

# CIE Biology GCSE

## 16 - Reproduction

### Flashcards



# What is asexual reproduction?



# What is asexual reproduction?

The production of two genetically identical offspring from one parent



Give one advantage and one  
disadvantage of asexual reproduction  
**(Higher/Supplement)**



Give one advantage and one disadvantage of asexual reproduction (**Higher/Supplement**)

Advantage - It produces lots of offspring quickly

Disadvantage - It does not introduce variation and so all offspring are susceptible to the same environmental pressures as the parents



# What is sexual reproduction?



# What is sexual reproduction?

The production of two genetically different offspring from the fusion of the nuclei from two gametes



# Define fertilisation





## Define fertilisation

The fusion of the nuclei from two gametes (sex cells)



State the difference in the number of chromosomes in a gamete nucleus compared with a zygote nucleus  
**(Higher/Supplement)**



State the difference in the number of chromosomes in a gamete nucleus compared with a zygote nucleus (**Higher/Supplement**)

Gametes have haploid nuclei (23 chromosomes) whereas zygotes have diploid nuclei (23 **pairs** of chromosomes)



Give one advantage and one  
disadvantage of sexual reproduction  
(Higher/Supplement)



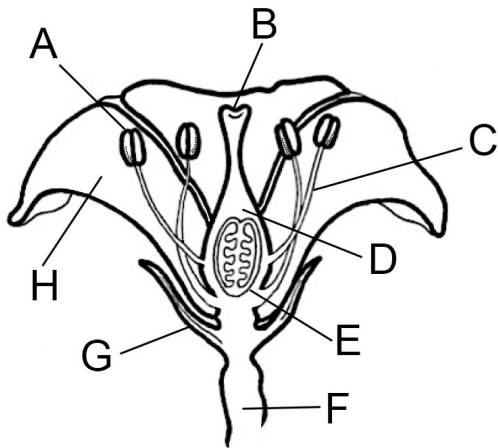
Give one advantage and one disadvantage of sexual reproduction

Advantage - It introduces variation

Disadvantage - It is slower and produces a limited amount of offspring

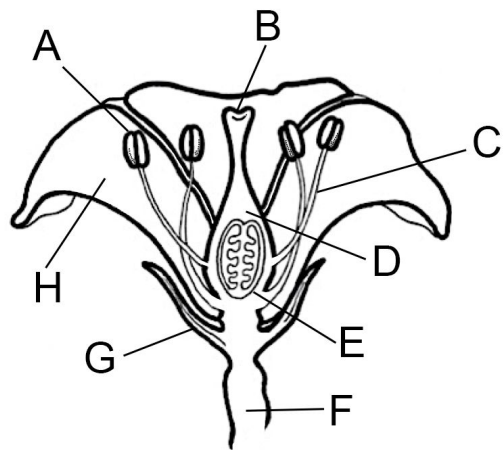


# Label the insect pollinated flower below



# Label the insect pollinated flower below

A	Anther	E	Ovary
B	Stigma	F	Pedicle
C	Filament	G	Sepal
D	Style	H	Colourful petal



What is the function of the sepals in an insect pollinated plant?





What is the function of the sepals in an insect pollinated plant?

The sepal is a hard coating that protects the developing flower in a bud



What is the function of the petals in an insect pollinated plant?



What is the function of the petals in an insect pollinated plant?

The petals attract the insects so that they can pollinate the plant



What is the function of the anthers in an insect pollinated plant?



What is the function of the anthers in an insect pollinated plant?

The anthers contain the pollen sacs which contain the male sex cells of the plant



What is the function of the stigma in an insect pollinated plant?



What is the function of the stigma in an insect pollinated plant?

These are the sticky parts of the plant designed to capture the pollen grains



What is the function of the ovaries in an insect pollinated plant?



