



Glenlola Collegiate School  
excellence through commitment, contribution and caring

# 2.4

# reproduction

Name \_\_\_\_\_

**LEARNING OUTCOMES**  
**CCEA GCSE BIOLOGY: 2.4.1 - 2.4.6**  
**UNIT 2.4 Reproduction**

	LEARNING OUTCOMES	PUPIL SELF-EVALUATION		
		Good	Average	Requires Attention
	Pupils should be able to:			
2.4.1	Know that:			
	<ul style="list-style-type: none"> <li>sperm cells are specialised cells formed by meiosis and followed by differentiation in the testes under the influence of the hormone testosterone;</li> </ul>			
	<ul style="list-style-type: none"> <li>sperm cells are adapted to their function by having a haploid nucleus and a tail for swimming;</li> </ul>			
	<ul style="list-style-type: none"> <li>fertilisation takes place in the oviducts when the sperm and the haploid egg nucleus fuse to give a diploid zygote;</li> </ul>			
	<ul style="list-style-type: none"> <li>the zygote divides by mitosis many times to form a ball of cells as it travels down the oviduct to the uterus;</li> </ul>			
	<ul style="list-style-type: none"> <li>after implantation in the uterus lining it then differentiates to produce a variety of tissues and organs.</li> </ul>			
	<ul style="list-style-type: none"> <li>the placenta is adapted for diffusion by having a large surface area for exchange of dissolved nutrients, oxygen, carbon dioxide and urea <b>and explain the role of villi in providing these adaptations;</b></li> </ul>			
	<ul style="list-style-type: none"> <li>these substances are carried to or from the foetus in the blood vessels in the umbilical cord;</li> </ul>			
	<ul style="list-style-type: none"> <li>the amnion and amniotic fluid cushion the foetus.</li> </ul>			
2.4.2	Know that testosterone (produced by the testes) and oestrogen (produced by the ovaries) are sex hormones, recalling the secondary sexual characteristics they cause to develop;			
2.4.3	Describe the events of the menstrual cycle: menstruation, ovulation and the period when fertilisation is most likely to occur			
2.4.4	Explain some of the causes of infertility and developments in fertility treatment:			
	<ul style="list-style-type: none"> <li>the use of hormones to produce multiple ova;</li> </ul>			
	<ul style="list-style-type: none"> <li>in vitro fertilisation;</li> </ul>			
	<ul style="list-style-type: none"> <li>the transfer of several embryos into the uterus;</li> </ul>			
2.4.5	Understand some of the controversy associated with these techniques and their ethical implications			

