Topic 25: Sexual reproduction in humans

Competency: The learner understands that sexual reproduction involves two parents with specialized reproductive systems.

A TELEVISION INTERVIEW ABOUT SEXUAL REPRODUCTION WITH THE BIOLOGY TEACHER

EAGLE TV – SCIENCE UNWRAPPED
Episode Title: *The Miracle of Life: Sexual Reproduction in Humans*
Broadcast for: Senior four biology learners
Host: Lubega J Simon
Guest: Mr. OC, Biology Teacher
Studio: Eagle TV Science Desk

Lubega J Simon (Host)
Good morning, viewers, and welcome to **Eagle TV – Science Unwrapped**, where we bring the wonders of biology right into your classroom. I'm your host, Lubega J Simon, and today's episode explores one of the most incredible processes in human life **sexual reproduction**. In studio with us is Mr. OC, an experienced biology teacher here to explain this essential topic. You're very welcome, Mr. OC.
Mr. OC (Biology Teacher): Thank you so much, Simon. It's a pleasure to join the learners watching from across the country. This is a topic that speaks to the very beginning of life and it's important that we understand it well.
Host: Let's begin simply: what is sexual reproduction in humans?
Mr. OC: Sexual reproduction is the process by which two human parents a male and a female contribute genetic material through special reproductive cells. The male's sperm cell and the female's egg cell (ovum) fuse during a process called fertilization to form a zygote, which grows into a new human being. This process ensures genetic diversity and the continuation of our species.

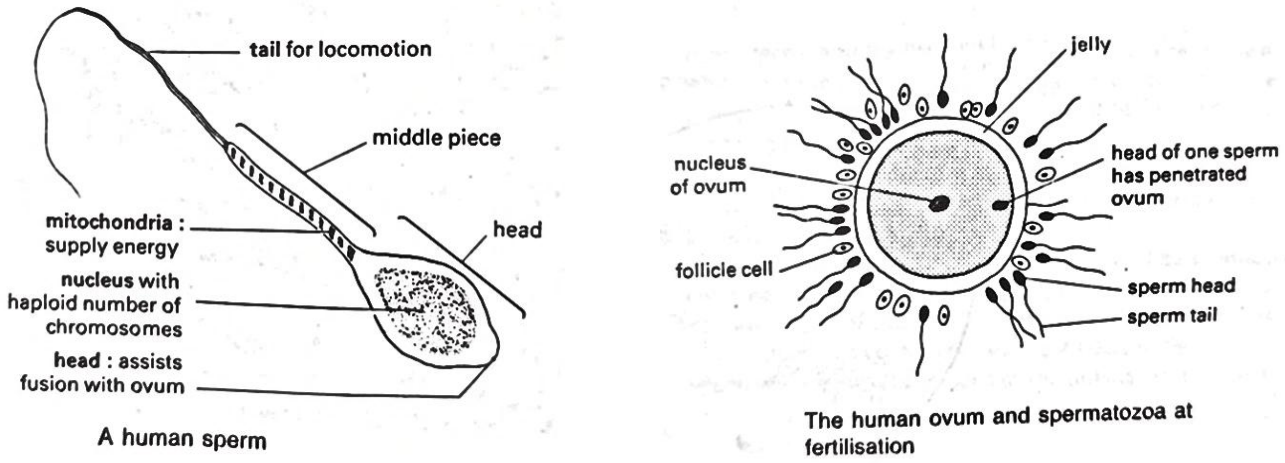


Fig 25.1 male sperm and an ovum

Host: That's quite remarkable. Can you walk us through the male reproductive system?
Mr. OC: Certainly. The male reproductive system consists of:

- Testes which produce sperm and testosterone.
- Scrotum is a pouch that holds and cools the testes.
- Vas deferens are tubes that transport sperm.
- Prostate gland and seminal vesicles which add nourishing fluids to form semen.
- Penis a structure through which semen is ejaculated during reproduction.

