SUBJECT and GRADE	Life Sciences Grade 12	
TERM 2	Term 2 (Week 6 and 7)	
TOPIC	Human reproduction (Menstrual cycle, fertilisation and development of zygote to blastocyst, Implantation, gestation and the role of the placenta)	
AIMS OF LESSON	At the end of this lesson you should be able to know the following: • The menstrual cycle including the uterine and ovarian cycles • Hormonal control of the menstrual cycle (ovarian and uterine cycles) with reference to the action of FSH, oestrogen, LH and progesterone • Negative feedback mechanism involving FSH and progesterone in controlling the production of ova • Fertilisation and the development of the zygote to blastocyst • Implantation, gestation and the role of the placenta	
RESOURCES	***Paper based resources***	***Digital resources***
	Refer to: • Your textbook sections on human reproduction • Pages 22 to 26 in your Mind the Gap Study Guide	Click on links below to download online resources on this topic/s: Refer to one-pager on the menstrual cycle: https://drive.google.com/file/d/1SJ5oW3NVpZ3pMmhQe537GT-7LgCxO6Jo/view?usp=sharing Refer to questions on the human reproduction: https://drive.google.com/file/d/1ANnJ2RB0Kmm2ra5qomngi8-vP5oXuHv1/view?usp=sharing
INTRODUCTION	• You have studied human reproduction in Grade 9 • Revise the section on meiosis that you have covered in term 1 in Grade 12. • Revise the previous lesson on male and female reproductive systems	

CONCEPTS AND SKILLS

Study the following definitions. (Note that at least 2 marks are awarded if you can define a term correctly in the examination)

Chorion - The membrane that, together with the endometrium, forms the placenta

Chorionic villi – the finger-like projections that develop from the outer extra-embryonic membrane

Prolactin - A hormone that stimulates the mammary glands to produce milk

Gestation – The period of development of the foetus in the uterus

Luteinising hormone (LH) - A hormone that stimulates the development of the corpus luteum

Endometrium - The inner lining of the uterus where implantation of the embryo occurs

Menstrual cycle:

The menstrual cycle includes the uterine and ovarian cycles

Ovarian cycle:

Describe the events in the ovarian cycle:

- Development of the Graafian follicle
- Ovulation
- Formation of the corpus luteum

Uterine cycle:

Describe the events in the uterine cycle:

- Changes that take place in the thickness of the endometrium
- Menstruation

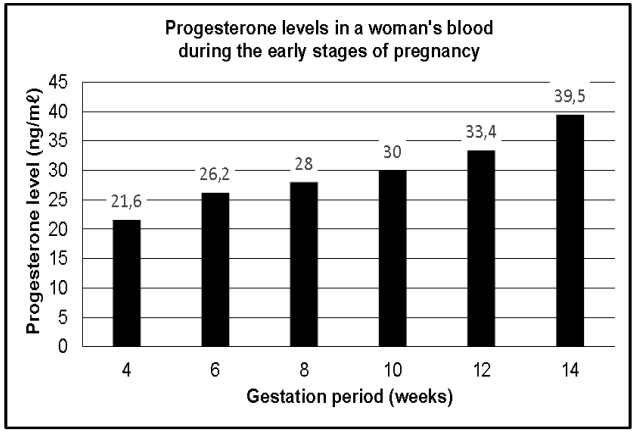
Know the meaning of instructional verbs in test and examination questions e.g.

Instructional verb	Meaning
Name	Give the name of something
Differentiate	Use differences to qualify between two or more categories
Tabulate	Draw a table and indicate the answers as direct pairs.
Describe	State in sentences the main points of a process
Explain	Give your answer in a cause-effect or statement and reason sequence
Compare	Give similarities and differences between concepts

Answer the following questions:

Question 1:

The graph below shows the concentration of progesterone in a woman's blood during the early stages of pregnancy.