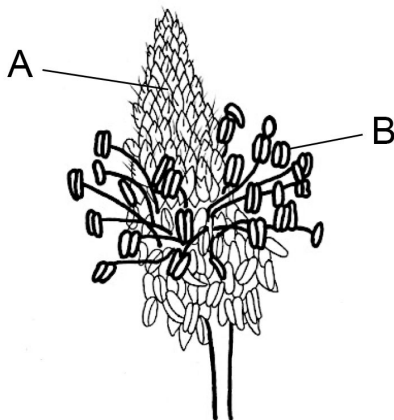


What is the function of the ovaries in an insect pollinated plant?

They contain ovules which will grow into seeds when they are fertilised by pollen



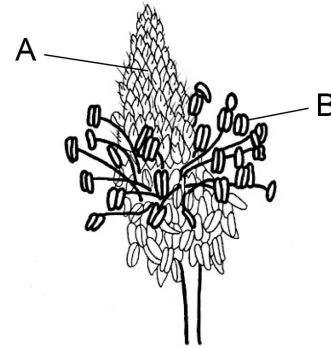
# Label the diagram of a wind pollinated plant below



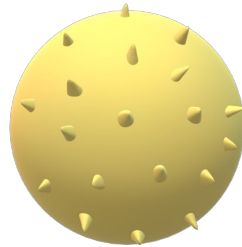
Label the diagram of a wind pollinated plant below

A - Stigma

B - Anthers



# What type of pollen grain is this and why?

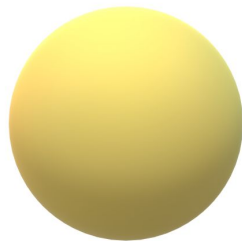


What type of pollen grain is this and why?

Pollen from an insect pollinated as it has spikes on it to make it sticky to be picked up by insects



What type of pollen grain is this and why?



What type of pollen grain is this and why?

Pollen from a wind pollinated as it is smooth so that it can be carried by the wind easily



# What is pollination?





# What is pollination?

Where pollen grains are transferred from the anthers to the stigma



# What is self-pollination? (Higher/Supplement)



What is self-pollination? (Higher/Supplement)

Where pollen grains are transferred from the anthers to the stigma **of the same plant**



# What is cross-pollination? (Higher/Supplement)



What is cross-pollination? (Higher/Supplement)

Where pollen grains are transferred from the anthers of one plant to the stigma of another plant of the same species



Give one advantage of self-pollination  
(Higher/Supplement)



Give one advantage of self-pollination  
(Higher/Supplement)

There is a greater chance of fertilisation  
as it does not rely on pollinators



Give one disadvantage of self-pollination  
(Higher/Supplement)





Give one disadvantage of self-pollination  
(Higher/Supplement)

Genetic variation decreases and the  
plant is less able to adapt to the  
environment



Give one advantage of cross-pollination  
(Higher/Supplement)



Give one advantage of cross-pollination  
(Higher/Supplement)

The plants are more able to adapt to environmental changes and there is increased genetic variation



Give one disadvantage of  
cross-pollination  
(Higher/Supplement)



Give one disadvantage of cross-pollination  
(Higher/Supplement)

The plants are reliant on insect  
populations for fertilisation



Describe what happens when a pollen grain lands on the stigma of a plant  
(Higher/Supplement)



Describe what happens when a pollen grain lands on the stigma of a plant (**Higher/Supplement**)

- A pollen tube grows through the style to reach the ovule in the ovary
- The nucleus from the pollen grain then travels down the pollen tube to reach the ovule



# When does fertilisation occur?





When does fertilisation occur?

