Lesson Description

In this lesson we:

- State that the menstrual cycle includes the uterine and ovarian cycles.
- Describe the events in the ovarian and uterine cycles.
- Describe the hormonal control of the menstrual cycle (ovarian and uterine cycles) with reference to the action of FSH, oestrogen, LH and progesterone.
- Describe the negative-feedback mechanism involving FSH and progesterone in controlling the production of ova.
- Define copulation and fertilisation.
- State where, and describe how, fertilisation occurs.
- Describe the following development: zygote - morula - blastocyst - embryo.
- Define implantation.
- State the role of oestrogen and progesterone in maintaining pregnancy.
- Identify and state the functions of the following parts of the developing embryo/foetus:
  - Chorion and chorionic villi
  - Amnion, amniotic cavity and amniotic fluid
  - Umbilical cord (including umbilical artery and umbilical vein)
  - Placenta
- Name the three stages of the natural birth process (labour, expulsion of baby, release of the afterbirth).

Summary

**Menstrual Cycle**

- Menstrual Cycle
  - Ovarian Cycle
  - Uterine Cycle
Uterine Cycle

Menstruation (period): uterine lining is shed as blood, mucus and cell debris.

Preparation of the uterus: the uterus lining continues to thicken in preparation for fertilisation. The egg moves into the uterus. If unfertilised, the uterus lining begins to break down.

Ovarian Cycle

Preparation of the egg: in an ovary, a follicle containing an immature egg begins to grow. The uterus lining begins to thicken.

Ovulation: the follicle bursts open, releasing a mature egg. The uterus lining continues to thicken.

EGG MATURATION AND RELEASE
The menstrual cycle

**Follicular phase**
- Ovulation
- LH surge
- Estrogen levels rise
- Follicular development

**Luteal phase**
- Progesterone levels rise
- Uterine cycle changes
- Endometrial cycle

Period:
- Day 0
- Day 14
- Day 28

Ovulation:
- Day 12 to Day 17
Stages in Birth
Test Yourself

Select the most correct answer from the options given. Write down only the correct letter

**Question 1**
Which ONE of the following correctly represents the correct sequence of events that take place in a female’s reproductive cycle should fertilisation occur?

(i) Fertilisation  
(ii) Ovulation  
(iii) Implantation  
(iv) Gestation

A. (i), (ii), (iii), (iv)  
B. (i), (iii), (ii), (iv)  
C. (ii), (i), (iii) and (iv)  
D. (ii), (i), (iv), (iii)

**Question 2**
In humans, a sperm cell and an egg cell normally fuse in the upper portion of the

A. Vagina  
B. Cervix  
C. Ovary  
D. Oviduct

**Question 3**
___________ is responsible for creating the increase in cells in the pictures between B and C.

A. Meiosis  
B. Fertilization  
C. Mitosis  
D. Gastrulation

**Question 4**
The human menstrual cycle is controlled by hormones produced and secreted by the:

A. Pituitary gland and ovaries  
B. Pituitary gland and uterus  
C. Ovaries, only  
D. Uterus, only
Question 5
Indicate whether each of the statements in COLUMN I applies to **A only**, **B only**, **both A and B** or **none** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question number.

<table>
<thead>
<tr>
<th>COLUMN I</th>
<th>COLUMN II</th>
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| 1        | Transports oxygen from the mother to the foetus | A: Umbilical artery  
B: Umbilical vein |
| 2        | Responsible for nourishing the foetus | A: Placenta  
B: Allantois |
| 3        | Stimulates the formation of the Graafian follicle | A: Corpus Luteum  
B: LH |
| 4        | Hormone that stimulates the release of the ovum | A: FSH  
B: Testosterone |
| 5        | Surgical procedure in men to prevent fertilisation of the ovum | A: Vasectomy  
B: Tubal Ligation |

Question 6
Give the correct biological term for each of the following descriptions. Write only the term next to the question number (a to d).

a.) The structure containing enzymes at the tip of a sperm cell that makes contact with the egg cell during fertilisation  
b.) The liquid that protects the embryo against mechanical injury and dehydration  
c.) The membrane around the embryo that forms part of the placenta

**Improve your Skills**

Question 1
Study the diagram below showing the sequence of events of the development of an ovum in a 28-day cycle

1.1 Identify the following:
(a) Follicle labelled A  
(b) Structure labelled C  
(c) Process shown at B  
(d) Hormone responsible for the formation of part A  
(e) Hormone responsible for the formation of part C
1.2 What type of cell division resulted in the formation of part D?  
1.3 State whether fertilisation took place during this 28 day cycle.  
1.4 Explain your answer to QUESTION 1.3  
1.5 Explain HOW and WHY the production of FSH is inhibited when fertilisation takes place.

Question 2

The graph below shows the levels of the hormones oestrogen and progesterone in a pregnant woman's blood.

![Levels of oestrogen and progesterone in blood over a period of time](image)

2.1 When are the levels of oestrogen and progesterone the same?  
2.2 How much oestrogen is in the blood on day 14?  
2.3 What evidence from the graph shows that an ovum was fertilised?  
2.4 Name another hormone, not shown in the graph, that also spikes around day 14.  
2.5 State the source and function of the hormone mentioned in 2.4.

Question 3

The diagram below shows the circulation of blood in the wall of the uterus of a pregnant woman. The arrows indicate the direction of flow of blood.

![Circulation of blood in the wall of the uterus](image)
3.1 Label structures A and D.
3.2 Which blood vessel, B, C, E or F, carries the following:
   (a) Food to the foetus
   (b) Blood from the mother
3.3 The foetal capillaries are located inside numerous finger-like villi. Explain why this is useful.
3.4 Name and describe the role of the TWO glands and their hormones in preparing part D for pregnancy.

**Question 4**

Describe the menstrual cycle and how it is influenced by different hormones.

**Links**

- Learn Xtra Live 2013: [https://www.youtube.com/watch?v=4k-sd7IMpRs](https://www.youtube.com/watch?v=4k-sd7IMpRs)
- Exam Revision 2012: [https://www.youtube.com/watch?v=gnQ394WPso](https://www.youtube.com/watch?v=gnQ394WPso)
- Learn Xtra Lesson: [https://www.youtube.com/watch?v=Q2d-DfAR94](https://www.youtube.com/watch?v=Q2d-DfAR94)