Use your textbook and study the functions of the following parts of the male reproductive system:

- Testis
- Epididymis
- vas deferens
- seminal vesicle
- prostate gland
- Cowper's gland
- urethra

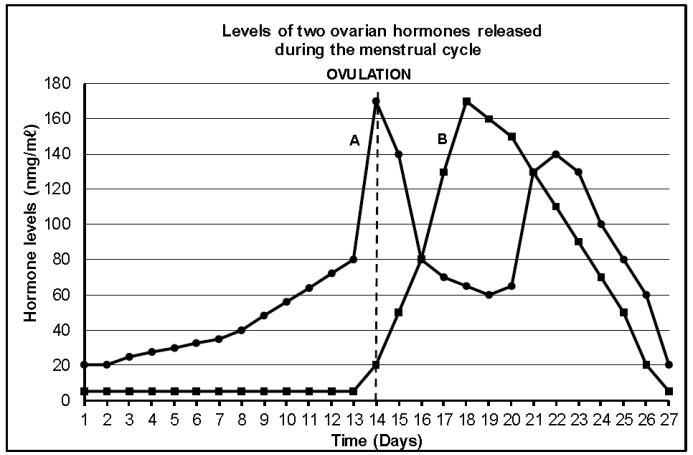
Describe the menstrual cycle (ovarian and uterine cycles) and how it is influenced by different hormones.

- The menstrual cycle is a series of events that occur in the female body to prepare it for possible pregnancy.
- The pituitary gland/hypophysis secretes **FSH** which stimulates the development of a primary follicle into a **Graafian follicle** in the ovary
- The **Graafian follicle** secretes **oestrogen** which stimulates the thickening of the lining of the uterus/endometrium
- Around day 13 pituitary gland/hypophysis secretes **LH** which cause **ovulation** to occur
- The remains of the Graafian follicle develop into the **corpus luteum** which secretes the hormone, **progesterone** which continues to stimulate the thickening of the uterus
- High levels of progesterone inhibit the production of FSH so that the ovaries are no longer stimulated to produce another follicle (**negative feedback mechanism**).

1.1 *Name* TWO structures responsible for producing progesterone during pregnancy.
1.2 *Describe* the general trend in the change in progesterone levels in the woman's blood during the early stages of pregnancy.
1.3 *Describe* the negative feedback mechanism that occurs between progesterone and FSH during pregnancy.
1.4 *State* the importance of the negative feedback mechanism described in QUESTION 1.3.
1.5 *Calculate* the percentage increase in progesterone levels between week **4** and week **14**. Show ALL calculations.
1.6 The woman's progesterone level in week 16 was 25 ng/mℓ.
(a) *Explain* why this woman should be concerned about the decrease in progesterone levels.
(b) *Suggest* ONE way in which this problem could possibly be treated by a doctor.

Question 2:

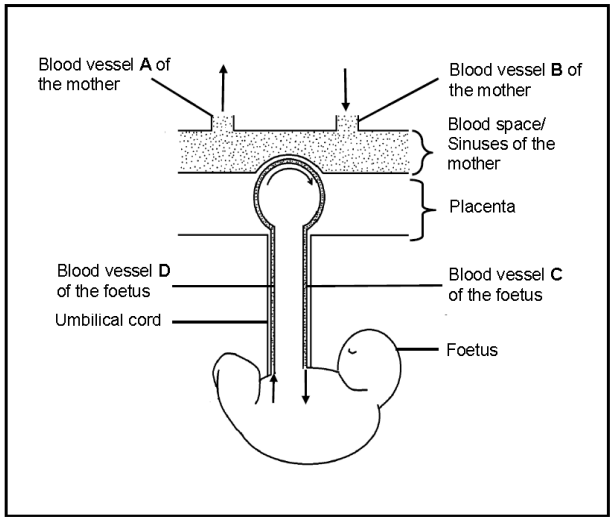
Study the graph below of the levels of two ovarian hormones released during the menstrual cycle.