When the nucleus of a pollen grain fuses  
with the nucleus of an ovule



State 3 environmental conditions that affect seed germination



State 3 environmental conditions that affect seed germination

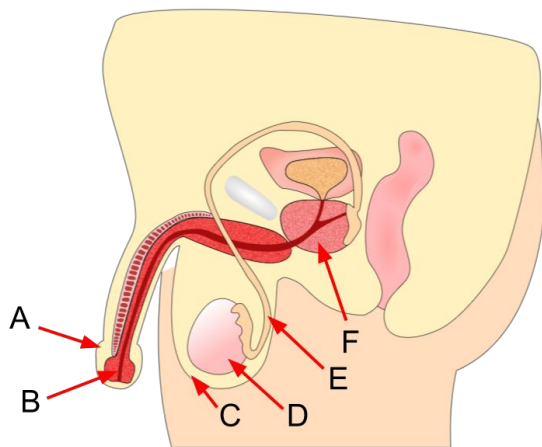
Oxygen availability

Water availability

A suitable temperature

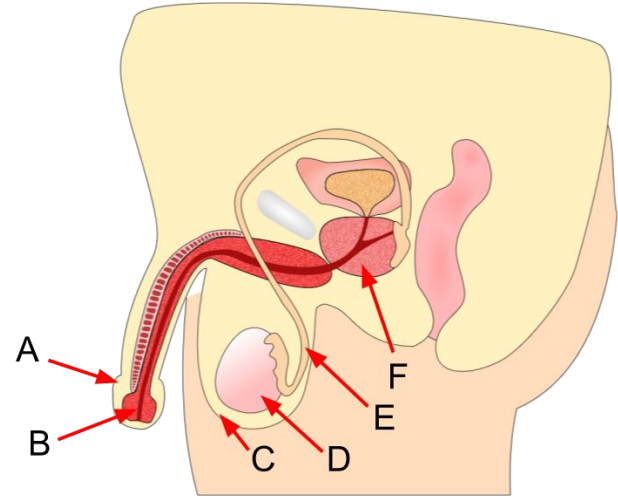


# Label the following diagram of the male reproductive system



# Label the following diagram of the male reproductive system

A	Penis
B	Urethra
C	Scrotum
D	Testes
E	Sperm duct
F	Prostate gland



State 2 functions of the testes



## State 2 functions of the testes

- They produce hormones
- They produce sperm



State 2 functions of the penis





## State 2 functions of the penis

- Used as the male sex organ
- Used as an excretory organ



State 2 functions of the male urethra



## State 2 functions of the male urethra

- It allows urine to exit the body from the bladder
- It is used during ejaculation to release semen



