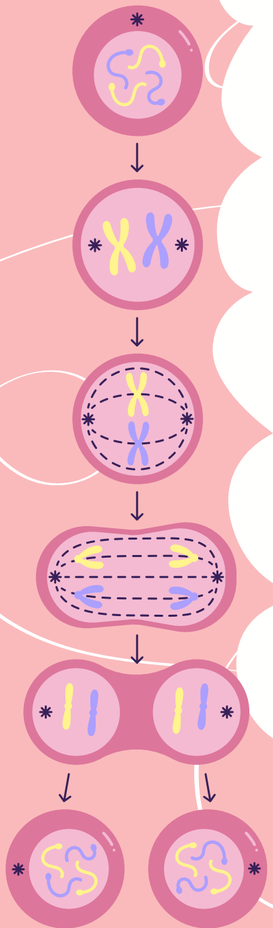
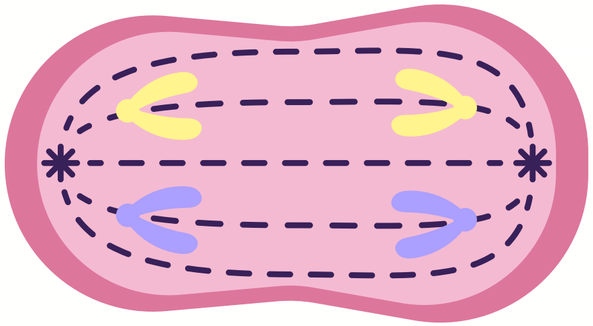


GRADE – 9 EOT–3 BIOLOGY



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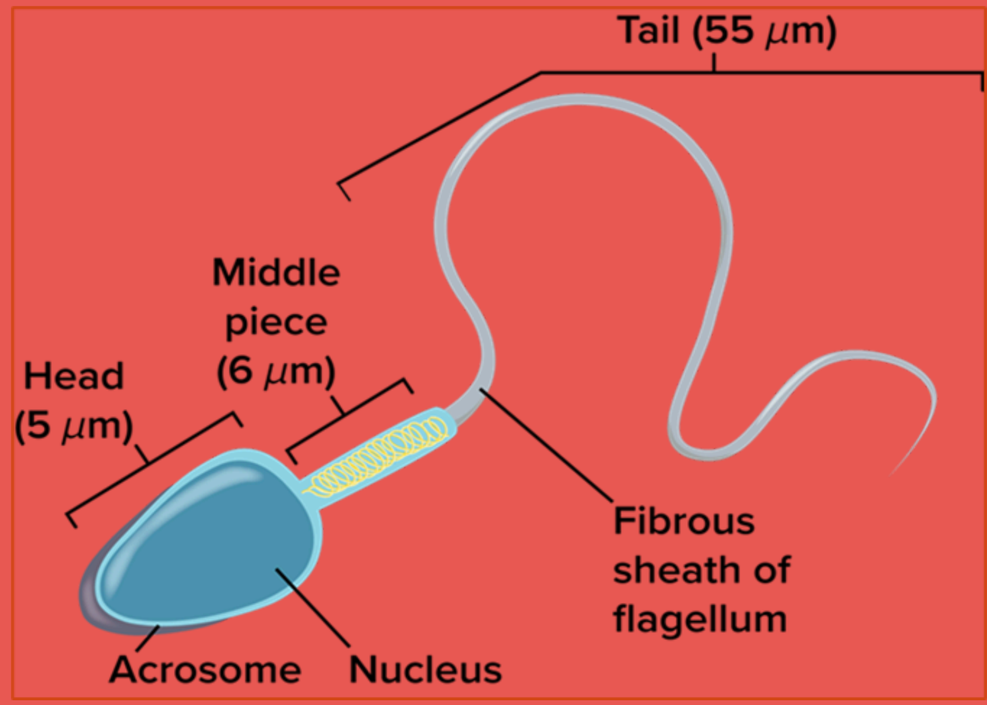
https://t.me/grade9ADV27

1	Explain the structure and function of the male and female human reproductive systems		209

Male reproductive cells are called **sperm.**

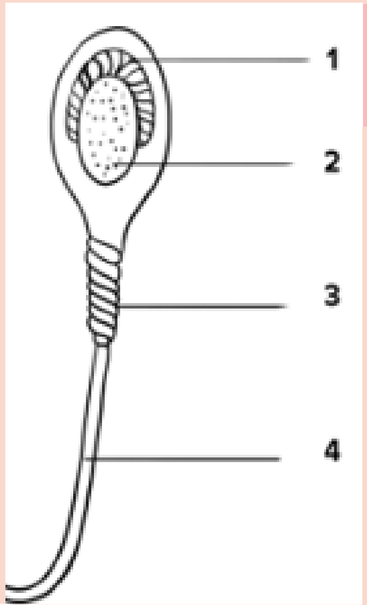
Sperms develop in seminiferous tubules of the testes. These tubules produce 100–200 million sperm each day.



SEMEN is a nourishing fluid for the survival of sperm.
It contains sperm, the nourishment, and other fluids from the male reproductive glands

Which number in the sperm structure represents the nucleus?

1
2
3
4



How many chromosomes are there in the human sperm nucleus?

A	15
B	30
C	**23**
D	46

In which part of the sperm cell is mitochondria found?