	• If fertilisation does not occur, the corpus luteum degenerates and stops producing progesterone • The pituitary gland/hypophysis is no longer inhibited in its production of FSH and a new follicle develops • The thick endometrium is no longer maintained and it degenerates and is shed together with blood and menstruation takes place • If fertilisation does occur the corpus luteum continuous to function until the 12th week of pregnancy. **Describe the development of a zygote until implantation occurs:** • **Zygote** divides by mitosis to form a ball of cells called the **morula** • The morula further divides to form a hollow ball of cells called the **blastula.** **Common errors made by learners in examinations:** • Learners unable to label and provide the functions of different parts of the male and female reproductive systems • Learners cannot interpret diagrams of the menstrual cycle • Learners do not know the functions of the different hormones • Learners cannot describe the negative feedback mechanism involving FSH and progesterone in controlling the production of ova.	2.1 Identify hormones A and B 2.2 What effect does an increase in hormone A have on the endometrium? 2.3 Ovulation is indicated on the graph. (a) Define *ovulation*. (b) On which day did ovulation take place? (c) Which hormone secreted by the pituitary gland stimulates ovulation? 2.4 Explain why high levels of hormone **B** prevent the development of new follicles. 2.5 Explain evidence in the graph that indicates that no fertilisation took place during the menstrual cycle shown above. **<u>Question 3:</u>** Research shows that the average age of first menstruation is influenced by socio-economic status as well as race. Scientists carried out an investigation to determine the average age of the first menstruation of the girls in a community. Their hypothesis was: **The average age of first menstruation has decreased over time.** 3.1 For the investigation, *identify* the: (a) Independent variable (b) Dependent variable 3.2 *Name* THREE planning steps that had to be considered before carrying out the investigation. 3.3 If the results show that the average age of first menstruation has remained at 12,9 years of age for the last 25 years, *explain* the implications for the hypothesis stated by the scientists.

Question 4:

The diagram below represents the relationship between the blood system of the foetus and that of the mother. The arrows indicate the direction of blood flow in the blood vessels.

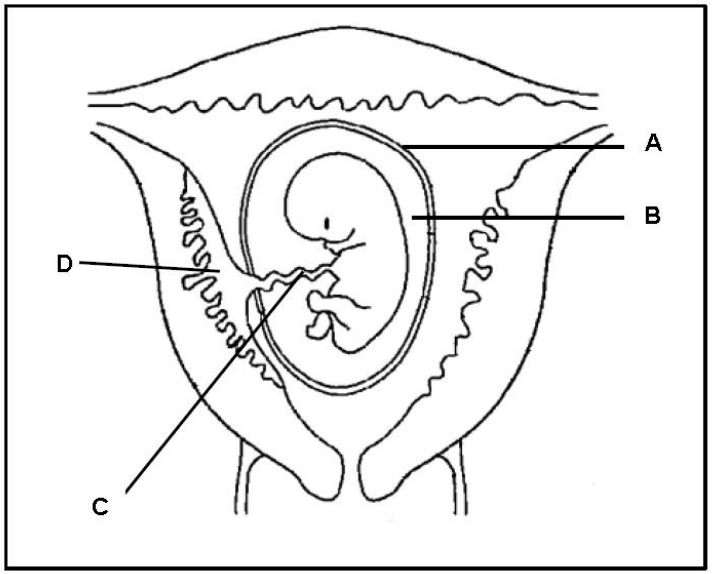


4.1 Apart from playing a role in the diffusion of substances from the mother's blood to the foetus' blood, and vice versa, *state* TWO other functions of the placenta.

4.2 Blood vessel **D** is an artery. *Tabulate* TWO differences between the composition of blood found in blood vessel **C** and blood found in blood vessel **D**.

4.3 *Explain* ONE consequence for the foetus if blood vessel **D** becomes blocked preventing blood flow.

4.4 If the blood of the mother and the blood of the foetus come into contact with each another, it could lead to the death of the foetus. *Describe* why this would occur.

		Question 5: The diagram below represents a developing foetus in a human body.  1.1 *Identify* parts A and C 1.2 *State* TWO functions of the fluid in part B. 1.3 *Name* ONE system in the baby's body that takes over the function of part D once the baby is born. 1.4 *Explain* ONE negative impact on foetal development if part D is reduced significantly.
ACTIVITIES/ASSESSMENT	• Complete the activities/questions on the above-mentioned sections of human reproduction in your textbook. • Work through the questions and activities on page 24 -26 of your Mind the Gap Study Guide	
CONSOLIDATION	• Define all the terminology relevant to the topic/s covered in this lesson • Work through the questions on human reproduction in past examination papers	
VALUES	By studying and learning about the human reproduction you will develop a deep understanding of the male and female reproductive systems, puberty, pregnancy and contraceptive devices	