Human male reproductive system

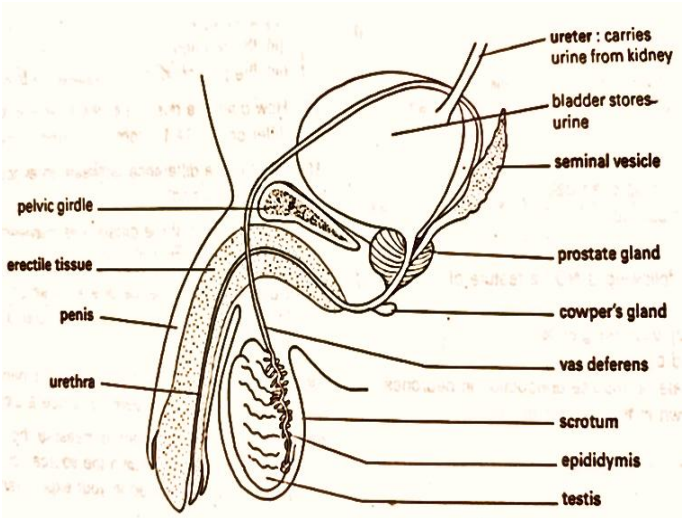


Fig 25.3: Mammalian male reproductive structures

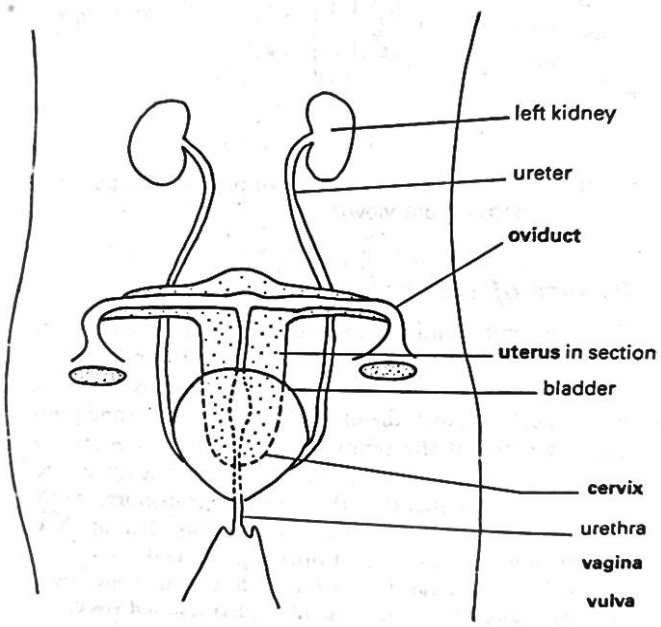
These parts work together to produce, protect, and deliver sperm to the female's body for fertilization to occur.

Human female reproductive system

Host: Now let's switch to the female reproductive system. What should students know?
Mr. OC: The female system is designed for egg production, fertilization, and pregnancy. It includes:

- Ovaries where eggs are produced and female hormones are secreted.
- Fallopian tubes where fertilization usually occurs.
- Uterus the womb where the embryo implants and grows.
- Cervix and vagina which allow for sperm entry and childbirth.

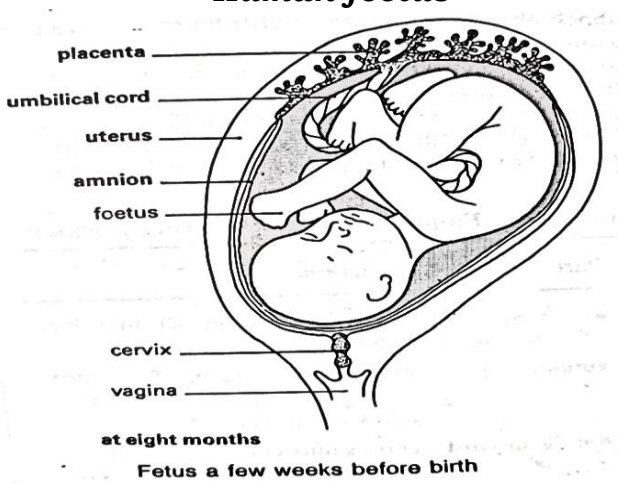
Each part plays a unique role in creating and nurturing new life.



Front view – the structure of the female reproductive organs

Host: So after fertilization, what happens?
Mr. OC: The zygote travels to the uterus, dividing rapidly to form an embryo. As it grows, it becomes a foetus, and the placenta forms to supply nutrients and remove waste. After approximately nine months, the baby is born.
Host: What values or life skills can learners gain from understanding this process?
Mr. OC: Learners gain respect for life, understand the importance of reproductive health, and learn how choices like avoiding drugs or early sexual activity affect their future. It also fosters an appreciation for the structure and function of the human body.