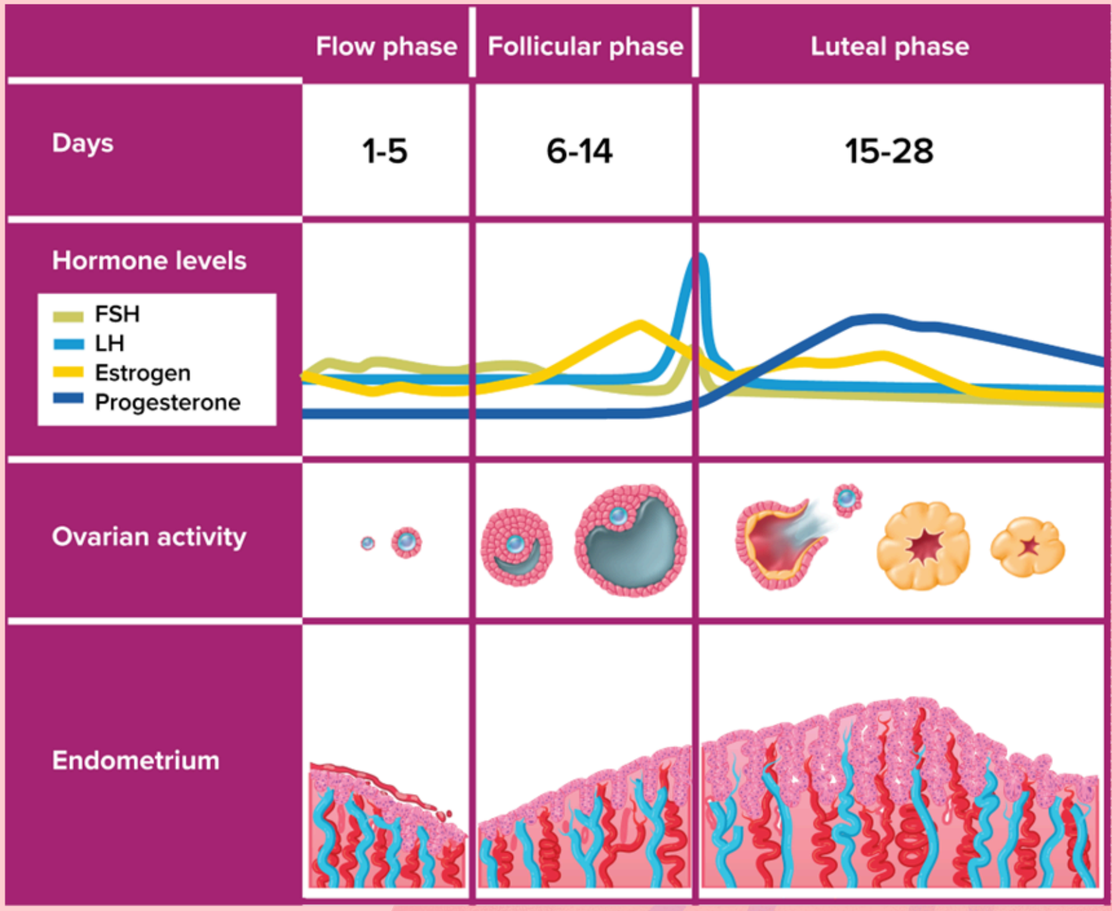
A	head
B	**midpiece**
C	tail
D	acrosome

2	Explain how reproductive hormones act in human feedback mechanisms to maintain homeostasis	Table1	212

- **Day 1 – beginning of menstrual flow- Shedding of blood, tissue fluid, mucus, epithelial cells tear from the endometrium**
- **Bleeding occurs due to tearing of the endometrium and rupturing of blood vessels.**
- **Day 5 – Repair of the endometrial lining, cycle continues**

2. Follicular Phase

- **Changes in ovaries occur**
- **Low estrogen level at the beginning of the cycle and increased level of FSH and LH which stimulates maturation of a few follicle cells**
- **Developing follicle cells produce estrogen and less progesterone which keep FSH and LH levels low (negative feedback). Only one follicle-containing egg matured fully.**
- **Day- 14- high amount of LH release by anterior pituitary – LH surge- cause the rupture of follicle and OVULATION occurs.**



What triggers a new menstrual cycle and the beginning of menstrual flow?

A. a decline in progesterone
B. a decrease in LH production
C. formation of the corpus luteum
D. thickening of the endometrium

4. In which phase of the menstrual cycle are progesterone levels the highest?

A luteal phase
CORRECT
follicular phase
flow phase
fertilization

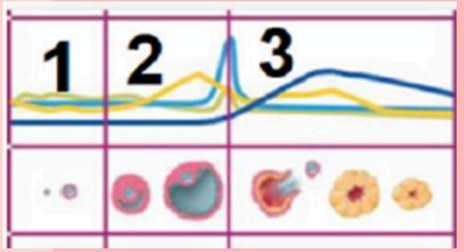
Q: What is occurring during the flow phase of the menstrual cycle?

The amniotic sac is torn
A morula is formed in the uterus
Fertilization occurs near the ovary
Blood vessels ruptured from the endometrium

What prevents the menstrual cycle from continuing once an egg has been fertilized?

A. Progesterone levels remain high.
B. Estrogen levels decrease.
C. The corpus luteum degenerates.
D. Blood supply to the endometrium decreases.

