

### WORKED EXAMPLES

1. Which of the following changes happen only in boys and **not** girls at puberty?

- I Sex organs produce sex hormones.
- II Pubic hair grows.
- III Body sweats more and may suffer from spots and pimples.
- IV Growth spurt occurs.

A. None of these    B. II only    C. II and III    D. III and IV

#### Answer Analysis

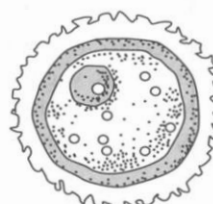
The correct answer is A.

All of these changes occur in both boys and girls during puberty.

2. The diagrams show the male and female sex cells.



A sperm



An egg (ovum)

How does the shape and size of these two cells help them to carry out their particular functions?

### Answer Analysis

The sperm has to travel through the vagina to the uterus (womb) and then along the oviduct towards the egg to fertilise it. Its small, streamlined shape and tail help it to do this. If it meets an egg, the head of the sperm is small enough to enter the egg so that the nuclei of the sperm and egg can unite (fertilisation).

The egg (ovum) is roughly ten times larger than the sperm and it is round. Because of its size, it is difficult for it to move by itself. However, its round shape makes it easier to be released from the ovary (ovulation) and also to pass along the muscular wall of the oviduct. The abundant cytoplasm also helps to nourish the egg as it travels down towards the womb.

3. A woman has a 28-day menstrual cycle. Her period starts on the 5<sup>th</sup> of April.
- On which day is she most likely
    - to release an egg?
    - to start her next period?
  - Between which dates might sexual intercourse result in the egg being fertilised?
  - If the egg was fertilised, in which month is the baby most likely to be born?

### Answer Analysis

- An egg is most likely to be released on day 14 from when her period starts. This is the 18<sup>th</sup> of April.
  - Her next period will start 28 days from the 5<sup>th</sup> of April. This is the 2<sup>nd</sup> of May.
- The ovary might release an egg between the 11<sup>th</sup> - 18<sup>th</sup> day of the menstrual cycle. It is during this time that sexual intercourse might result in the egg being fertilised. This is between 15<sup>th</sup> April and 22<sup>nd</sup> April.
- It takes an average 9 months (280 days) between fertilisation and birth. Birth is most likely, therefore, around the middle of January in the following year.

4. Which of the following lists the correct order for the passage of a sperm to an egg?
- Uterus, vagina, cervix, oviduct
  - Ovary, oviduct, uterus, vagina
  - Vagina, cervix, uterus, oviduct
  - Vagina, uterus, oviduct, cervix

### Answer Analysis

The correct answer is C.

5. Why does a woman not have any more periods until after the baby is born if an egg is fertilised?
- The developing baby blocks off the entrance to the vagina.
  - The womb shrivels up when the egg is fertilised.
  - The ovaries swell up to block the oviduct.
  - The fertilised egg is implanted in the lining of the womb.

### Answer Analysis

The correct answer is D.

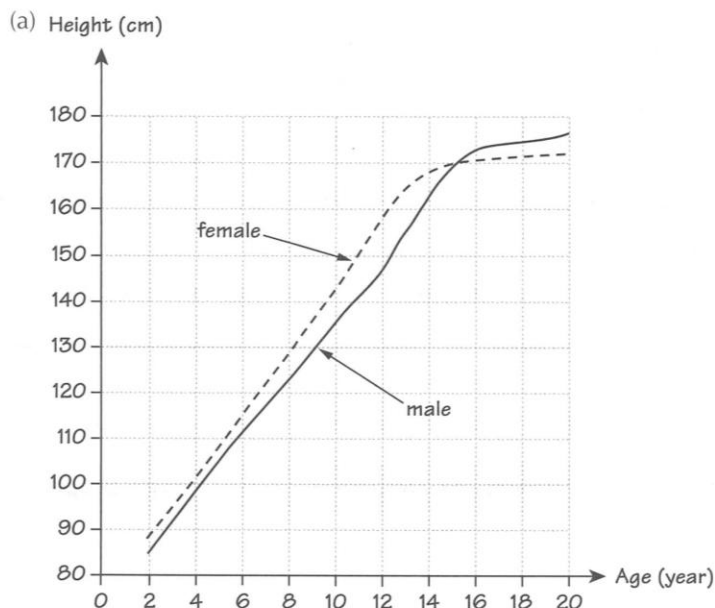
If the woman did have a period, the implanted fertilised egg would be discharged through the vagina.