State the function of the scrotum



State the function of the scrotum

It holds and protects the testes



State the function of the sperm duct



State the function of the sperm duct

It carries sperm from the testes to the urethra



State the function of the prostate gland



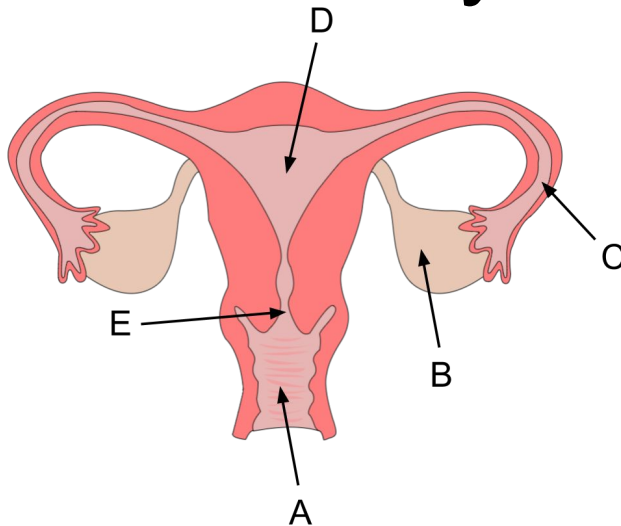


State the function of the prostate gland

It produces prostate fluid which combines with sperm cells to make sperm

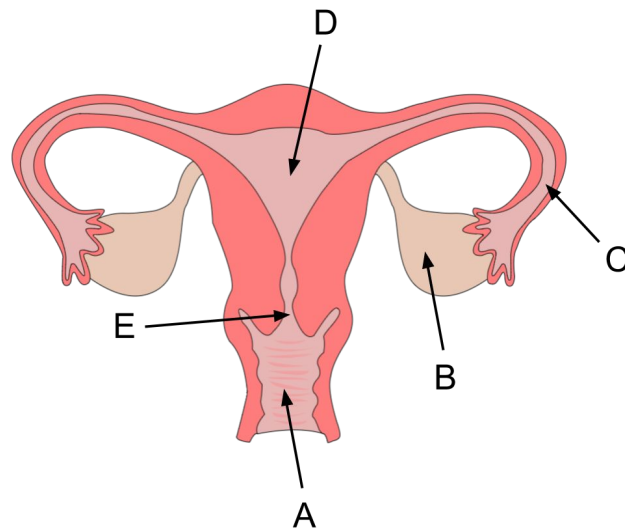


# Label the following diagram of the female reproductive system



# Label the following diagram of the female reproductive system

A	Vagina
B	Ovary
C	Oviduct
D	Uterus
E	Cervix



State 2 functions of the ovaries



## State 2 functions of the ovaries

- They produce eggs
- They produce hormones



State 2 functions of the vagina



## State 2 functions of the vagina

- To receive the penis during intercourse
- It is used as the birth canal during childbirth



State the function of the oviduct





State the function of the oviduct

To create a passage between the ovary and the uterus for the egg to travel down



State 2 functions of the cervix



## State 2 functions of the cervix

- To allow menstrual blood to flow out of the vagina
- To channel the sperm into the uterus



# Define fertilisation



## Define fertilisation

The fusion of the nucleus of a male gamete with the nucleus of a female gamete



# Compare sperm and egg cells in terms of size (Higher/Supplement)



Compare sperm and egg cells in terms of size  
(Higher/Supplement)

Sperm cells are significantly smaller than  
egg cells



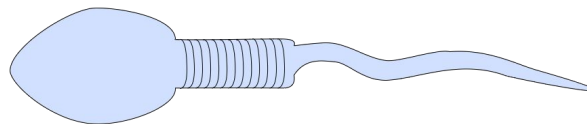
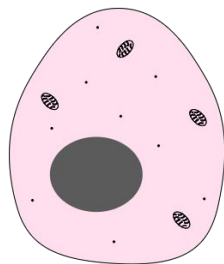
# Compare sperm and egg cells in terms of structure and shape (Higher/Supplement)





# Compare sperm and egg cells in terms of structure and shape **(Higher/Supplement)**

Sperm cells are long and thin with a head and tail whereas egg cells are large and in the shape of a sphere or ovoid



Not to scale



Compare sperm and egg cells in terms  
of their ability to move  
**(Higher/Supplement)**



## Compare sperm and egg cells in terms of their ability to move (Higher/Supplement)

- Sperm cells have large energy stores and a long tail to help them to move quickly
- Egg cells do not have this and so are relatively non-motile



Compare sperm and egg cells in terms  
of the number of each cell  
(Higher/Supplement)



Compare sperm and egg cells in terms of the number of each cell (**Higher/Supplement**)

There are many more sperm cells than egg cells (up to 100 million sperm per millilitre of ejaculate)



# State 2 adaptive features of sperm cells



## State 2 adaptive features of sperm cells

- Long flagellum
- Contain enzymes



# Explain 3 adaptive features of sperm cells

## (Higher/Supplement)





## Explain 3 adaptive features of sperm cells (Higher/Supplement)

- Lots of mitochondria in the middle section provide energy for movement
- Enzymes in the acrosome break down the outer membrane of the egg
- Long whip-like flagellum used for movement



# State 2 adaptive features of egg cells



## State 2 adaptive features of egg cells

- Large energy stores
- Jelly-like coat



Explain the 2 adaptive features of egg cells  
(Higher/Supplement)



# Explain the 2 adaptive features of egg cells (Higher/Supplement)

- Large energy stores allow for lots of cell divisions and growth
- Jelly-like coat ensures that only one sperm can fertilise the egg as it changes after fertilisation



Briefly describe the early development of an embryo



Briefly describe the early development of an embryo

- After fertilisation a zygote is formed
- The zygote implants in the uterus wall and becomes an embryo



What is the function of the umbilical cord?





## What is the function of the umbilical cord?

- It delivers oxygenated blood and nutrients to the developing foetus
- It removes deoxygenated blood and waste products from the developing foetus



# What is the function of the placenta?



## What is the function of the placenta?

- It separates the mother's blood supply from the foetus' blood supply
- It also allows for exchange between the mother and foetus



What is the function of the placenta?  
(Higher/Supplement)



# What is the function of the placenta?

(Higher/Supplement)

- To allow the removal of waste gases and excretory products from the foetus
- To act as a barrier for toxins and pathogens
- To provide the foetus with dissolved nutrients



What is the function of the amniotic sac  
and amniotic fluid?