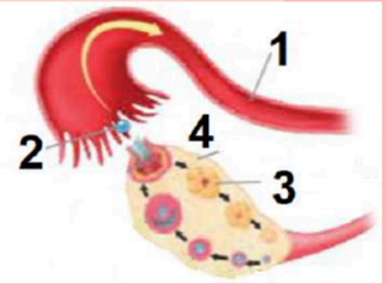
How many days does stage 1 takes?
1-3
1-5
6-4
15-28



Q. What is the name of the hormone that causes the follicle to rupture and? ovulation occurs?

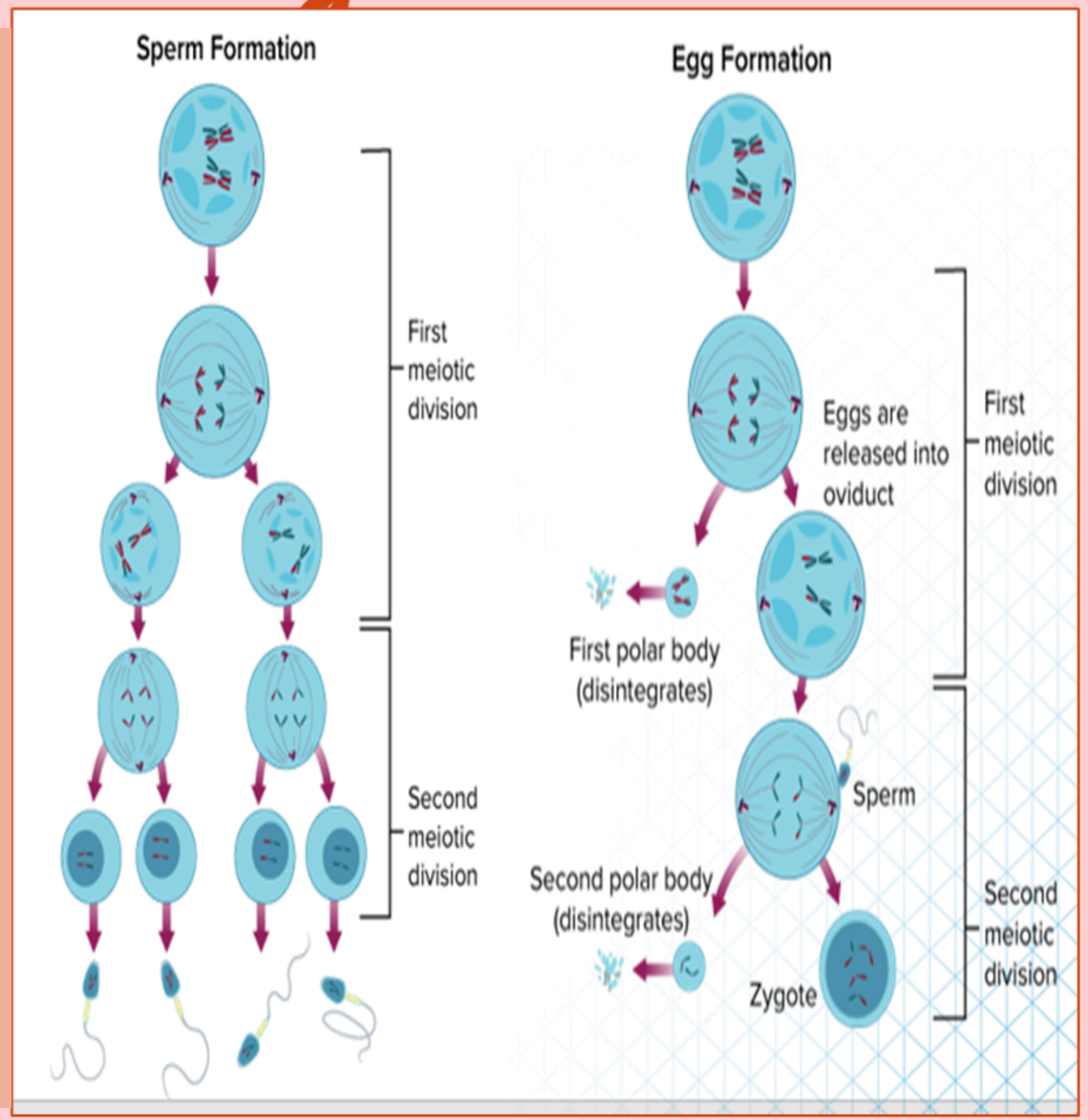
LH
FSH
Estrogen
Progesterone

Which number in the picture represents the ovary?
1
2
3
4



3	Explain the structure and function of the male and female human reproductive systems	Figure5	211

- Through **meiosis**, cells in the testes or ovaries give rise to sex cells called **gametes.**
- Male gametes are *sperm*, produced by **spermatocytes.**
- Sperm is produced daily when puberty starts and continues throughout his life.
- **After meiosis, 4 sperms are produced.**



- Female born with eggs, genetic material (DNA) starts replication in **oocytes**, and there is a stop in the meiotic division.
- **Menstrual Cycle** – meiosis continues for a single oocyte.

- **1st Division** – 2 structures, 1 big and 1 small – **Polar body**
- (it disintegrates)
- **2nd Division** – egg started the second meiotic division, but stops at a moment and Ovulation happens during the menstrual cycle.
- Second division completes only if there is fertilization and as a result Zygote and second polar body form (disintegrates).

- **Two meiotic divisions give only one egg.**

Which of the following is not happening in male sex cell formation

A One cell gives rise to one sex cell called a gamete

B Sperm are produced in the testes

C Produced daily beginning at puberty and continuing throughout a lifetime

D One cell gives rise to four sex cells called gametes

13 Prior to puberty, the development of eggs is stopped at which phase of meiosis?

A first meiotic division

B second meiotic division

C when polar bodies form

D when a zygote forms

15) Categorize the following descriptions as either *male sex cell production* or *female sex cell production*. NOTE: Some descriptions may be used in both male and female sex cell production.