6. The table shows how the height of males and females varies with age.

Age (years)	Female height (cm)	Male height (cm)
2	88	85
4	105	98
6	115	123
8	129	123
10	142	135
12	158	147
14	168	163
16	170	172
18	171	174
20	171	176

- Plot a graph of height (y-axis) against age (x-axis). Plot both graphs for male and female on the same axes.
- Describe how the height difference between boys and girls changes as they get older. When do the boys increase in height most rapidly and when do the girls experience this?

### Answer Analysis



(b) Girls are usually slightly taller than boys when young and have a growth spurt earlier, between the ages of 10–12 years. They also do not grow much more after the age of 14 years. Boys have their growth spurt later (12–14 years) and continue growing for a longer period, even after the age of 16 years.

7. Which of these methods of contraception is the odd one out? Give your reasons.

Spermicide

Intra-uterine device

Oral contraceptive

Condom

Vasectomy

### Answer Analysis

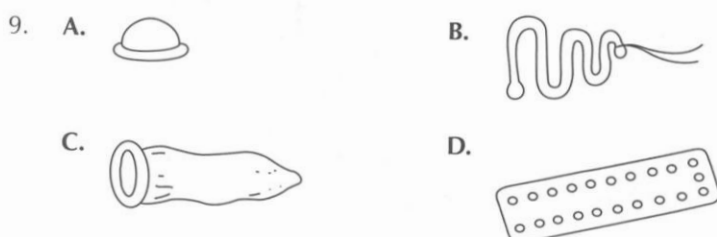
All of these methods of contraception are temporary except vasectomy. This is a permanent method of male sterilisation and is therefore, the odd one out. Vasectomy involves cutting and tying the sperm ducts so that sperms from the testes do not reach the urethra. During sexual intercourse, no sperm will enter the woman's vagina, so there is no chance of any eggs becoming fertilised.

8. Some couples use the 'safe period' (or rhythm method) as a method of contraception. On which days of the 28-day menstrual cycle do you think a couple could have intercourse with the least risk of pregnancy? Is this 'safe period' a reliable method of contraception?

### Answer Analysis

The ovary releases an egg between the 11<sup>th</sup> – 18<sup>th</sup> day of the menstrual cycle. During this time, sexual intercourse might result in the egg being fertilised. The safe period would therefore be either side of this middle section of the menstrual cycle. This is the 1<sup>st</sup> – 10<sup>th</sup> day or the 19<sup>th</sup> – 28<sup>th</sup> day.

However, this is not a reliable method of contraception, especially close to the 11<sup>th</sup> and 18<sup>th</sup> day. It is possible that the egg may be released from the ovary earlier or later than expected. Also, menstruation occurs for the first five days of the cycle which again restricts sexual intercourse.



The diagram shows four devices used as temporary methods of contraception.

- Identify these four devices.
- Which of these devices is used by the male?
- Which two devices could be described as 'barrier methods'?
- Which one of these barrier methods would also give protection against sexually transmitted diseases?

### Answer Analysis

- A : Diaphragm

B : Intra-uterine device (IUD) or coil

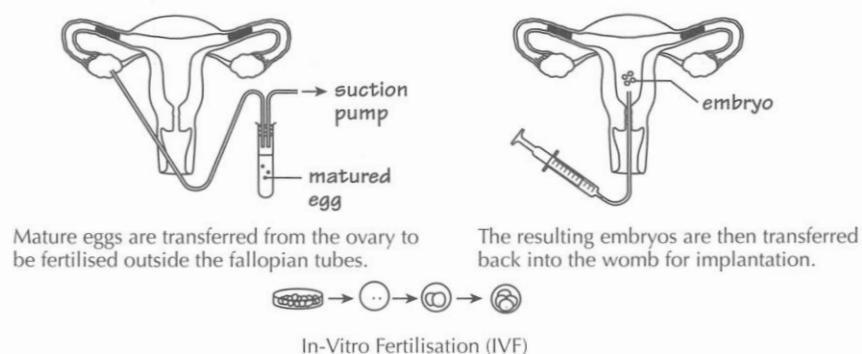
C : Condom or sheath

D : Birth control pills or oral contraceptive tablets
- The only device used by the male is the condom (C).
- A and C are barrier methods as they prevent sperms from reaching the womb.
- Only a condom (C) worn over the male's penis will give protection against sexually transmitted diseases.

