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SUBJECT: LIFE SCIENCE
GRADE: 12
MODULE: 2 - Structure, control and processes in basic life systems of plants and humans
UNIT: 2 - The Human Reproductive System – Control of fertility, Technology in reproduction

UNIT OUTCOMES:

By the end of this unit you should be able to:

- Compare various forms of contraception
- Discuss the problem, impact and possible solutions for infertility
- Analyse and motivate views on abortion
- Class Exercises

LESSON OVERVIEW: (Knowledge areas)

1. Contraception and control of human fertility
2. Abortion
3. Infertility and technology in reproduction

LESSON:

Introduction:

There are various forms of contraception and birth control available. Some people argue that contraception is against the laws of nature. Natural methods of birth control require abstinence and are accepted by the Catholic Church. Physical methods not only prevent conception but also protect against sexually transmitted diseases like HIV. Preventative methods like the IUD prevent implantation into the uterine wall. The Pill prevents ovulation, but it was originally argued that the use of the pill would result in sexual permissiveness. Contraception is required to restrict the growth of the human population and to prevent the spread of HIV and other STDs. Women are given the opportunity to plan their careers and choose when to have babies. Producing a small, planned family will mean a better standard of living and allows the population to stabilize.

Contraception and the control of human fertility:

Be sure to learn the table below on birth control methods because you may be asked to compare various types of birth control.

Method	Action	Failure rate	Advantages and disadvantages
Barrier methods			
Condom	A rubber sheath, which fits over the penis and prevents sperm from entering the vagina.	3% to 10% depending on whether it is used properly	May slip off or break during intercourse. Must be fitted before intercourse.
Diaphragm or	A flexible rubber dome which fits	3% to 15%	Can be inserted a few hours before



Dutch cap	over the cervix of the female and prevents sperm from entering the uterus. It must be used with a spermicide, which kills sperm.		intercourse. Must be fitted by a doctor the first time to ensure that it is the correct size.
Hormonal methods			
The Pill	Contains oestrogen and progesterone. The pill inhibits the secretion of FSH, thereby preventing the development of the eggs and ovulation.	1%	Very reliable. Side effects like water retention, weight gain, skin pigmentation, headaches and strokes. Not recommended for smokers and women over the age of 40.
Mini-pill	Contains progesterone only so ovulation takes place but thickened cervical mucus prevents sperm from entering the uterus.	2%	Very reliable with a lower dose of hormones. Can be used by older women. Side effects are breakthrough bleeding between periods, headaches and slight water retention.
Implantation preventing methods			
IUD (intra-uterine device) or coil	A device made of copper or stainless steel which is inserted into the uterine wall by a doctor and which prevents implantation of the fertilized egg.	3%	Can be inserted and left for a long period of time. Side effects are heavy periods and discomfort. The IUD may grow into the uterine wall, or may dislodge and come out.
Natural methods			
Abstinence	No sexual intercourse.	0%	Very effective. No sexually transmitted diseases are transmitted. No side effects.
Rhythm method	Avoid sexual intercourse (abstinence) at time of ovulation.	20%	It is a natural method, but female cycles may vary and periods may be irregular. The Catholic Church accepts this method. No side effects.
Sterilization methods			
Tube tying in females	The fallopian tubes are 'tied' or cut. This prevents the sperm from reaching the egg.	1%	The process is difficult to reverse. In some cases the 'tied' tubes come undone and fertilization can take place. There are no side effects.
Vasectomy in males	Both vas deferens are cut.	1%	This is a simple procedure with no side effects. Semen is still released but sperm are absent. The process is very difficult to reverse.
Termination methods			
Morning-after Pill	The pill contains an anti-progesterone drug and must be	20%	This pill may have long-term effects. A doctor prescribes it after

	taken no more than 48 hours after sexual intercourse.		a rape or when other means of protection were not used. This pill should only be used as a last resort.
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Abortion:

Abortion is the premature and deliberate termination of a pregnancy. The abortion procedures are performed by qualified staff, up to 12 weeks of pregnancy. It may be legally performed up to 24 weeks in cases where genetic deformities of the foetus are suspected or the mother is in physical danger. The mother should be **counselled** before and after the procedure. Whether abortion is acceptable to you or not will depend on your belief systems. The following are possible 'pros' and 'cons' for the abortion debate.