Human foetus



Fetus a few weeks before birth

Did you know

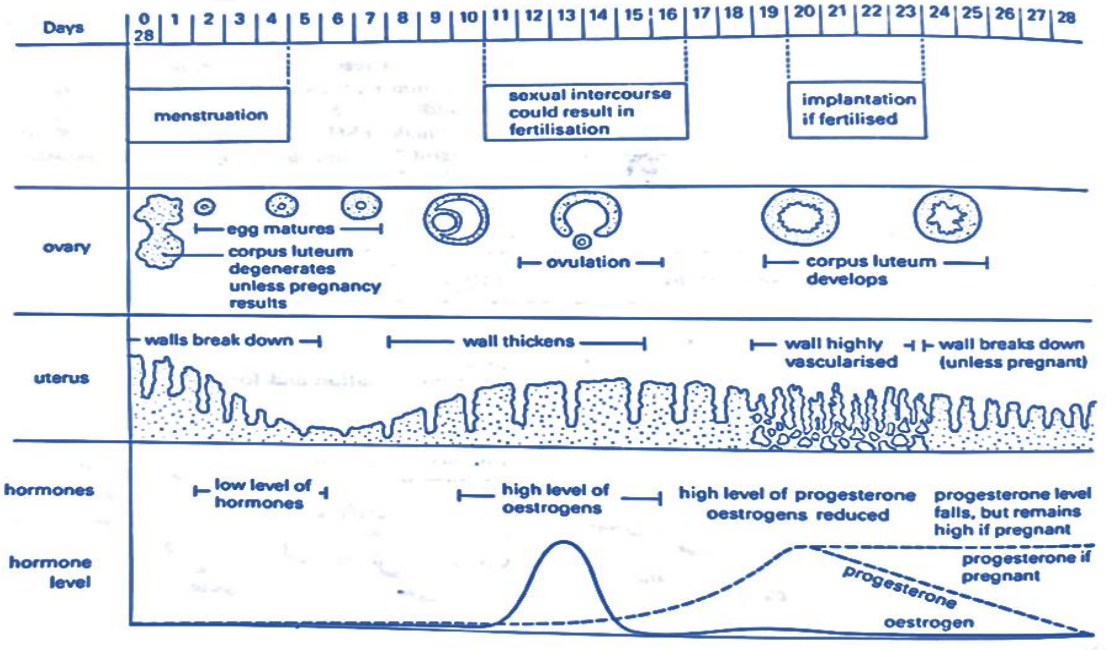
The battle of numbers

A baby girl is born with all the eggs she will ever have about 1 to 2 million but only around 400 to 500 will mature and be released in her lifetime

The testes produce millions of sperm every day around 100 to 200 million but only one sperm is needed to fertilize an egg

Host: Before we wrap up, any surprising fact you'd like to share?
Mr. OC: Sure! Did you know that in every ejaculation, a male can release up to 300 million sperm, but only one gets to fertilize the egg? Nature is competitive!
Host: (Laughs) That's mind-blowing, Mr. OC! Thank you for joining us today on **Eagle TV**.
Mr. OC: Thank you, Simon, and thank you to our eager learners out there. Keep asking questions!
Host (to viewers)
That's it for today's episode of **Eagle TV – Science Unwrapped**. Tune in next week for more engaging science topics. Until then stay curious, stay smart, and stay tuned.

Table summarising the menstrual cycle, structures and the hormones involved over a 28-day cycle



The menstrual cycle lasts about 28 days and is regulated by interactions between the ovaries, uterus, and hormones as shown i the figure above.

- Days 1-5 (Menstrual phase): The **uterine lining** (endometrium) is shed due to low levels of estrogen and progesterone.
- Days 6-13 (Follicular phase): The pituitary gland releases **FSH,** which stimulates follicle growth in the ovaries. The developing follicles secrete estrogen, causing the uterine lining to thicken in preparation for possible implantation.
- Day 14 (Ovulation): A surge in LH triggers the ***release of a mature egg*** from the ovary. This is the most fertile period.
- Days 15-28 (Luteal phase): The ruptured follicle forms the corpus luteum, which secretes **progesterone** (and some estrogen). Progesterone maintains the thickened uterine lining. If fertilization does not occur, the corpus luteum breaks down, hormone levels fall, and the cycle restarts with menstruation.