10. The following passage describes how a woman can have a 'test tube baby'.

Read the passage carefully and answer the questions below.

If a woman has blocked oviducts, she may decide to have a test tube baby. The woman is first given hormones to increase the number of eggs maturing in the ovaries. Then, the doctor, using a fine tube through the body wall, extracts several mature eggs from the surface of an ovary just before they are released. These eggs are then placed in a special culture dish and semen containing sperms is added for fertilisation to take place. Three days after fertilisation, the embryos contain either 8 or 16 cells. These tiny embryos are very carefully transferred from the culture dish into the womb of the woman using a fine tube pushed along the vagina into the womb. If the process is successful, one of the embryos will become implanted and develop into a baby.



- Why can't a woman have a baby normally if her fallopian tubes are blocked?
- What do we call a fertilised egg?
- Why does the doctor wait three days after fertilisation before transferring the embryos into the womb?
- Why can't embryos contain 6, 10 or 12 cells?
- Why are the embryos not transferred into the womb by inserting a fine tube through the wall?



### Answer Analysis

- (a) If the fallopian tubes are blocked, sperms cannot pass along the tube to reach and fertilise the egg. Also, the egg would be unable to pass along the oviduct to the womb.
- (b) A fertilised egg is called an embryo.
- (c) After fertilisation, the single-celled embryo multiplies by division. If we wait several days, the embryo would have grown and contain either 8 or 16 cells and therefore be more likely to survive.
- (d) The single-celled (unicellular) fertilised egg divides by binary fission to form 2, then 4, then 8, then 16 cells and so forth. There would be no odd number of cells and the even numbers of cells would all be 'powers' of two.
- (e) Embryos are extremely delicate and must be very carefully implanted onto the lining of the womb. This operation can be carried out more successfully if we place the embryo in the womb instead of injecting through the body into the womb.

### 10.3 GLOSSARY OF TERMS

<b>Abortion</b>	The ending of a pregnancy by deliberately removing the foetus from the uterus. Abortion must not be regarded as a contraceptive method.
<b>AIDS</b>	The abbreviation for Acquired Immune Deficiency Syndrome. It is the last stage of the HIV infection and at the present time is incurable.
<b>Birth control pills</b>	Pills which contain two female hormones called progesterone and oestrogen. Progesterone stops ovulation and oestrogen causes the lining of the womb to build up.
<b>Cervix</b>	The narrow neck of the uterus which widens during childbirth.
<b>Conception</b>	The fertilisation of the human egg and implantation of this egg (zygote) into the wall of the uterus.
<b>Condom</b>	A very thin rubber tube worn over the penis before and during sexual intercourse. It prevents sperm from entering the vagina.
<b>Congenital syphilis</b>	Syphilis that is passed from an infected woman to her unborn baby during pregnancy.
<b>Contraception or birth control</b>	The process of preventing fertilisation or the development of the fertilised egg.
<b>Diaphragm</b>	A contraceptive device in the shape of a thin rubber cup. This fits at the top of the vagina to prevent the entry of sperms into the uterus during sexual intercourse.

<b>DNA</b>	The abbreviation for deoxyribonucleic acid. This is a chemical compound found in chromosomes and carries the genetic information of the cell.
<b>Egg</b>	The female sex cell (gamete) produced by the ovaries. It is also called an ovum (plural: ova).
<b>Embryo</b>	The fertilised egg which has been implanted into the wall of the uterus (uterine lining).
<b>Fallopian tube or oviduct</b>	The tube which leads from the ovary to the uterus or womb. Along this tube passes the mature egg. In this tube fertilisation normally occurs.
<b>Fertile period</b>	The period in the menstrual cycle when ovulation occurs, thus, having sexual intercourse during this period is more likely to result in pregnancy.
<b>Fertilisation</b>	The joining of the nucleus of a sperm with the nucleus of an egg to form a new life (zygote).
<b>Foetus or Fetus</b>	The developing unborn child inside a mother's womb or uterus. In humans the embryo is called a foetus from the eighth week until birth.
<b>Gamete</b>	The sex cell, like the sperm or egg.
<b>Gene</b>	A section of DNA which carries hereditary information.
<b>Gonorrhoea</b>	A sexually transmitted infection (STI) which is caused by bacteria. Gonorrhoea can be treated with antibiotics.
<b>Heredity</b>	The passing of genetic characteristics from one generation to the next through genes.
<b>Heredity characteristics</b>	Those characteristics that we inherit from our parents such as hair colour, skin colour, tongue (roller or non-roller).
<b>HIV</b>	The abbreviation for the Human Immunodeficiency Virus. It is the virus that causes AIDS. It attacks and damages a person's immunity system.
<b>Hormone</b>	A chemical messenger found in the blood. Hormones are produced by various glands. For example, sex glands produce hormones like oestrogen and progesterone.
<b>Immune system</b>	The body's immune system which helps to fight infection and disease.
<b>Implantation</b>	The attachment of the fertilised egg (embryo) to the wall of the uterus during conception.
<b>Impotence</b>	The inability of the male to achieve an erection of the penis.
<b>Intra-uterine device (IUD)</b>	A temporary method of contraception where a plastic loop is put into the uterus to prevent the fertilised egg from becoming implanted.



