their effects?

Starter

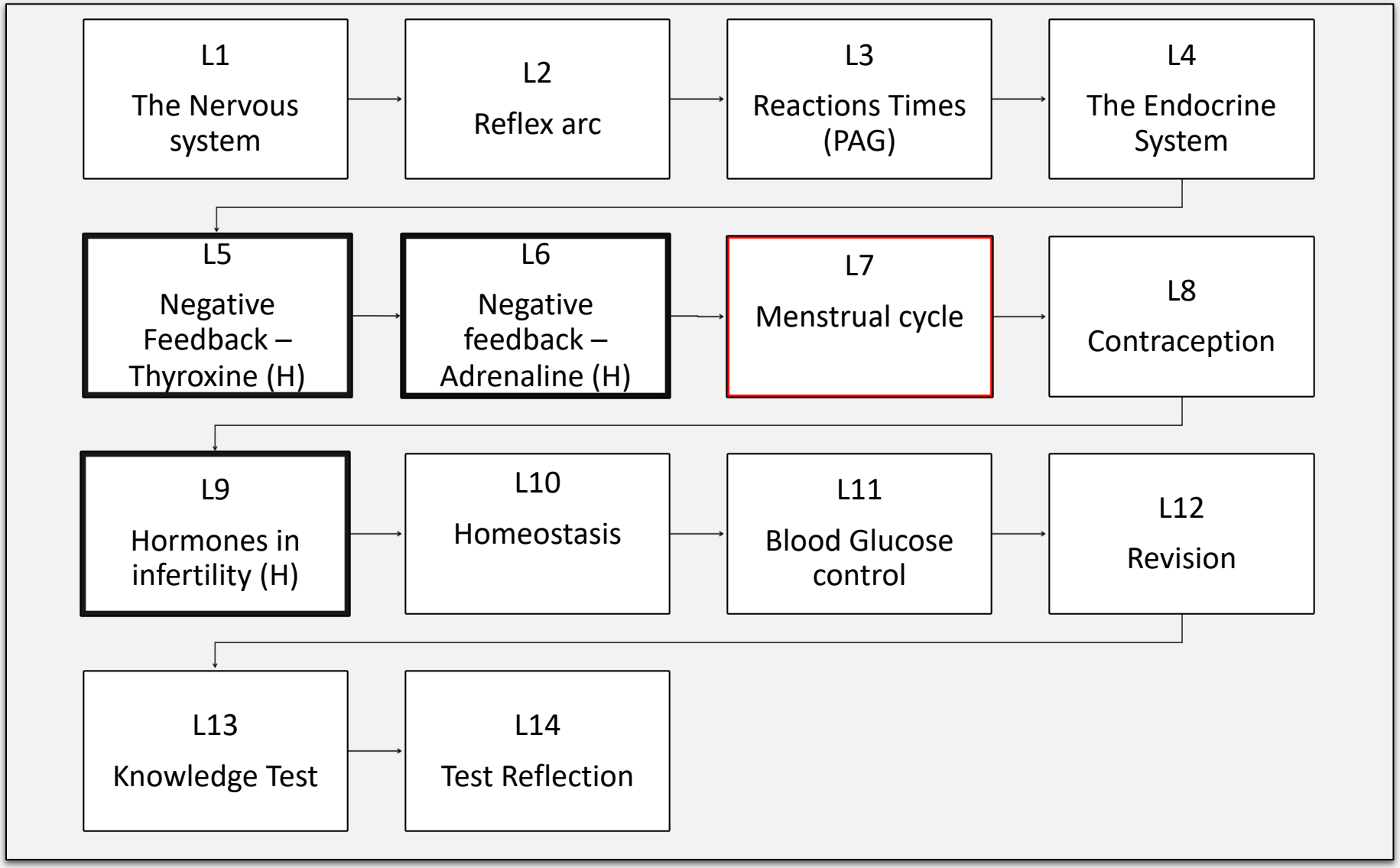
Purple pen improvements

Males: Testosterone

Females: Oestrogen and progesterone

- Testosterone- stimulates sperm and red blood cell production, helps muscle development and bone density.
- Oestrogen- responsible for increasing the thickness of the uterus lining. Also involved in breast and hip growth/development.
- Progesterone: regulates the thickness of the uterus lining.