Activity 25.1

Maria, a 16-year-old student in Alebtong District, has been feeling tired, unsettled, and emotionally unstable. After missing her period for two months, she confides in a teacher who refers her to a health centre. A nurse confirms that she is 10 weeks pregnant. Maria does not understand what is happening inside her body. She has never attended an antenatal clinic and is unsure whether to keep the baby or not. Her friend suggests trying "local herbs" to end the pregnancy quietly.

Tasks and responses

a) Describe what is likely happening in Maria's reproductive system from fertilisation up to 10 weeks of pregnancy, including the roles of the placenta and the stages of zygote development.

<u>What is happening in Maria's reproductive system from fertilisation up to 10 weeks of pregnancy:</u>

Fertilisation occurs when a sperm fuses with an egg in the fallopian tube the fertilised egg (zygote) undergoes cell division and becomes a blastocyst the blastocyst travels to the uterus and implants in the uterine lining the implanted blastocyst develops into an embryo and then a foetus by around 8 weeks. By 10 weeks, major organs have begun to form (organogenesis).

<u>Roles of the placenta:</u>

- The placenta starts forming and attaches to the uterine wall
- It supplies oxygen and nutrients from the mother to the embryo
- It removes waste products from the embryo's blood
- It produces hormones (like HCG) to maintain the pregnancy

b) Explain the physical and emotional risks Maria may face due to early pregnancy, and outline two dangers of attempting abortion without medical supervision.

Responses

Physical and emotional risks Maria may face due to early pregnancy, and dangers of unsafe abortion:

Physical risks:

- ❖ Increased risk of anaemia and poor nutrition
- ❖ Higher chance of high blood pressure and complications like preeclampsia
- ❖ Risk of obstructed labour due to an underdeveloped pelvis

Emotional risks

- ➢ Feelings of fear, guilt, confusion, and stress
- ➢ Social stigma, school dropout, or loss of peer and family support

Dangers of unsafe abortion using local herbs:

- Risk of severe bleeding and damage to the uterus
- Risk of infection or poisoning leading to long-term complications or death

c) Advise Maria on the importance of antenatal care at this stage and give two key services she would receive if she visits a clinic.

Importance of antenatal care and key services offered:

Importance of antenatal care:

- ❖ Helps monitor the health and development of the mother and baby
- ❖ Allows early detection and management of complications
- ❖ Offers emotional support and professional guidance

Two key services Maria would receive at a clinic:

- Medical check-ups (blood pressure, weight, scans)
- Nutritional support and preventive services like iron supplements, folic acid, and tetanus immunization

Activity 25.2

Peter and Sarah, a couple in Mpigi District, are expecting their first child. Sarah is 8 months pregnant and has been attending antenatal visits regularly. After the baby is born, they plan to name him Jonah. They are eager to raise a healthy child but are unsure about how to care for him after birth. Peter, meanwhile, is curious about how male and female reproductive systems work together, and wonders how birth control methods work to prevent unplanned pregnancies in others.

Tasks and responses

a) Explain how the structure and function of both male and female reproductive systems work together to make pregnancy like Sarah's possible, including a comparison of the male and female gametes.

How male and female reproductive systems work together to make pregnancy possible, including gamete comparison

- The male reproductive system produces sperm in the testes
- During sexual intercourse, sperm is released through the penis into the female reproductive tract (vagina)
- The female reproductive system produces eggs (ova) in the ovaries
- Around ovulation, an egg is released and travels through the fallopian tube
- Fertilisation occurs when a sperm meets the egg in the fallopian tube and fuses with it
- The fertilised egg (zygote) implants in the uterus and develops into a baby, like Sarah's case

Comparison of male and female gametes:

- Male gametes (sperm): small, mobile, and produced in large numbers
- Female gametes (eggs): large, immobile, and produced once per menstrual cycle
- Sperm contributes only DNA, while the egg provides DNA and nutrients for early development

b) Suggest three key practices Peter and Sarah should follow to ensure proper care for baby Jonah after birth.

Three key practices for caring for baby Jonah after birth:

- Ensure exclusive breastfeeding for the first six months to provide proper nutrition and immunity
- Keep baby Jonah's environment clean and safe, and take him for all immunizations as scheduled
- Attend postnatal check-ups for both mother and baby to monitor health and growth

c) Identify and explain two common birth control methods used in Uganda, describe their biological principles, and explain why abstinence is recommended for young people like students.