Possible Anti-abortion points:

- The unborn foetus is a living being from conception (fertilization has taken place)
- The foetus has a brain, heart and other organs early in its development (by 10 weeks) and can therefore feel pain
- Abortion is legalized killing/murder since you are taking away a life
- Many religions and cultures do not condone abortion – this goes against their morality/ethics that could lead to conflict in the family
- The mother-to-be also experiences deep emotional trauma and depression long after she has aborted her child – even if she has made the choice to abort
- Why should abortion be condoned when there are many contraceptive methods available
- Couples that have sexual relations must be responsible/ if a baby is conceived it should be accepted and loved - no matter what

Possible Pro-abortion points:

- Abortion is legal in South Africa – it is enshrined in our constitution – women have a choice
- The foetus does not have the status of a child in South Africa
- Abortion is better than bringing an unwanted child into the world and abandoning it
- The abandoned child could possibly have anti-social behaviour and become a problem
- Sometimes women do not have a choice about the use of contraceptives/ it is male controlled – she falls pregnant not out of choice – abortion is the only option in this case

Infertility and technology in reproduction:

Infertility is the inability to become pregnant and is common in today's society. Most couples want to have children. Women were blamed in the past as the cause of childless couples. Today, research has shown that infertility is just as likely due to the men.

• Female infertility

- **Failure to ovulate** due to poor hormonal function. Cure: hormone therapy.
- **Damage to the fallopian tubes** where infections can cause scarring and blocking of the tubes. Cure: surgery to open the tubes.
- **Uterus damage** will result in a lack of implantation by the fertilized egg to the lining of the uterus. Cure: surgery.
- **Cervix damage** can result from abortion or a difficult birth where scar tissue blocks the cervix and sperm prevented from swimming to the uterus. Cure: Surgery.
- **Antibodies produced to sperm.** Cure: drugs to suppress the immune system and by Invitro Fertilization.

• Male infertility

- **Low sperm count** has many causes, such as obesity, hormonal problems, stress, drugs and alcohol abuse.
- **Abnormal sperm** where sperm have two heads or tails as a result of hormonal problems or infection.



- **Premature ejaculation** where the male reaches a climax before penetration.
- **Impotence** is the inability to achieve an erection. This is usually due to a psychological problem. The male can go for counselling or sex therapy. If the problem persists, then a drug called Viagra is prescribed. Viagra assists the male to achieve and maintain an erection. The drug has many side effects and cannot be used by males who suffer from heart, liver, kidney and prostate problems or high blood pressure.

10.1. Donor insemination

Males donate sperm, stored in **sperm banks** to be used when a woman wishes to fall pregnant but her partner is unable to provide sperm. Potential donors are very carefully **screened** for health and genetic diseases. The sperm is selected based on the donor's records and inserted into the woman when she is ovulating.

Ethical issues concerning donor insemination:

- Should child be told the identity of his or her biological father
- the emotional impact and commitment of the legal father
- the risk of a child entering into a sexual relationship with other offspring from the donor father
- some groups regard donor insemination as the equivalent to adultery

10.2. Invitro Fertilization (IVF)

This is when one or more eggs are fertilized outside the woman's body and transferred into the uterus for development and growth.

The stages of IVF are as follows:

- Fertility drugs containing FSH are used to **stimulate the ovaries** to produce many eggs
- The **collection of the eggs**
- **Sperm is collected** from the male and seminal fluid is removed
- **Fertilization of the eggs** takes place in a test-tube within six hours of the harvesting of the eggs
- **Three embryos are transferred into the uterus.** Any remaining fertilized eggs can be frozen for implantation at a later stage should this process be unsuccessful.