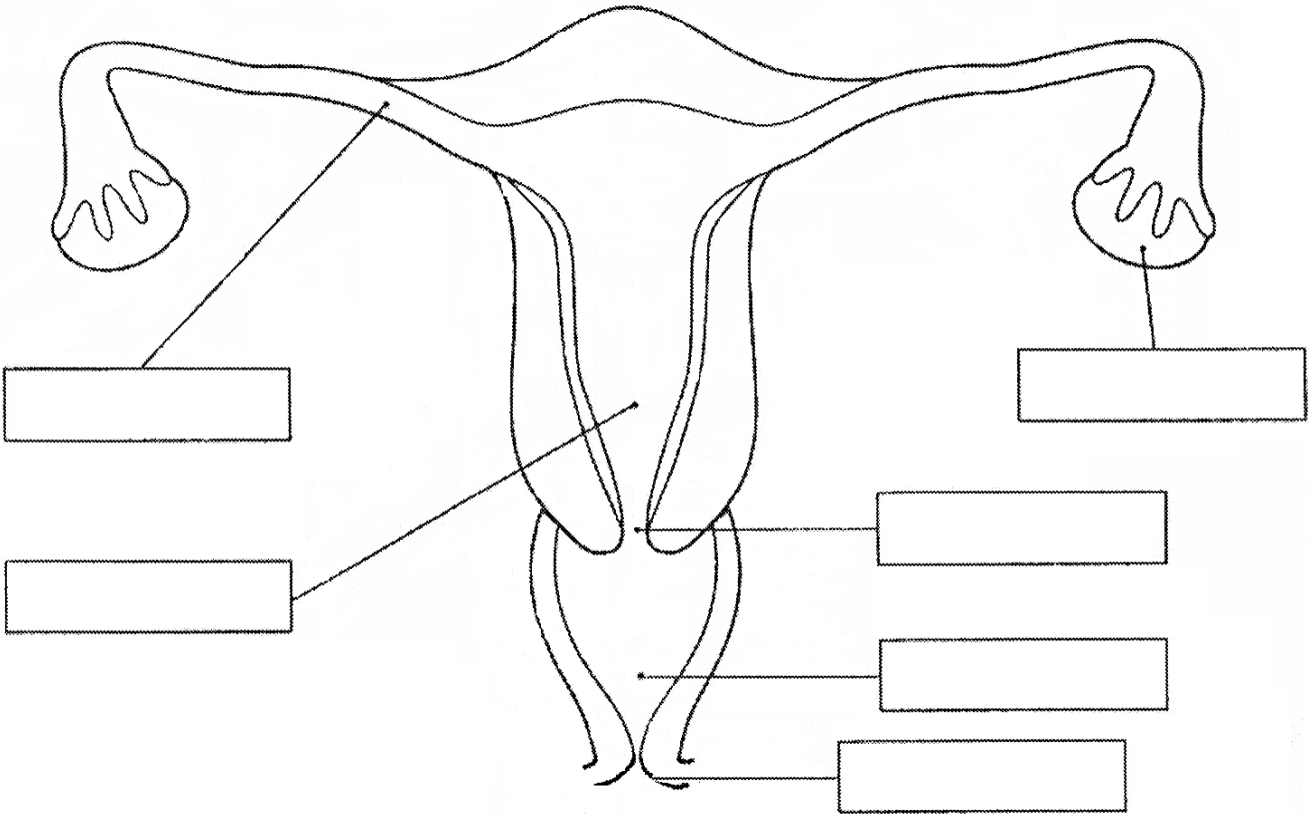
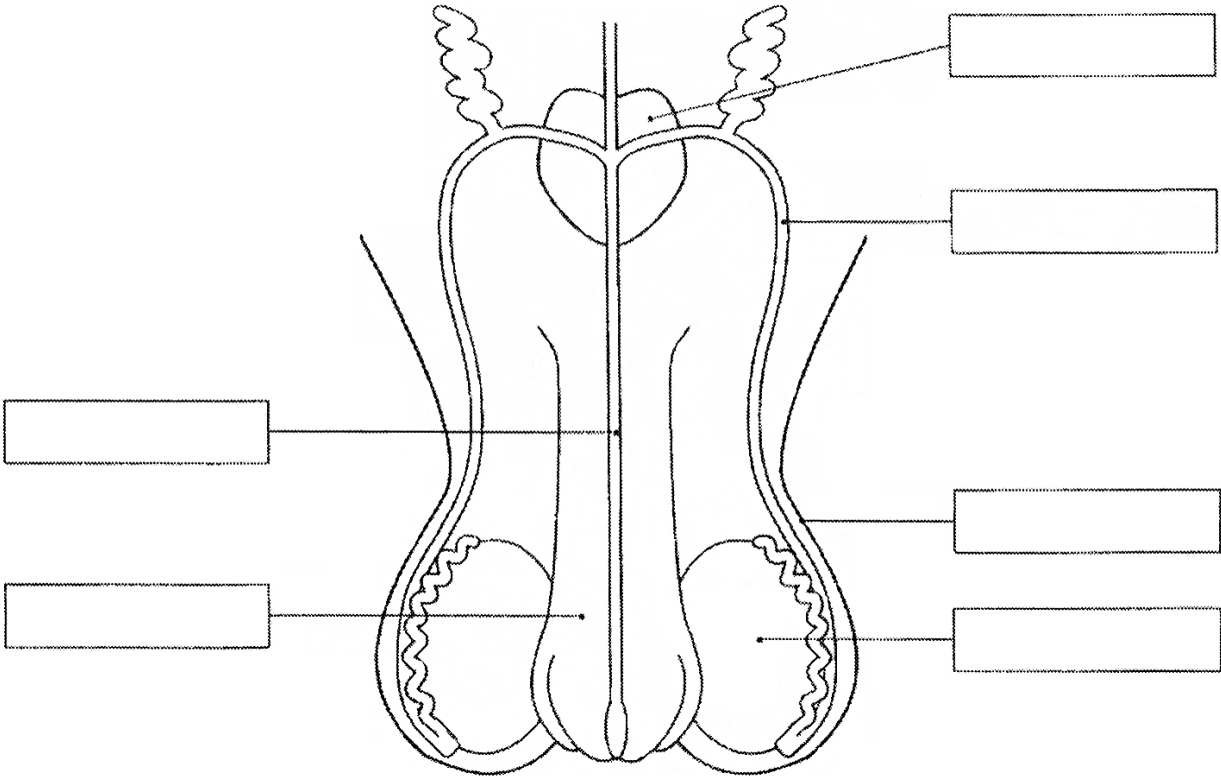
2.4.6	<p>Examine how different methods of contraception work and evaluate the advantages and disadvantages of each to include;</p> <ul style="list-style-type: none"> <li>• mechanical – the condom as a barrier to prevent the passage of sperm and also prevent the spread of sexually transmitted infections, some of which can lead to infertility if left untreated (gonorrhoea, Chlamydia and HIV leading to AIDS);</li> <li>• chemical - the contraceptive pill that changes hormone levels and stops the development of the ovum;</li> <li>• surgical – male and female sterilisation to prevent the passage of sperm and ova respectively</li> </ul>			
2.4.7	An awareness that contraception can cause ethical issues for some people.			

Terminology			

UNIT TEST RESULT:	%	GRADE:
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PUPIL COMMENT
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# MALE AND FEMALE REPRODUCTIVE SYSTEMS