Male sex cell production	Female sex cell production

Correct Answer

Male sex cell production

- One cell gives rise to four sex cells called gametes
- Sperm are produced in the testes
- Produced daily beginning at puberty and continuing throughout a lifetime

Female sex cell production

- One cell gives rise to four sex cells called gametes
- Eggs are produced in the ovaries
- One mature cell every 28 days
- Release of cells occurs during reproductive years
- Unequal portion of cytoplasm between two cells causes disintegration of one

Q. Which would result in the conception of more twins, triplets, and quadruplets?

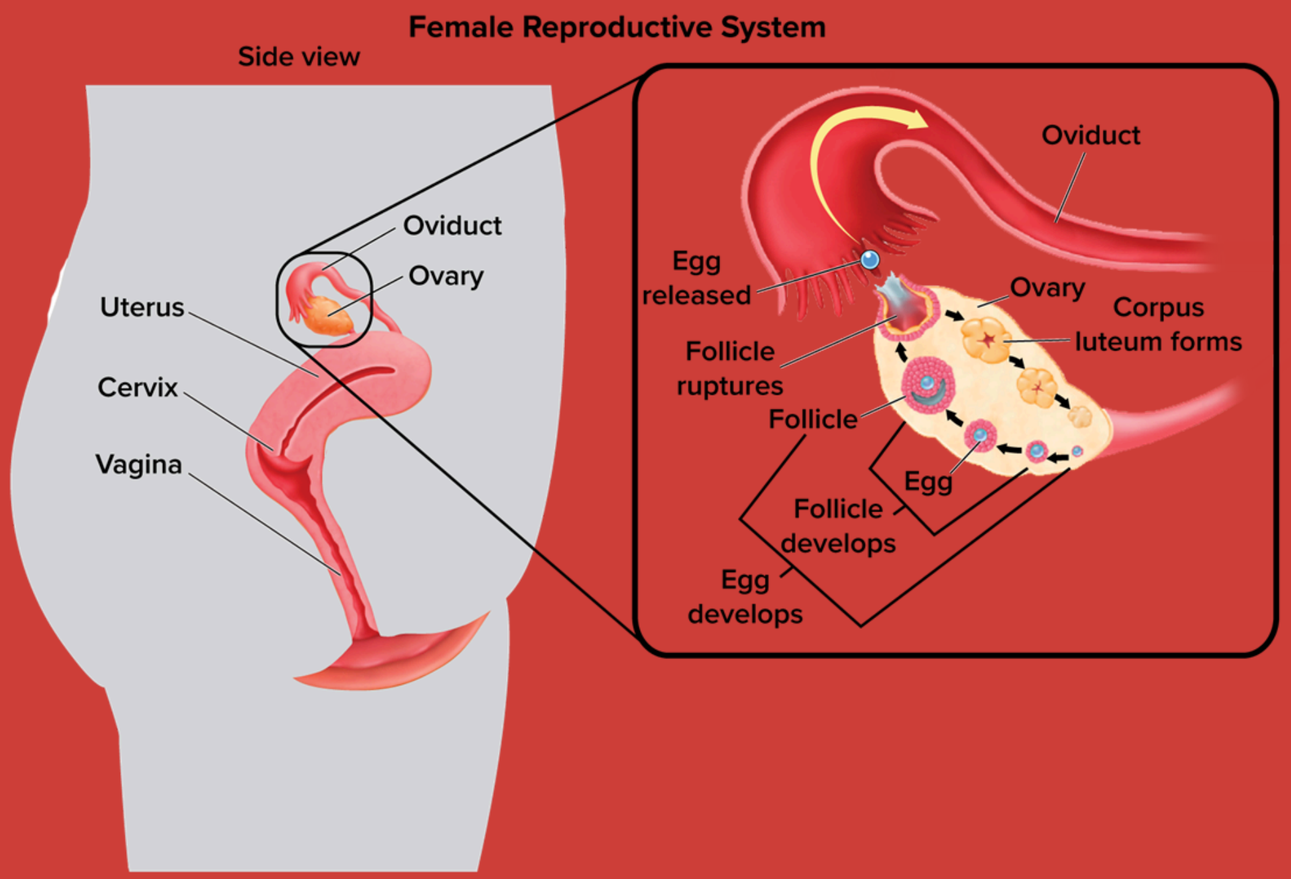
- increased production of sperm cells through testosterone supplements
- suppression of the negative feedback for the hormones FSH and LH
- formation of polar bodies during the follicular phase of menstruation
- a yield of four egg cells after two meiotic divisions of the oocyte

Q: What results from the first meiotic division of oocyte?

- sperm formation
- Ovulation
- development of a zygote
- development of a polar body

17) Immature eggs that develop into an ovum are called _oocytes_.

4	Explain the structure and function of the male and female human reproductive systems	Figure4	210



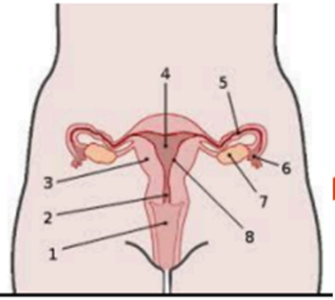
OVIDUCT – the tube which connects the ovary to the uterus through which the egg travel. It is the site of **fertilization.**

OVARY - Site of production of **egg cell/ovum**

UTERUS/WOMB – an area of fetus development

CERVIX – the lower end of the uterus

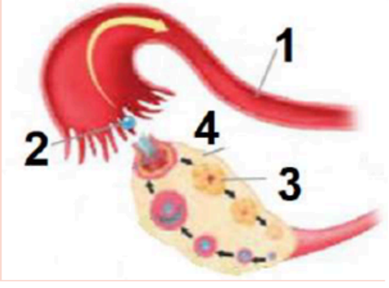
VAGINA - last part which leads to the outside of the female body

Q3.	Identify the structure labelled number 5. 
a.	cervix
b.	uterus
c.	fallopian tube
d.	ovary

	Identify the structure labelled number 1.
a.	cervix
b.	vagina
c.	fallopian tube
d.	ovary

Which number in the picture represents the ovary?