Homeostasis and Response - Overview



Learning outcomes *(activity 1)*

Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.

3/4
- TK the main hormones involved in the menstrual cycle

5
- TU the roles of the hormones in the menstrual cycle

6
- TBAT describe the hormones in the menstrual cycle interact

7+
- TBAT explain positive and negative feedback in the menstrual cycle

Key words: oestrogen, progesterone, LH, FSH, uterus, ovulation, inhibit, stimulate

Menstrual Cycle – the basics

Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.

1. How long does the menstrual cycle last for?
2. Name some glands involved in the menstrual cycle.
3. Name the 3 stages of the menstrual cycle.

http://www.nhs.uk/video/pages/menstrualcycleanimation.aspx

1. The cycle lasts 28 days on average.
2. The ovaries and pituitary gland are involved.
3. Ovulation (egg release), menstruation (period), fertilisation (if/when sperm fertilises egg).

Menstrual Cycle

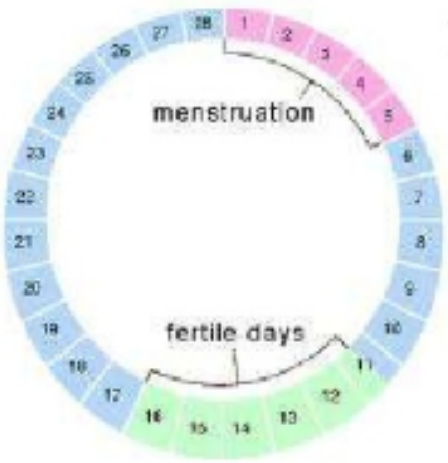
Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.

STAGE 1: This is the break down of the uterus lining

STAGE 2: The lining of the uterus builds up

STAGE 3: An egg is released on day 14. These are the most fertile days

STAGE 4: The wall is maintained for these days. If no fertilised egg implants then the cycle starts again



Menstrual cycle of 28 days

Hormones are produced at different times during the 28 day cycle in order to prepare a female for fertilisation. If fertilisation does not occur then the cycle will start again.

The Hormones

Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.

1. FSH (follicle stimulating hormone)
2. Oestrogen
3. LH (luteinising hormone)
4. Progesterone

The Hormones

Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.

Where are they produced?

- Oestrogen - ovaries
- Progesterone - corpus luteum (structure that develops in an ovary after an ovum has been discharged from the ovaries)
- LH and FSH - pituitary gland