Two common birth control methods used in Uganda and why abstinence is recommended for students:

- Injectable contraceptives (e.g., Depo-Provera) which is injected every 3 months contains hormones (usually progesterone) that stop ovulation and thicken cervical mucus to prevent sperm entry
- Male condoms: A barrier method worn on the penis during intercourse to prevents sperm from entering the vagina, thus preventing fertilisation. Condoms also protect against sexually transmitted infections (STIs)

Why abstinence is recommended for students:

- It is the only 100% effective method of preventing pregnancy and STIs
- Supports young people to focus on education and avoid emotional or health complications linked to early sexual activity
- Encourages responsible decision-making until they are mature enough for family planning

Activity 25.3 (Trial activity)

Amina, a Senior Three student in Iganga, visits a youth-friendly health clinic after noticing unusual itching and discharge. She is scared and unsure whom to talk to. The nurse explains that she may have contracted a sexually transmitted infection (STI), possibly *Candida* or *Gonorrhoea*. Amina is shocked to learn that these infections are common among young people, yet many don't know the signs or how they spread. The nurse also reminds her that abstinence is the most reliable prevention method for people her age.

Tasks:

a) Based on Amina's symptoms and the nurse's comments, describe the possible causes, signs, and modes of transmission of *Candida* and *Gonorrhoea*.

b) Explain why abstinence is the most suitable STI prevention method for Amina and others her age, and mention one other preventive measure used by adults.

c) Propose how schools and communities can improve awareness among young people to prevent and detect STIs early, using Amina's case as an example.

Activity 25.4

Mr. Babati, a well-respected teacher in Kyotera, has been living with HIV for 12 years. He takes antiretroviral drugs (ARVs) regularly and lives a healthy life. However, some students avoid sitting near him and whisper behind his back. During a health education week, Mr. Lubaj volunteers to speak about his journey and encourages students to get tested and learn about HIV, *Hepatitis B*, and *HPV*. He wants to change how people view those living with STIs.

Tasks:

a) From Mr. Lubega's experience and the diseases he mentions, explain the causes, signs, and modes of transmission of *HIV*, *Hepatitis B*, and *HPV*.

Responses

Causes, signs, and modes of transmission of HIV, Hepatitis B, and HPV:

<u>HIV (Human Immunodeficiency Virus)</u>

Cause: A virus that attacks the immune system

Signs: Tiredness, weight loss, frequent infections, skin rashes, and swollen lymph nodes (especially in late stages)

Transmission: Through unprotected sex sharing infected needles or sharp objects from mother to child during birth or breastfeeding transfusion with infected blood

<u>Hepatitis B</u>

Cause: A virus that infects the liver

Signs: Yellowing of the eyes and skin (jaundice), dark urine, fatigue, abdominal pain, and nausea
Transmission: Contact with infected blood unprotected sex sharing sharp instruments mother to baby during childbirth

HPV (Human Papilloma Virus)
Cause: A group of viruses, some of which cause genital warts and cervical cancer
Signs: Often no symptoms some types cause genital warts or lead to cancer (e.g., cervical cancer)
Transmission: Mostly through skin-to-skin contact during sexual activity

b) Describe two challenges Mr. Lubaj is facing as a person living with HIV and suggest practical ways that schools or communities can help reduce stigma and support people like him.

Responses

Two challenges Mr. Lubaj is facing and how schools/communities can help:

Challenges:

- Stigma and discrimination from students who avoid him or talk behind his back
- Emotional stress due to being misunderstood and isolated despite living positively and taking medication

Practical ways to reduce stigma and offer support:

- Schools can conduct awareness campaigns and health education to teach students the truth about HIV and how it is *not* spread through casual contact.
- Encourage peer support groups and respectful behaviour through school clubs, assemblies, and role plays
- Recognise and celebrate positive role models like Mr. Lubaj who live responsibly and educate others

c) Explain how Mr. Lubaj's personal example can help young people understand the value of testing, prevention (like abstinence), and respectful behaviour toward those living with STIs.

Responses

How Mr. Lubaj's personal example helps young people:

- His life story shows that people with HIV can live long, healthy lives if they take their medication and take care of themselves
- By sharing his journey, he encourages early testing and treatment, which can save lives and reduce transmission
- Promotes prevention practices like abstinence, safe sex, and vaccination (e.g., for HPV and Hepatitis B)
- Teaches empathy and respect for people living with STIs, helping students reject myths, fear, and stigma.