What is the function of the amniotic sac and amniotic fluid?

They help to protect the developing foetus



Describe the growth of the foetus over  
time





## Describe the growth of the foetus over time

- The foetus begins by developing and becoming more complex
- In the later stages of pregnancy, the foetus increases in size



How can certain toxins and pathogens  
be harmful to the developing foetus?  
(Higher/Supplement)



How can certain toxins and pathogens be harmful to the developing foetus? (Higher/Supplement)

The toxins and pathogens can pass across the placenta and can damage the foetus



Name one toxin that can affect a  
developing foetus  
(Higher/Supplement)



Name one toxin that can affect a developing foetus  
(Higher/Supplement)

Nicotine found in cigarette smoke



Name one pathogen that can affect a  
developing foetus  
**(Higher/Supplement)**



Name one pathogen that can affect a developing foetus (Higher/Supplement)

The rubella virus



Describe how women should control their diet during pregnancy





## Describe how women should control their diet during pregnancy

- Avoid smoking or drinking as this can damage the foetus
- Make sure to have a balanced diet with a focus on nutrients like iron for the development of blood and calcium for the development of bones



State one advantage of breastfeeding  
over bottle feeding using formula milk  
**(Higher/Supplement)**



State one advantage of breastfeeding over bottle feeding using formula milk (**Higher/Supplement**)

Breastfeeding provides the child with important antibodies from the mother which provides protection against disease



State one disadvantage of breastfeeding  
over bottle feeding using formula milk  
**(Higher/Supplement)**



State one disadvantage of breastfeeding over bottle feeding using formula milk (**Higher/Supplement**)

Breastfeeding may be painful for the mother



State one advantage of bottle feeding  
using formula milk over breastfeeding  
(Higher/Supplement)



State one advantage of bottle feeding using formula milk over breastfeeding (**Higher/Supplement**)

The mother does not need to control her diet to provide the correct nutrients to her baby



State one advantage of bottle feeding  
using formula milk over breastfeeding  
(Higher/Supplement)





State one disadvantage of bottle feeding using formula milk over breastfeeding (**Higher/Supplement**)

Bottle feeding can be an extra expense for parents



State the 6 main stages of labour and birth



## State the 6 main stages of labour and birth

- The amniotic sac breaks (water breaking)
- The muscles in the wall of the uterus contract
- Widening of the cervix opening (dilation)
- Passage of the baby through the vagina
- Tying and cutting the umbilical cord
- Delivery of the afterbirth



# What role does testosterone play during puberty?



## What role does testosterone play during puberty?

- Triggers growth and development of the penis and testes
- Causes the voice to deepen
- Triggers the growth of pubic hair
- Increases muscle mass



What role does oestrogen play during puberty?



## What role does oestrogen play during puberty?

- Increases breast size
- Triggers the development of the uterus
- It causes eggs to mature during the menstrual cycle



Where is oestrogen secreted from?  
(Higher/Supplement)





Where is oestrogen secreted from?  
(Higher/Supplement)

The ovaries



Where is progesterone secreted from?  
(Higher/Supplement)



Where is progesterone secreted from?  
(Higher/Supplement)

The ovaries



What happens on day 1-4 of the menstrual cycle?



What happens on day 1-4 of the menstrual cycle?

The uterus lining is shed during menstruation

Menstruation	Uterus lining growth	Lining maintained
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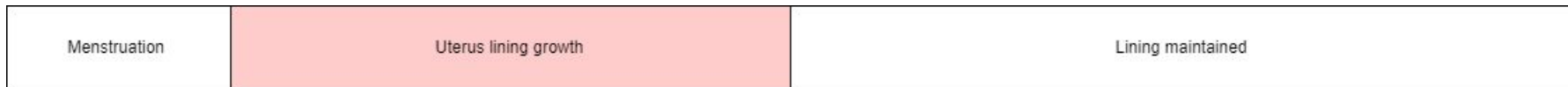


What happens on day 4-14 of the menstrual cycle?