The Hormones

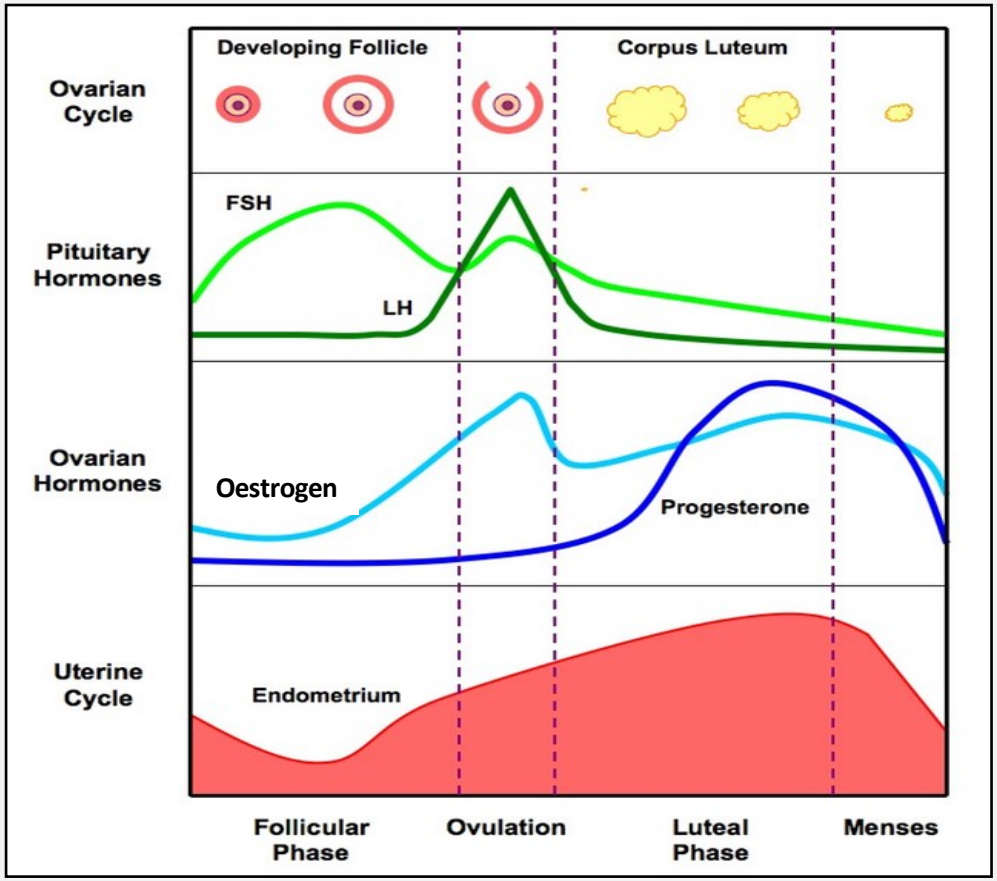
Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.

Endocrine Gland	Hormone	Function
Anterior Pituitary 	FSH	• Stimulates follicular growth in ovaries • Stimulates estrogen secretion (from developing follicles)
	LH	• Surge causes ovulation • Results in the formation of a corpus luteum
Ovaries 	Estrogen	• Thickens uterine lining (endometrium) • Inhibits FSH • Stimulates LH release pre-ovulation
	Progesterone	• Thickens uterine lining (endometrium) • Inhibits FSH and LH

The Hormones

Use the acronym FOLP to help you remember the order of hormone release:

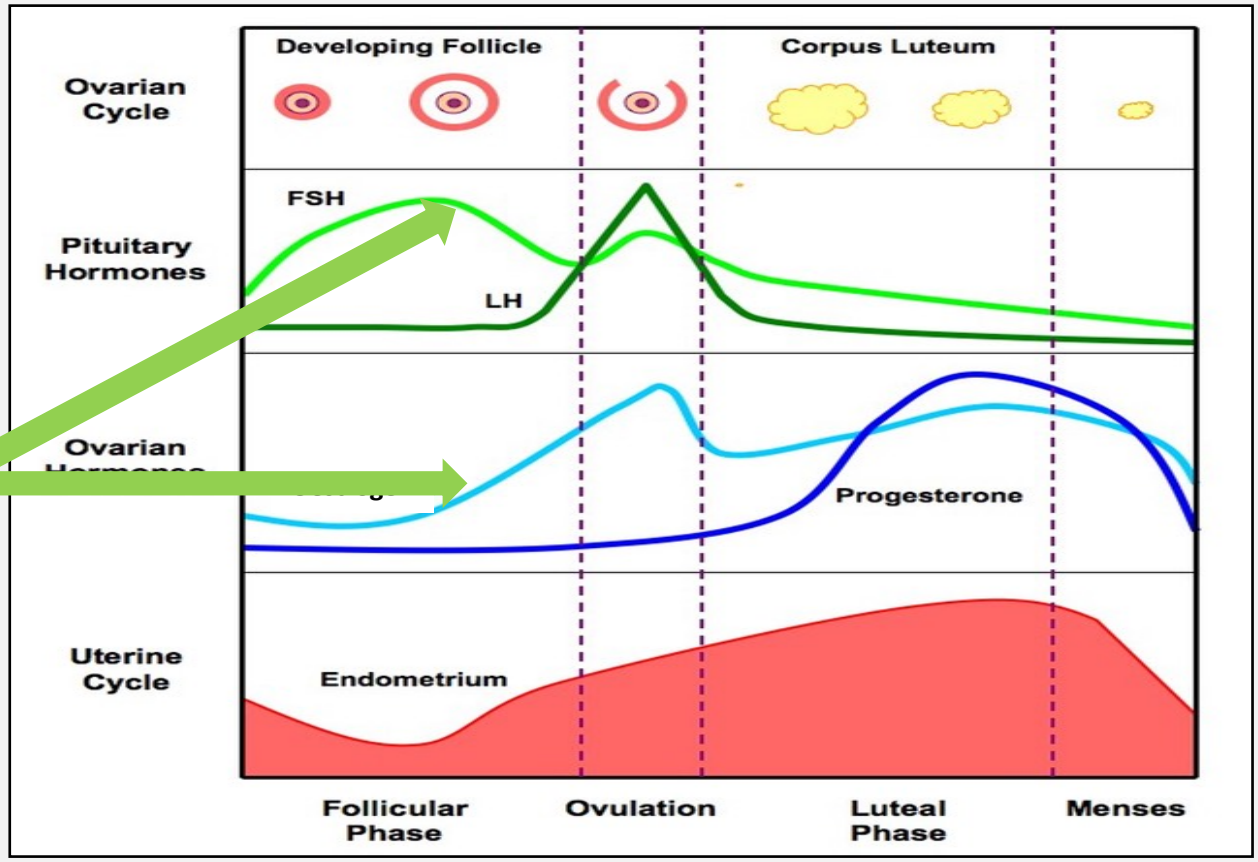
1. FSH
2. Oestrogen
3. LH
4. Progesterone



Positive and Negative feedback

F
O
L
P

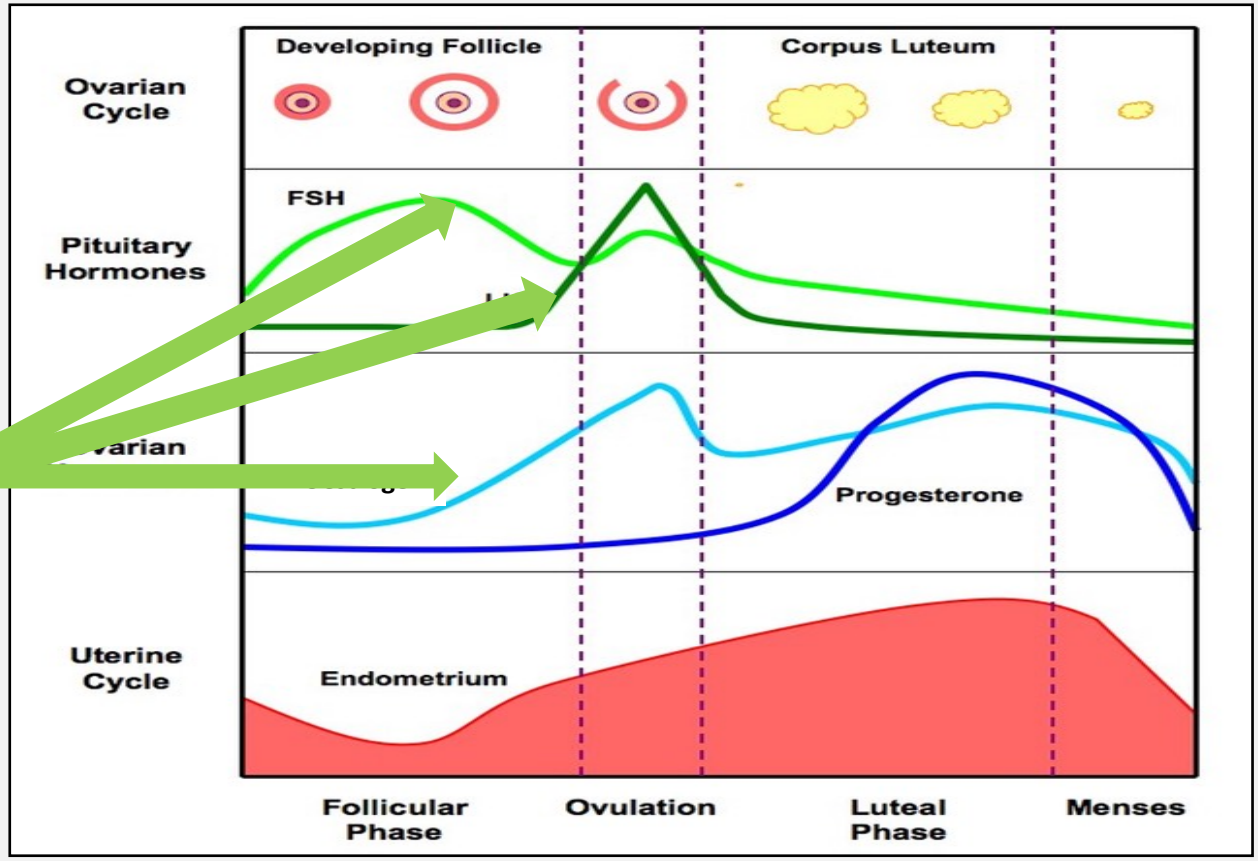
As FSH peaks it causes the level of oestrogen to rise