1
2
3
4



Q2.	A fertilized egg develops in the _____.
a.	cervix
b.	uterus
c.	vagina
d.	ovary

	Identify the structure labelled number 2.
a.	cervix
b.	uterus
c.	fallopian tube
d.	ovary

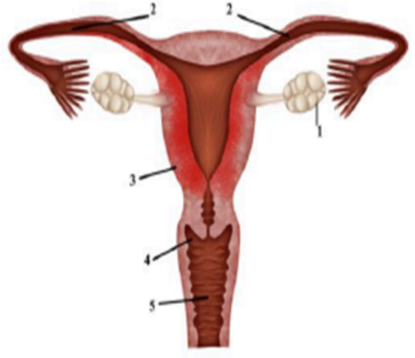
3. Which two steroid hormones are produced by the ovaries?

- testosterone and FSH
- estrogen and LH
- B estrogen and progesterone — CORRECT
- progesterone and FSH

46) Fertilization occurs in the upper portion of the oviduct.

The figure below illustrates the female reproduction system. Which of the following numbers represents the ovary?

1
2
3
4



10) Fill in the blanks using the available answer choices.

Match the following descriptions to the correct structure of the female reproductive system.

Description	Structure
Location of baby development before birth	
Female reproductive glands	
A tube that connects the ovary to the uterus	
The lower end of the uterus	
Leads to the outside of the female body	(Blank 5)
A mature egg released from the ovary about once every 28 days	(Blank 6)
Immature egg cells	(Blank 7)

Correct Answer

uterus
ovaries
oviduct
cervix
vagina
ovum

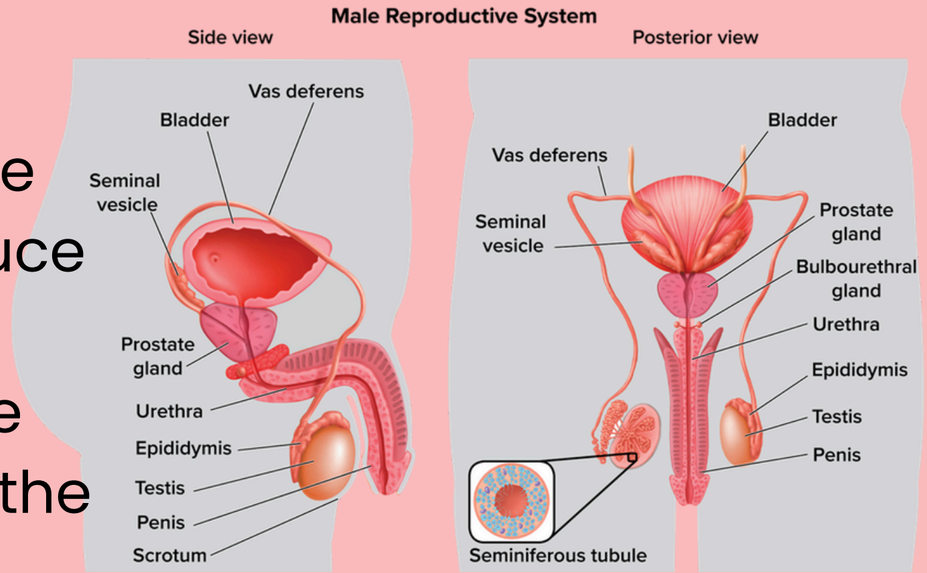
5	Explain the structure and function of the male and female human reproductive systems	Figure1	208

SEMINAL VESICLES contribute over half of the semen
It secretes sugar (provides energy), other nutrients, proteins, and enzymes for the sperm.

VAS DEFERENS- a duct leading away from the testis through which sperm travel

EPIDIDYMIS- a structure located on top of each testis.
Maturation and storage of sperm.

Male reproductive glands are called the TESTES, which produce sperm.
They are located outside the body cavity in a pouch called the SCROTUM.



URETHRA- the tube that carries both semen and urine outside of the body through the penis.
The two Vas deferens join together and enter the urethra.

Q13.	Why is the scrotum held outside the body?
a.	to keep the testis cool
b.	to keep the testis warm
c.	for protection
d.	all of the above

58) Sperm develop in the testes in the ___.

- epididymis
- seminiferous tubule
- urethra
- vas deferens

38) Sperm cells are stored in the ___.

- vas deferens
- epididymis
- seminiferous tubules
- testes

1. What would happen if the testes were located inside the body cavity?

A Sperm would not be produced because it is too warm inside the body. **CORRECT**

Testosterone levels would increase because of the warm temperature.

The seminal vesicles would no longer be needed.

Hormones from the testes would have difficulty entering the bloodstream.

6) Fill in the blanks using the available answer choices.

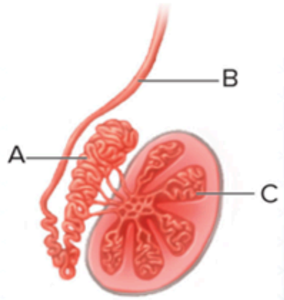
Match the following descriptions to the correct structure of the male reproductive system.

Description	Structure
Pouch that keeps sperm cells in a cooler environment	
Male reproductive glands	
100-200 million sperm are produced each day	
A tube through the penis	
Storage location for mature sperm	
A duct leading away from the testis	
Substance in which sperm can travel, provide an energy source, and an alkaline solution to neutralize acidic conditions	

Correct Answer

scrotum
testes
seminiferous tubules
urethra
epididymis
vas deferens
semen

2. What occurs in the structure labeled C?



sperm cell storage and maturation

secretion of sugar

B sperm cell production
CORRECT

production of FSH

67) A duct through which sperm move away from the testis and toward the urethra is called the epididymis.