# ADAPTATIONS OF SPERM CELLS

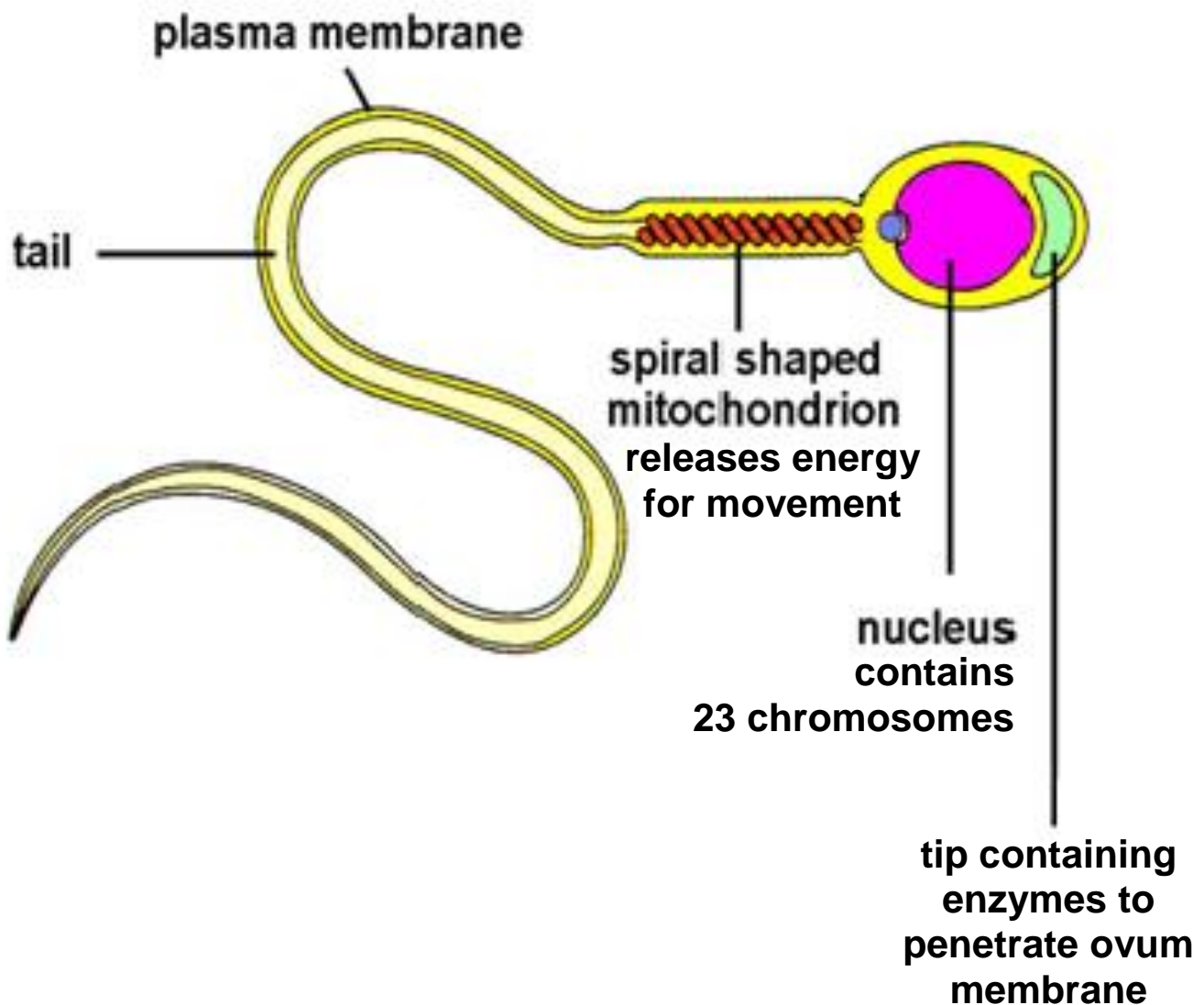
Sperm cells are the male sex cells or \_\_\_\_\_

They are \_\_\_\_\_ cells formed by \_\_\_\_\_

Sperm cells are \_\_\_\_\_. This means that their \_\_\_\_\_ contains \_\_\_\_\_

the total number of chromosomes, 23.

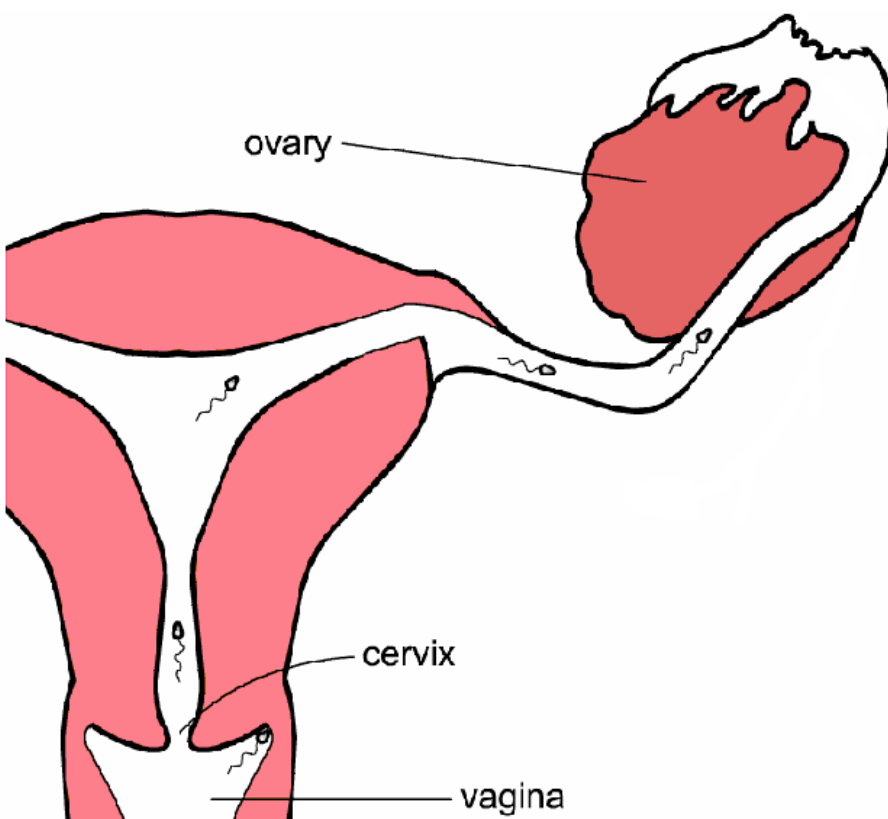
The hormone \_\_\_\_\_ causes cells in the testes to differentiate into sperm cells.