Positive and Negative feedback

F
O
L
P

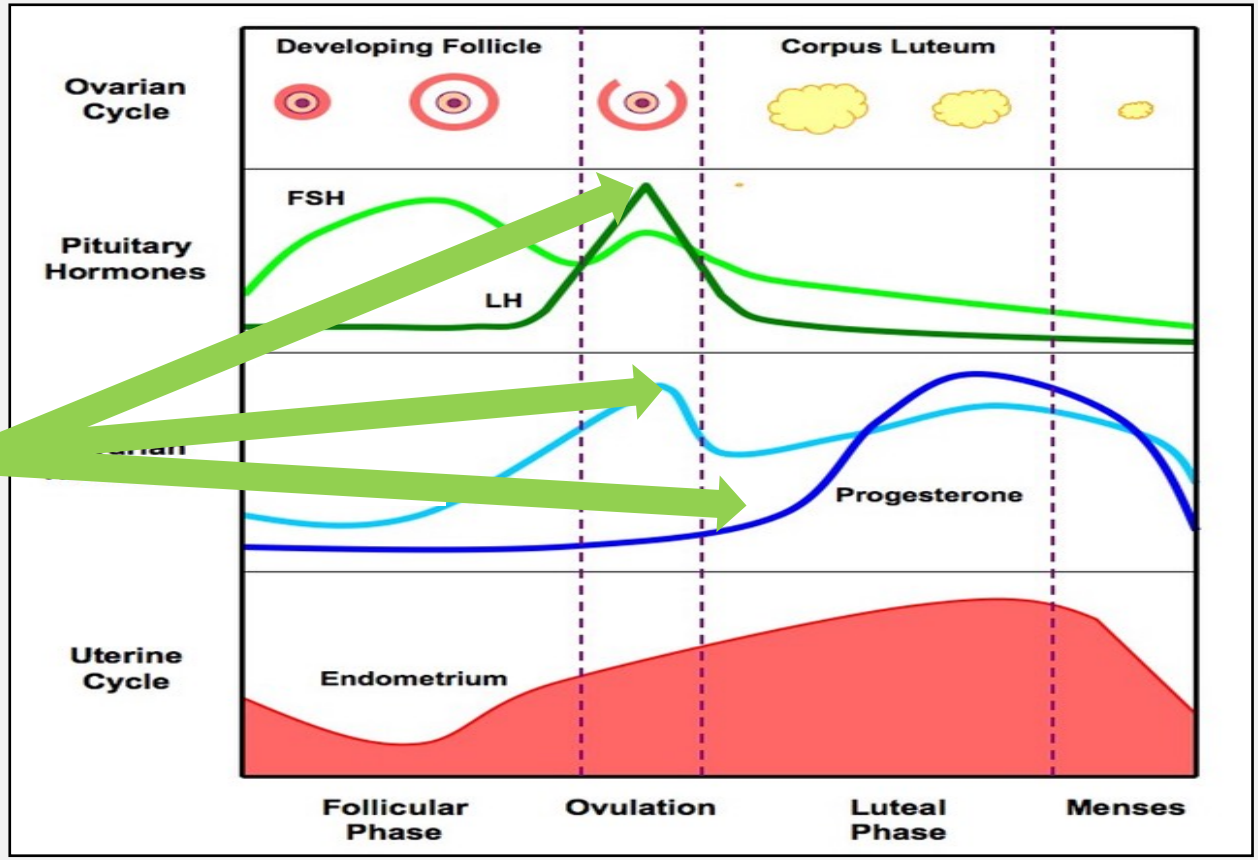
As oestrogen rises it causes levels of LH to increase AND FSH to decease