- ○ True
- ○ False

56) The tube that carries both semen and urine outside the body through the penis is called the __.

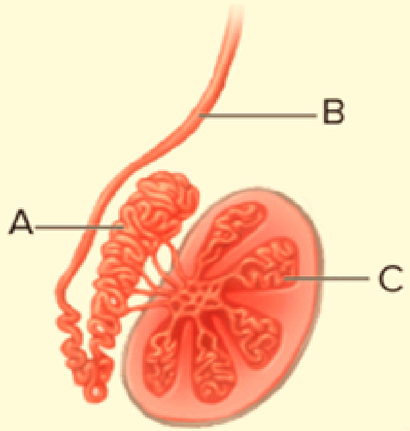
- ○ urethra
- ○ epididymis
- ○ vas deferens
- ○ seminiferous tubule

44) Temperature regulation of newly produced sperm cells is achieved in the __: scrotum .

❷ Through which do sperm travel after leaving the testes?

- **A** vas deferens
- **B** urethra
- **C** epididymis
- **D** seminal vesicles

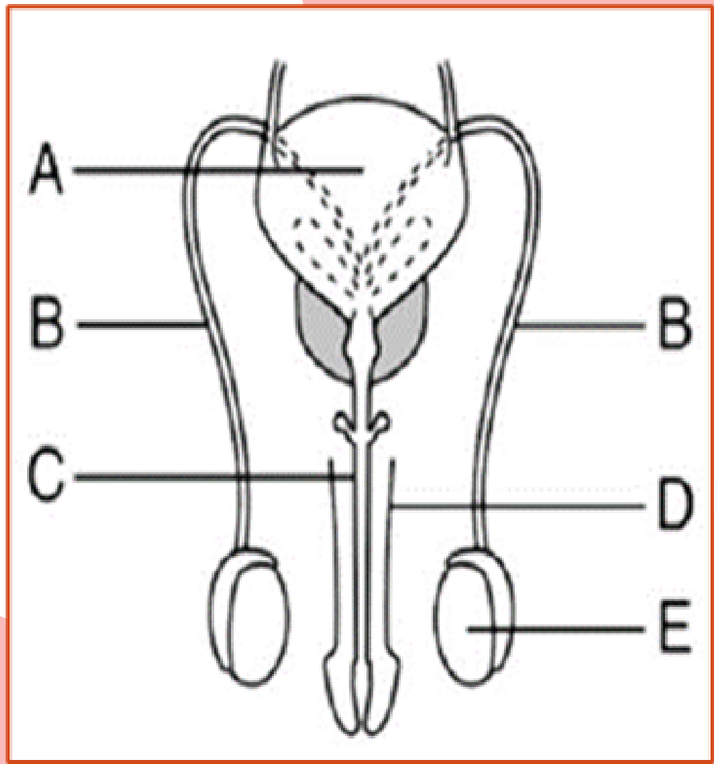
5. What is the function of the structure labeled A in the illustration?



- A sperm cell storage and maturation CORRECT
- ~~secretion of sugar~~
- ~~sperm cell production~~
- ~~production of FSH~~

The figure below illustrates the male reproduction system. Which of the following letters represents the vas deferens?