# FERTILISATION AND IMPLANTATION

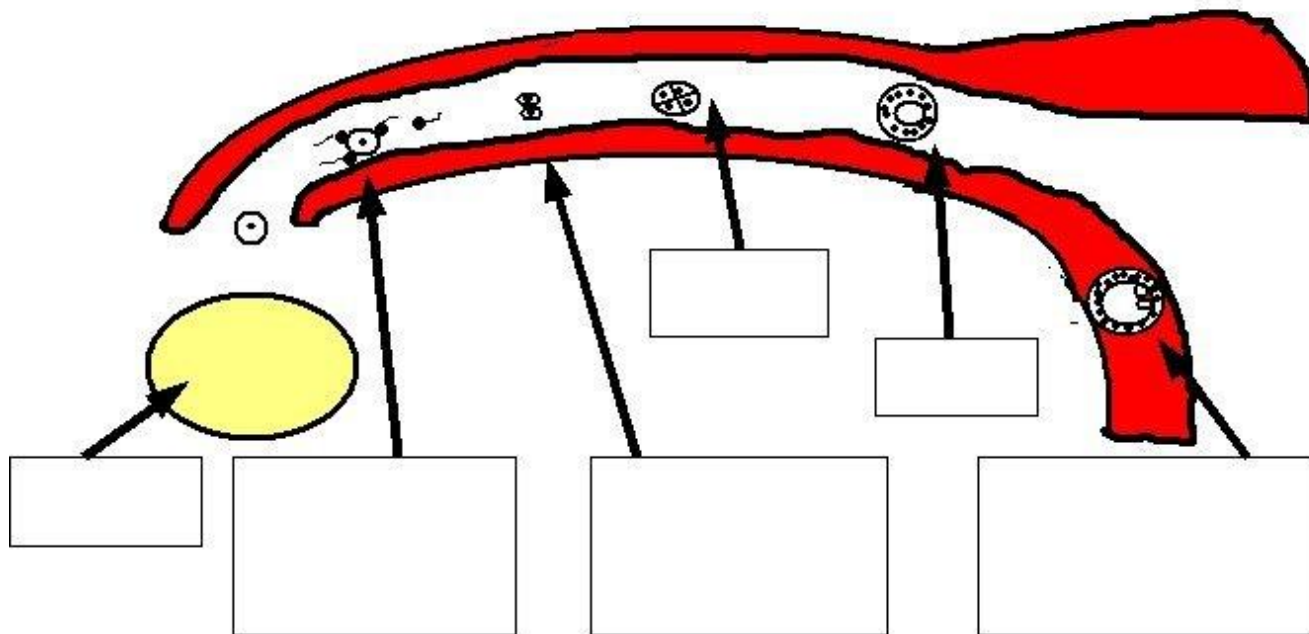
## OVULATION

## FERTILISATION

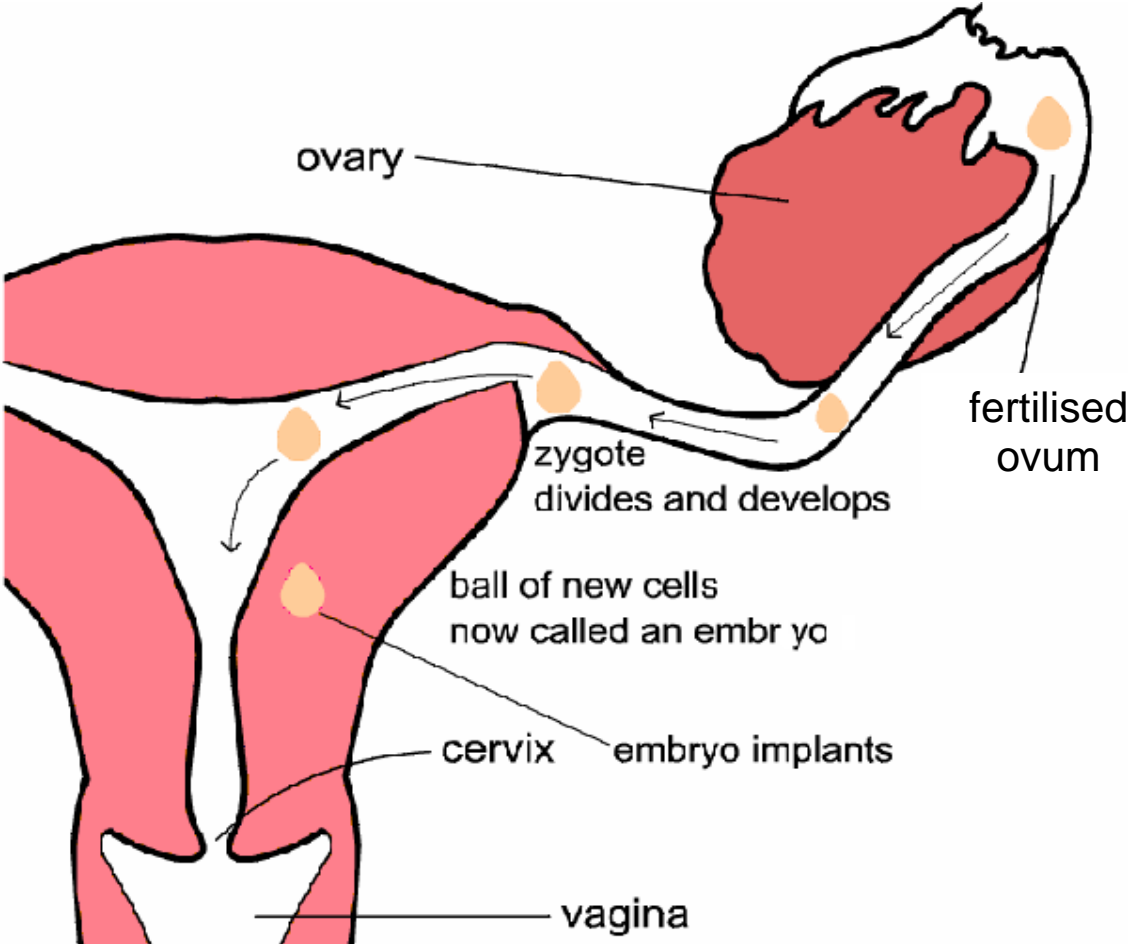


The fertilised cell formed is called a \_\_\_\_\_. The zygote is \_\_\_\_\_

The zygote divides by \_\_\_\_\_ to form a ball of cells as it travels down the oviduct to the uterus.