What happens on day 4-14 of the menstrual cycle?

The uterus lining then begins to grow again in preparation to receive an egg



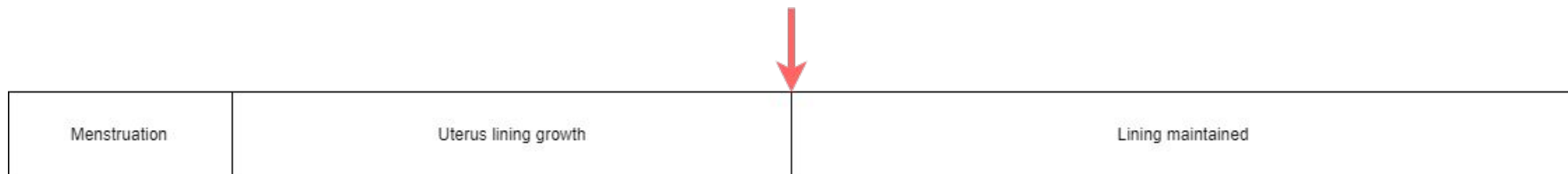
What happens on day 14 of the menstrual cycle?





# What happens on day 14 of the menstrual cycle?

## An egg is released

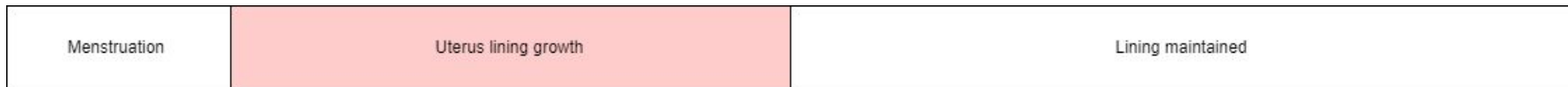


What happens on day 14-28 of the menstrual cycle?



# What happens on day 14-28 of the menstrual cycle?

## The lining of the uterus is maintained



What does follicle stimulating hormone  
(FSH) do?  
(Higher/Supplement)



What does follicle stimulating hormone (FSH) do?  
(Higher/Supplement)

FSH stimulates the follicle to mature and release oestrogen



# What does luteinising hormone (LH) do? (Higher/Supplement)



What does luteinising hormone (LH) do?  
(Higher/Supplement)

A surge in LH causes the release of an egg from a follicle (ovulation)



# What does progesterone do? (Higher/Supplement)





What does progesterone do? (Higher/Supplement)

Progesterone maintains the womb lining



What hormone does progesterone  
inhibit?  
(Higher/Supplement)



What hormone does progesterone inhibit?  
(Higher/Supplement)

Progesterone inhibits follicle stimulating hormone (FSH) and Luteinizing hormone (LH)



# How do oestrogen pills work to prevent pregnancy? (Higher/Supplement)



How do oestrogen pills work to prevent pregnancy?  
(Higher/Supplement)

Oestrogen pills inhibit FSH which stops  
the egg from maturing



# How do progesterone pills work to prevent pregnancy? (Higher/Supplement)



How do progesterone pills work to prevent pregnancy? (Higher/Supplement)

Progesterone pills cause a sticky mucus to form at the cervix which prevents the sperm from fertilising the egg



Give 4 different types of birth control





Give 4 different types of birth control

- Natural methods
- Barriers
- Chemicals
- Surgical methods



Give 2 examples of natural methods of birth control



Give 2 examples of natural methods of birth control

- Abstinence (refraining from sex)
- Monitoring temperature and cervical mucus levels to predict ovulation



Give 2 examples of barriers that act as birth control



## Give 2 examples of barriers that act as birth control

- Condoms - Can be male or female condoms and prevent the sperm from entering the vagina
- Diaphragm - A silicone dome shaped object that is inserted into the vagina to cover the cervix (usually used alongside chemical methods)