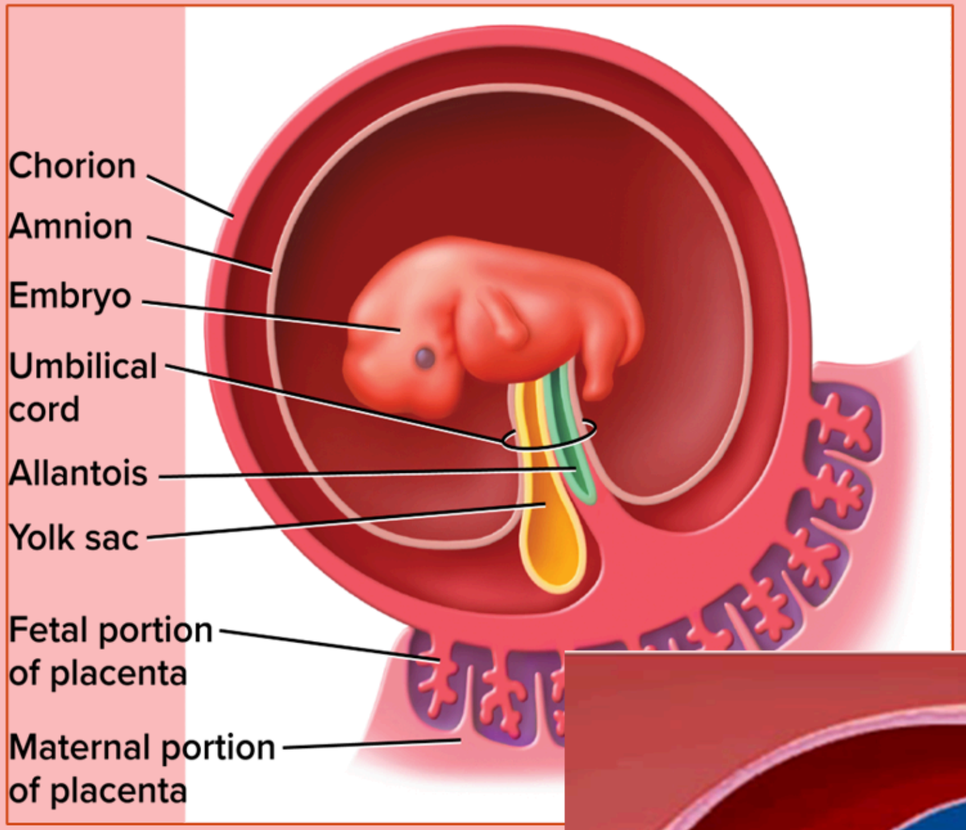
A	A
B	B
C	C
D	D

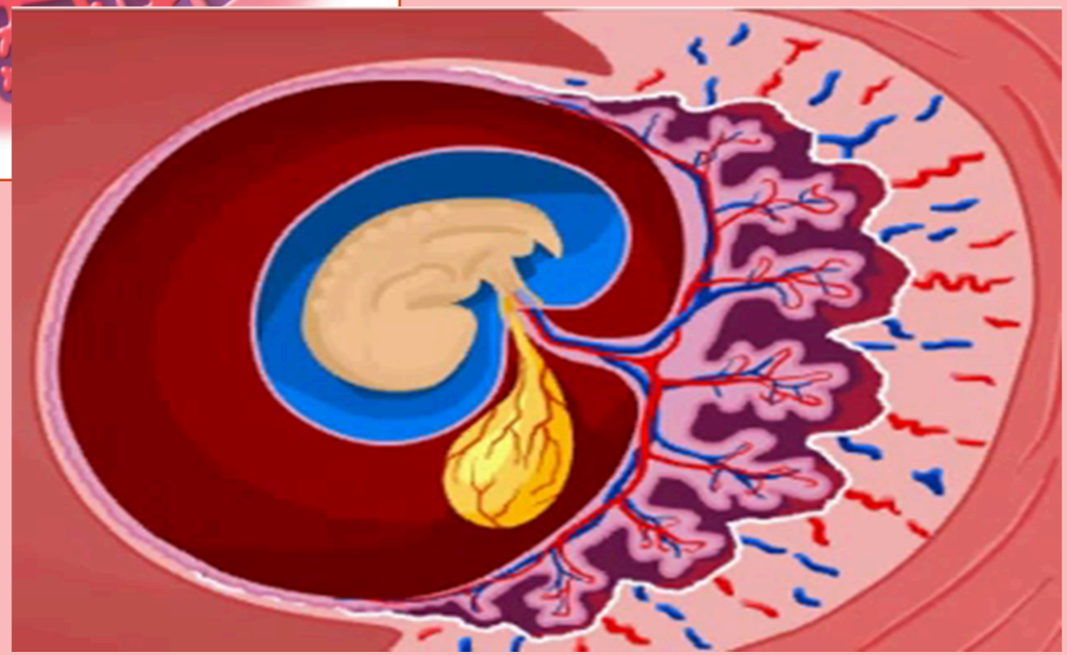


AMNION is a thin layer of the sac around the embryo. It is filled with **AMNIOTIC FLUID,** which protects, cushions, and insulates the embryo

CHORION is seen outside the amnion. Chorion and **ALLANTOIS** contribute to the formation of the placenta

The **YOLK SAC** in humans does not contain any yolk but serves as the first site of red blood cell formation for the embryo