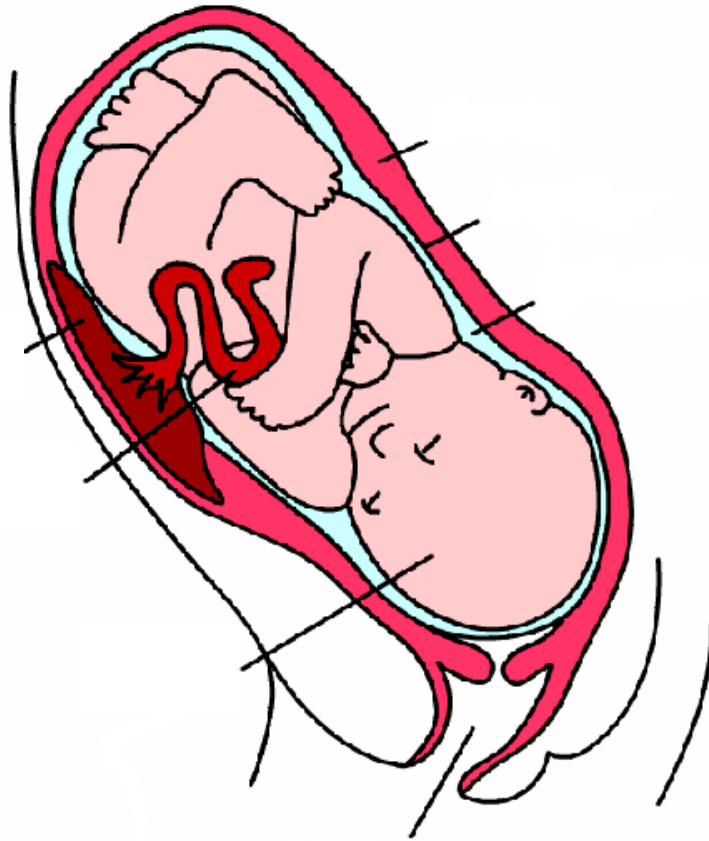


## IMPLANTATION





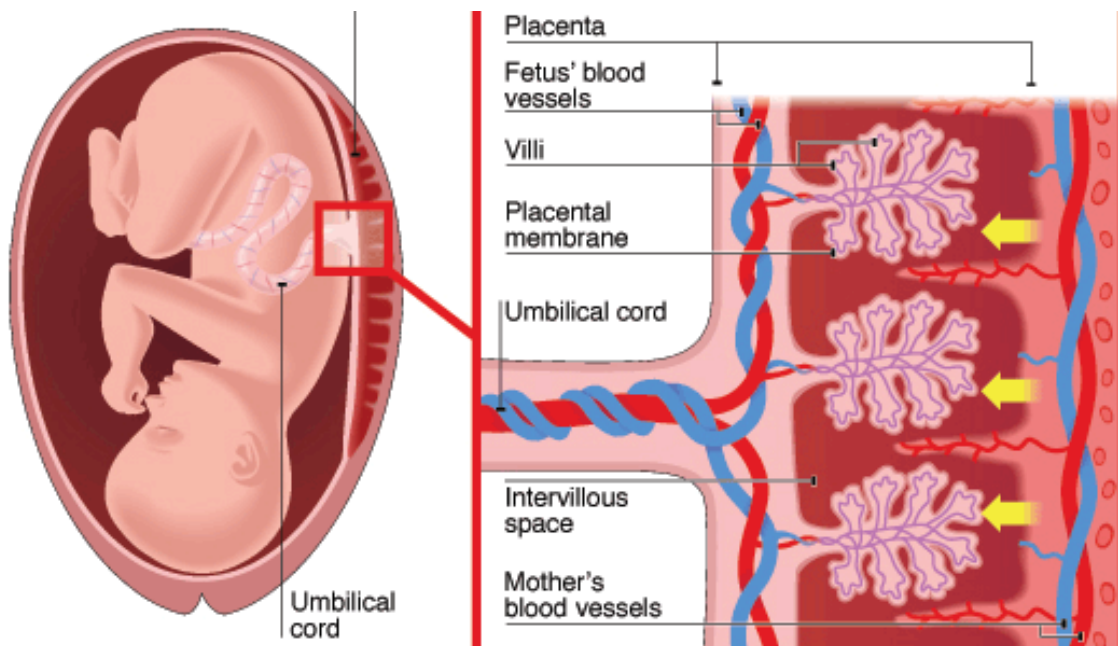
# DEVELOPMENT OF THE FOETUS



There are a number of special features which support the developing foetus.