Give 5 examples of chemical methods of birth control



Give 5 examples of chemical methods of birth control

- IUD
- IUS
- Contraceptive pill
- Implant
- Injection



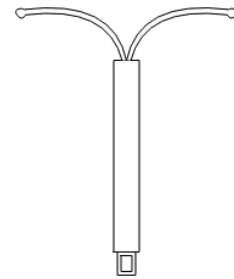
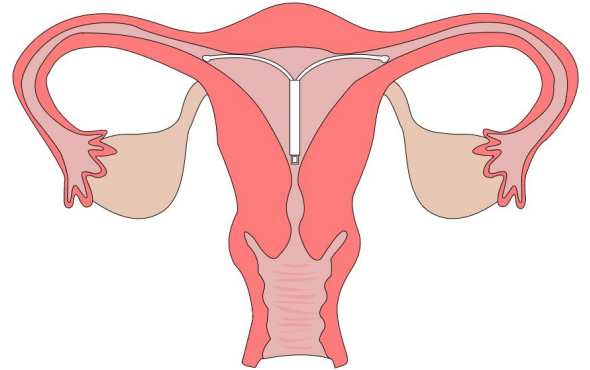
Briefly describe the use of an IUD as a contraceptive device





# Briefly describe the use of an IUD as a contraceptive device

Intrauterine devices (IUDs) are small copper-coated tubes in a T shape that prevent sperm from reaching the egg and the copper works to kill the sperm



Describe the use of an IUS as a  
contraceptive device



## Describe the use of an IUS as a contraceptive device

- Intrauterine systems are very similar to intrauterine devices except they release progesterone instead of copper
- They thicken the cervical mucus and thin the womb lining



Describe the use of an implant as a  
contraceptive device



## Describe the use of an implant as a contraceptive device

- The implant is a small matchstick sized device
- Inserted into the upper arm
- It releases progestogen into the bloodstream which prevents ovulation



# How does the contraceptive pill work?



## How does the contraceptive pill work?

- It contains artificial versions of oestrogen and progesterone which prevent pregnancy
- Prevents ovulation
- Thickens mucus
- Alters womb lining



How does the contraceptive injection prevent pregnancy?





# How does the contraceptive injection prevent pregnancy?

It releases progesterone into the bloodstream which prevents ovulation



# State 2 surgical methods of contraception



## State 2 surgical methods of contraception

- Vasectomy
- Female sterilisation



How does a vasectomy work to prevent pregnancy?



# How does a vasectomy work to prevent pregnancy?

The vas deferens are cut or tied which prevents sperm from being released from the testicles into the urethra



# How does female sterilisation work?



## How does female sterilisation work?

- The fallopian tubes are blocked by clips or rings or they are cut
- This prevents the release of an egg from the ovaries



# Describe artificial insemination (AI) (Higher/Supplement)





# Describe artificial insemination (AI) (Higher/Supplement)

Sperm are placed within a woman's uterus  
using a catheter



Describe how IVF is carried out  
(Higher/Supplement)



## Describe how IVF is carried out (Higher/Supplement)

- The mother is given FSH
- Sperm from the father and eggs from the mother are collected
- The egg is fertilised in a laboratory and allowed to develop into an embryo
- The embryo is then put into the mother's uterus



Define sexually transmitted infection  
(STI)



## Define sexually transmitted infection (STI)

An infection caused by a pathogen that is transmitted through bodily fluids, usually involving sexual contact



Give an example of an STI



Give an example of an STI

HIV (Human Immunodeficiency Virus)



State 3 ways of preventing the spread of STIs





## State 3 ways of preventing the spread of STIs

- Wearing condoms during sex
- Educating people about STIs and wearing protection during sex
- Don't share needles



# How is HIV spread?



# How is HIV spread?

## Through bodily fluids



# What can HIV infection lead to?



# What can HIV infection lead to?

## AIDS (Acquired Immunodeficiency syndrome)



# How does HIV affect the immune system?

## (Higher/Supplement)



# How does HIV affect the immune system?

## (Higher/Supplement)

- Decreased lymphocyte numbers
- White blood cells have a reduced ability to produce antibodies