<b>Ligation</b>	A surgical operation which involves cutting and then tying the oviduct tubes. It is a permanent method of contraception.
<b>Menstrual cycle</b>	The regular monthly cycle of ovulation and menstruation.
<b>Menstruation (Period)</b>	The discharge of the broken-up lining of the uterus through the vagina.
<b>Oestrogen</b>	The female sex hormone that causes the wall of the uterus to thicken.
<b>Ovary</b>	One of the two female reproductive organs which produce sex hormones and ova (eggs).
<b>Oviduct or fallopian tube</b>	The tube which leads from the ovary to the uterus or womb. Along this tube passes the mature egg. In this tube fertilisation normally occurs.
<b>Ovulation</b>	The release of a mature ovum (egg) from the ovary.
<b>Ovum</b>	The female sex cell (gamete) produced by the ovaries (plural: ova). It is also called an egg.
<b>Penis</b>	The male organ which deposits sperm into the vagina of a female during sexual intercourse.
<b>Premarital sex</b>	Having sexual intercourse before marriage. This can lead to unwanted pregnancies and sexually transmitted infections.
<b>Prostate gland or sex gland</b>	This secretes a nutrient fluid (seminal fluid) for the sperm to swim in so that they can reach the female egg.
<b>Puberty</b>	A stage of growth in a young person when the reproductive organs become active to produce sex hormones and sex cells.
<b>Reproduction</b>	The process by which living organisms produce new organisms like themselves. It ensures continuation of the species.
<b>Scrotum</b>	The bag of skin which holds the testes outside of the male's body.
<b>Semen</b>	The fluid from the male reproductive organs which consists of sperm from the testes and seminal fluid from the prostate gland.
<b>Sex hormones</b>	Chemicals produced from the reproductive organs which bring about changes during puberty.
<b>Sexual intercourse</b>	The process during which sperm from the male are deposited into the vagina of the female.
<b>Sexual reproduction</b>	This involves male and female of the species to reproduce a new organism.
<b>Sexually transmitted infections (STIs)</b>	Infections transmitted during sexual intercourse such as gonorrhoea, syphilis and AIDS.

<b>Sperm</b>	The male sex cell produced by the testes (plural: sperm or sperms).
<b>Sperm duct</b>	One of two tubes which transports sperm from the testes to the urethra.
<b>Spermicide</b>	The chemical in the form of a cream, foam or jelly which kills sperm.
<b>Sterilisation</b>	A surgical operation which makes a person incapable of reproducing. This is a permanent method of contraception.
<b>Syphilis</b>	A sexually transmitted infection (STI) which is caused by bacteria.
<b>Testis</b>	One of the two male reproductive organs which produce sex hormones and sperms. The plural is testes.
<b>Urethra</b>	A muscular tube that leads from the bladder and opens to the outside of the body through a small opening.
<b>Urine</b>	Liquid waste which is excreted through the urethra.
<b>Uterus or womb</b>	A pear-shaped muscular structure in females where the unborn child (foetus) develops before birth.
<b>Vagina</b>	The muscular tube that holds the penis during sexual intercourse. It is also called the birth canal.
<b>Vasectomy</b>	A surgical operation which involves cutting and tying the sperm ducts. It is a permanent method of contraception.
<b>Zygote</b>	The fertilised egg which is implanted in the lining of the uterus during conception.