## THE AMNION

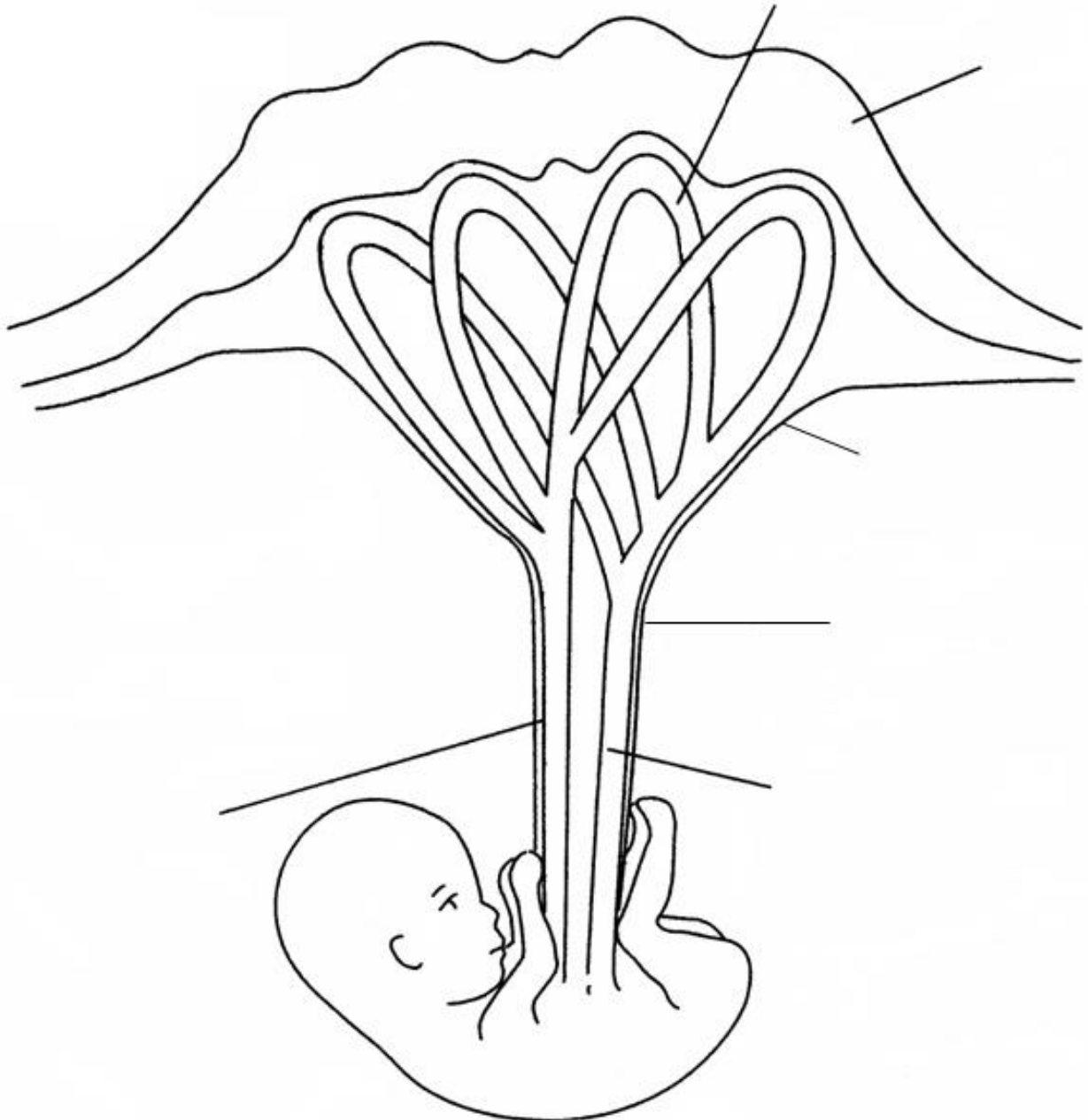
# THE PLACENTA



# Substances Exchanged across the placenta

The **Umbilical artery** carries blood rich in \_\_\_\_\_ and \_\_\_\_\_ from the embryo to the placenta.

The **Umbilical vein** carries blood rich in \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ from the placenta to the embryo.



# THE MENSTRUAL CYCLE

Use the words below to complete the paragraph. They may be used once, more than once or not at all.

uterus, pregnancy, cervix, fertilised ovum, 4-5, placenta,  
28, amnion, 14, oviduct, oestrogen, menstruation, 12, ovum,  
testes, hepatic portal vein

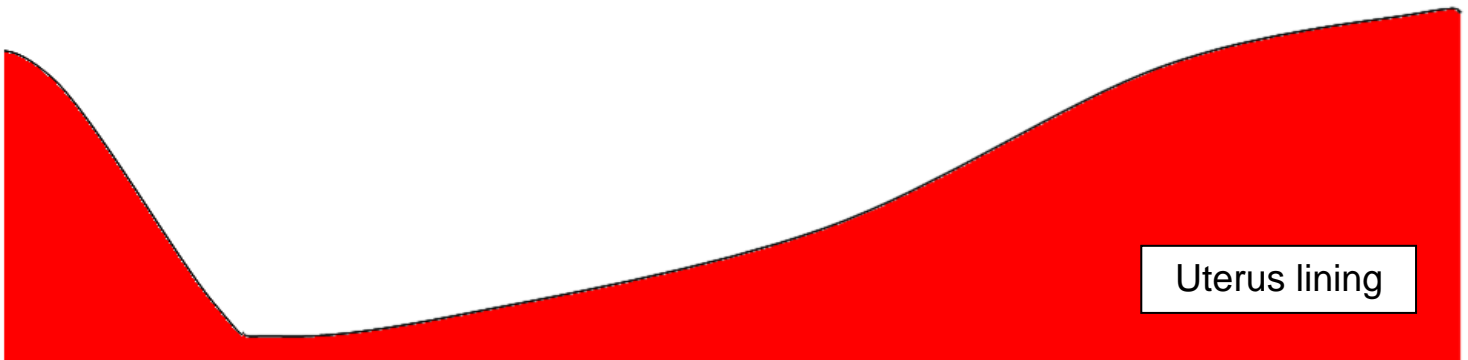
The menstrual cycle describes the changes that take place in a woman's body approximately every \_\_\_\_\_. The menstrual cycle prepares the woman's body for \_\_\_\_\_.