Positive and Negative feedback

F
O
L
P

As LH rises the levels of progesterone increase AND oestrogen fall



Activity 1 - The Hormones

Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.

Use the text books to find out the role of each hormone in the menstrual cycle and where this hormone is produced. Note this down in your books.

Then gather information to annotate your worksheet to show where you have met each grade descriptor.

3/4	• TK the main hormones involved in the menstrual cycle
5	• TU the roles of the hormones in the menstrual cycle
6	• TBAT describe the hormones in the menstrual cycle interact
7+	• TBAT explain positive and negative feedback in the menstrual cycle

Activity 2 – Exam questions

Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.

Complete the exam questions provided.

Answers

Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.

A = 4 B = 2 C = 1 D = 3

8a) 3
8b) 4
8c) 3
8d) 1

Plenary

Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.

1. Name 2 hormones released during the menstrual cycle.
2. On what day is the egg released?
3. Name the structure that produces progesterone
4. What does FSH stand for?
5. Describe the role of FSH
6. What does oestrogen do?
7. Describe the effect of oestrogen release on LH and FSH
8. Describe the effect of LH release on progesterone and oestrogen
9. Define ovulation
10. Why is negative feedback important in the menstrual cycle?

Plenary

Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.

1. FSH, LH, progesterone or oestrogen
2. 14
3. Corpus luteum
4. Follicle stimulating hormone
5. Matures the egg
6. Thickens the lining of the uterus
7. Decrease FSH, increase LH
8. Increase progesterone, decrease oestrogen
9. Ovary released an egg
10. Decreases levels of hormones after they are required

Tracking sheet

Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.

Now, complete your tracking sheet for this lesson.

4.5.3.3 Hormones in human reproduction

Content	Key opportunities for skills development
Students should be able to describe the roles of hormones in human reproduction, including the menstrual cycle. During puberty reproductive hormones cause secondary sex characteristics to develop. Oestrogen is the main female reproductive hormone produced in the ovary. At puberty eggs begin to mature and one is released approximately every 28 days. This is called ovulation. Testosterone is the main male reproductive hormone produced by the testes and it stimulates sperm production. Several hormones are involved in the menstrual cycle of a woman. • Follicle stimulating hormone (FSH) causes maturation of an egg in the ovary. • Luteinising hormone (LH) stimulates the release of the egg. • Oestrogen and progesterone are involved in maintaining the uterus lining.	
(HT only) Students should be able to explain the interactions of FSH, oestrogen, LH and progesterone, in the control of the menstrual cycle.	
(HT only) Students should be able to extract and interpret data from graphs showing hormone levels during the menstrual cycle.	MS 2c