10.3. Surrogacy:

Surrogacy is when **another woman's uterus** is used to carry the embryo of a couple. The male provides the sperm and the egg can be from his partner or the surrogate. The egg is fertilized invitro and implanted into the surrogate. If the surrogate egg is used, then the sperm is simply inserted as with donor insemination. Agreements and legal documents must be drawn up before the process.

Ethical issues concerning surrogacy:

- exploitation of infertile women by surrogates
- refusal to give the baby to the couple when the surrogate provided the egg
- the legal issues if the baby is born with genetic defects or physical abnormalities, as the donor couple may not want the baby
- if the surrogate suffers damage to her health during the pregnancy, does she reserve the right to abort the couple's baby.

EXERCISES:

Question 1:

Sportswomen use the contraceptive pill not only for birth control but also to alter their menstrual cycle to suit their sporting lifestyle. Explain your view on this. (3)

(Taken from NSC Life Science Examination Exemplar 2008 Paper 1)



Question 2:

A FOETUS IS A BABY

The biggest lie of the abortion industry is that the unborn child is a worthless, disposable blob of tissue. The second lie is that it is acceptable to ruthlessly terminate this life simply because it will be an inconvenience.

More than 85 000 babies were aborted in South Africa last year bringing the total number of abortions since legalisation of abortion on demand, to more than half a million since 1997. These statistics indicate that abortion on demand is being used as a heartless form of birth control.

No wonder that baby/child abuse and murders have increased. The only difference between abortion and murder victims is that one has been born while the other is supposedly in the safety of the mother's womb.

Abortion, which places little value on human life, breeds a society that is heartless, especially towards its most vulnerable citizens.

[Source: *Daily News*, 7 June 2006]

You are required to respond to this letter by addressing the following points:

- 2.1. Choose an opinion that is either for or against abortion and discuss at least FOUR reasons to support your viewpoint. (8)
- 2.2. Some people use abortion to get rid of unwanted offspring. Describe TWO methods that they could have used to prevent pregnancy in the first place. (4)

Synthesis (3)

Total: 15

NOTE: NO marks will be awarded for answers in the form of flow charts or diagrams.

(Taken from NSC Life Science Examination Exemplar 2008 Paper 1)

HOMEWORK:

Write a mini-essay explaining how any THREE contraceptive methods affect human reproduction. You should also explain ONE way in which contraception can influence the quality of human life.

Content (12)

Synthesis (3)

NOTE: NO marks will be awarded for answers in the form of flow charts or diagrams.

(Taken from NSC Life Science Examination Feb/March 2009 Paper 1)

When answering an essay type question:

- **Always read the topic with care.** There may be “hidden pit-falls”. Underline the operative words and answer what is asked in the question. Let's look at the Homework question as an example:

Write a mini-essay explaining how any THREE contraceptive methods affect human reproduction. You should also explain ONE way in which contraception can influence the quality of human life.



So now you should know that this question has TWO parts.

- Prepare for this essay by writing down the contraceptive methods that you can remember. Now select any three that you know best noting down briefly points about each of the three methods.
- Under **NO** circumstances do you number any paragraphs. Any diagrams that you use in an essay will be ignored, so don't waste time drawing them.
- **Never use points in an essay.** If you run out of time (you should not if you plan your time properly) simply write your information in point form without the points ie. Sentence after sentence and **NOT** a line per fact.
- For all essays (excluding languages such as English, Afrikaans etc) **DO NOT** use words and phrases like "it can be seen", "I feel that", "in my opinion" etc. These essays are factual and objective, even if you are asked "In your opinion...". It **MUST** be based on facts, which are laid out in a logical, systematic order. Be careful of repetition and writing nonsense. This only serves to prove that you did **NOT** prepare the essay properly and marks will be deducted.
- **Now check** that you have answered all the components in the essay, by rereading the question.