For the first \_\_\_\_\_ days of the cycle the thick spongy lining breaks down and passes out of the body along with the unfertilised ovum. This is called \_\_\_\_\_.



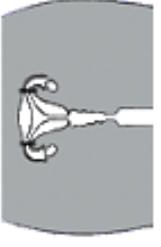

After menstruation the lining of the uterus is rebuilt and around day \_\_\_\_\_ ovulation occurs when an \_\_\_\_\_ is released.

The ovum travels along the \_\_\_\_\_ to the \_\_\_\_\_ Meanwhile the lining of the uterus continues to grow until day \_\_\_\_\_ in preparation for receiving a \_\_\_\_\_. If fertilisation does not occur the egg and lining pass out of the body and the cycle repeats.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
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# Contraception

	<p>Contraceptive Pill - combined</p> 	<p>Over 99% effective. Less than 1 in 100 women will get pregnant in a year.</p>	<p>Over 99% effective. Less than 1 in 100 women will get pregnant in a year.</p>	<p>98% effective in the first year of use. 2 in 100 women will get pregnant in a year. If not used according to instructions the chance of pregnancy is higher.</p>	<p>82% effective - 96% effective. Between 4 and 8 women will get pregnant in a year.</p>	<p>Diaphragm or cap</p> 	<p>Female sterilisation</p> 	<p>Male sterilisation</p> 
reliability							Over 99% effective. Failure rate about 1 in 1000.	Over 99% effective. Failure rate about 1 in 1000.
how it works	<p>Contains two hormones - oestrogen and progesterone, which stops a woman ovulating.</p>	<p>The hormone progesterone taken at the same time each day, causes changes that make it difficult for the sperm to enter the uterus or for the egg. In some women it prevents ovulation.</p>	<p>Made of very thin rubber, condoms are placed over the erect penis and act as a barrier, preventing passage of sperm into the woman's vagina.</p>	<p>A flexible rubber device used with spermicide, is put into the vagina to cover the cervix and must stay for at least 6 hours after intercourse.</p>	<p>A permanent method in which the oviducts are cut or blocked so eggs cannot travel down them to meet the sperm.</p>	<p>A permanent method in which the sperm tubes are cut so sperm are not present in the semen that is ejaculated.</p>		
advantages	<p>Often reduces bleeding, period pain and pre-menstrual tension. Protects against cancer of the ovary and uterus. Suitable for healthy non-smokers up to the menopause.</p>	<p>Useful for older women who smoke and women who cannot use the combined pill. Can be used when breastfeeding.</p>	<p>Condoms must be used before any sperm have been released and care should be taken after ejaculation to ensure no semen is spilled.</p>	<p>Can also prevent the spread of sexually transmitted infections some of which may lead to infertility if left untreated (Gonorrhoea, chlamydia and HIV leading to AIDs)</p>	<p>Permanent. Works immediately after the operation.</p>	<p>Permanent. Operation takes 10-15 minutes and can be done at a doctor's surgery or clinic.</p>		
disadvantages	<p>May not be suitable for some women and there may be temporary, minor side-effects. Not suitable for smokers or for women over 35 or who are breastfeeding.</p>	<p>May be temporary, minor side-effects. Periods may be irregular, with some bleeding in between, or be missed. May be less effective in women who weigh over 70kg (11 stone).</p>	<p>Some people are sensitive to spermicide. Fitting should be checked every 12 months and if more than 3kg of weight are gained or lost or if the woman has a baby, mis carriage or abortion. Must not be left in place for more than 30 hours.</p>	<p>Must be specially fitted to ensure it is the correct size. Cystitis can be a problem for some users.</p>	<p>Rarely the tubes rejoin and the woman is fertile again.</p>	<p>It usually takes a few months for all the sperm to disappear from the semen. Contraception must be used during this time until there are two negative sperm tests. Rarely the tubes rejoin and the man is fertile again.</p>		
comments	<p>Not reliable if taken over 12 hours late or after vomiting or diarrhoea. Some drugs may stop the pill working.</p>	<p>Not reliable if taken over 3 hours late, or after vomiting or severe diarrhoea, unless an extra method is used. Some drugs may stop the pill working.</p>	<p>A new condom must be used each time and the expiry date should be checked. Oil based products should not be used with condoms as they can damage them.</p>	<p>Some people are sensitive to spermicide. Fitting should be checked every 12 months and if more than 3kg of weight are gained or lost or if the woman has a baby, mis carriage or abortion. Must not be left in place for more than 30 hours.</p>	<p>This is a permanent method and should not be chosen if in any doubt. Counselling is important. Time in hospital varies from 1 to 3 days depending on the type of operation. A few days rest are needed afterwards.</p>	<p>This is a permanent method and should not be chosen if in any doubt. Counselling is important. Likely to be bruising and some discomfort for a short time after the operation. A few days rest needed afterwards.</p>		

### **Mechanical method**

The condom is a barrier to prevent the passage of sperm and also prevent the spread of sexually transmitted infections, some of which can lead to infertility if left untreated (gonorrhoea, Chlamydia and HIV leading to AIDS);

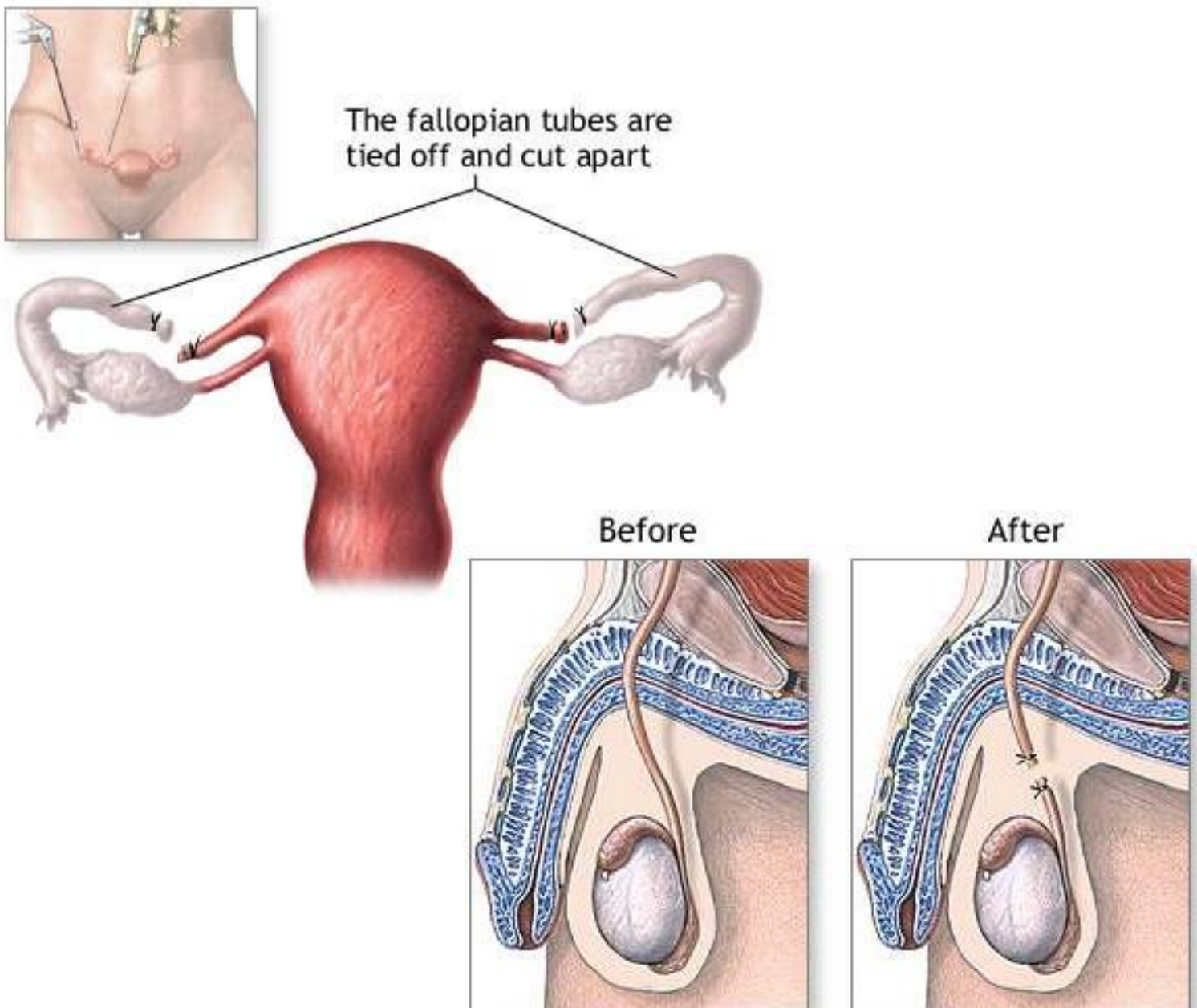
### **Chemical method**

The contraceptive pill changes hormone levels and stops the development of the ovum;

### **Surgical methods**

Male and female sterilisation prevents the passage of sperm and ova respectively

- This is a permanent method of contraception, used mainly by couples who have decided they do not want more children.
- Cutting the oviduct prevents sperm reaching the ovum.
- Cutting the sperm duct prevents sperm entering the semen (a vasectomy).
- Blocking the path of eggs and sperm prevents fertilisation.



# PUBERTY

Puberty occurs between the ages of about twelve and fourteen. A hormone released from the brain causes the testes and ovaries to release sperm and ova. They also produce sex hormones (**testosterone** in the **testes** and **oestrogen** in the **ovaries**) which bring about changes to the body associated with puberty. These changes are called **secondary sexual characteristics**.

Characteristic	Males	Females
Sex hormone- testosterone		
Sex hormone - oestrogen		
Growth spurt		
Body hair – arm pits and pubic regions		
Facial hair		
Breasts form		
Voices deepens		
Menstruation		
Hips widen		
Growth of penis and testes		

# INFERTILITY

Read the handout and answer the questions below.

Infertility prevents couples from conceiving and starting a family.  
What are the FOUR reasons which cause female infertility?

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

How does smoking and excessive alcohol intake affect fertility in men?

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How do the testes maintain the optimum temperature of 1°C below body temperature for sperm production?

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## **Fertility Drugs**

Why are women given fertility drugs and what problems can they cause?

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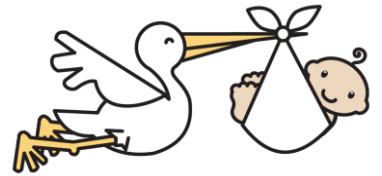
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## In Vitro Fertilisation

IVF is the fertilisation of an egg by a sperm **OUTSIDE THE BODY**.

② Draw a flow diagram to show the stages involved in IVF.



② Why are there problems if many eggs are fertilised?