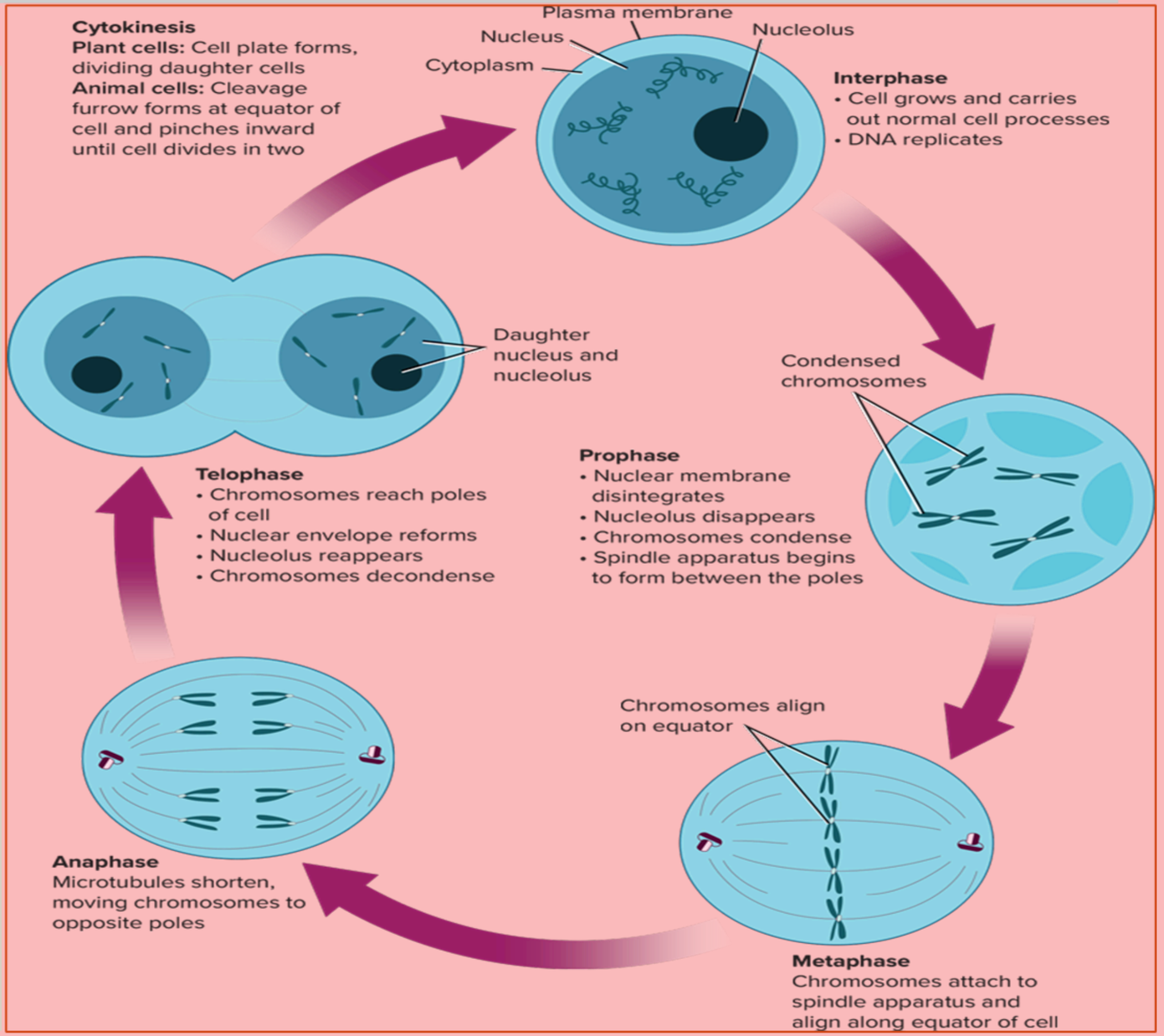




7	amine specimens under a microscope or similar instrument to identify the various stages of mitosis in plants and anima	Figure6	237

Mitosis

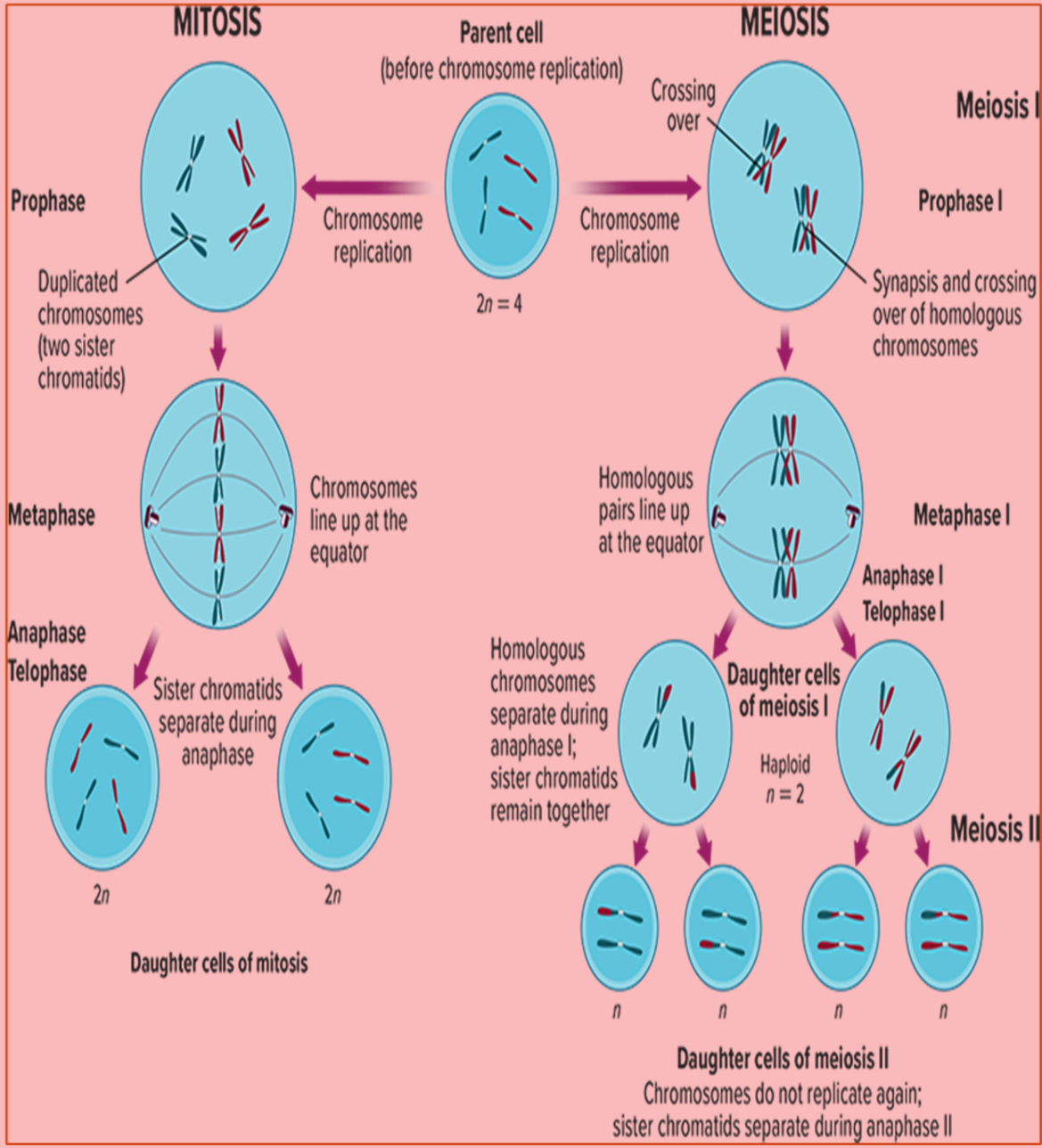
- The stage of the cell cycle during which the cell's nucleus and nuclear material divide is called mitosis.
- The cell's replicated genetic material separates, and the cell prepares to split into two.
- In multicellular organisms, ***mitosis increases the number of cells in young, growing organisms.***
- Organisms also use mitosis to ***replace damaged cells.***
- Mitosis also helps ***maintain chromosome number*** in organisms that undergo asexual reproduction

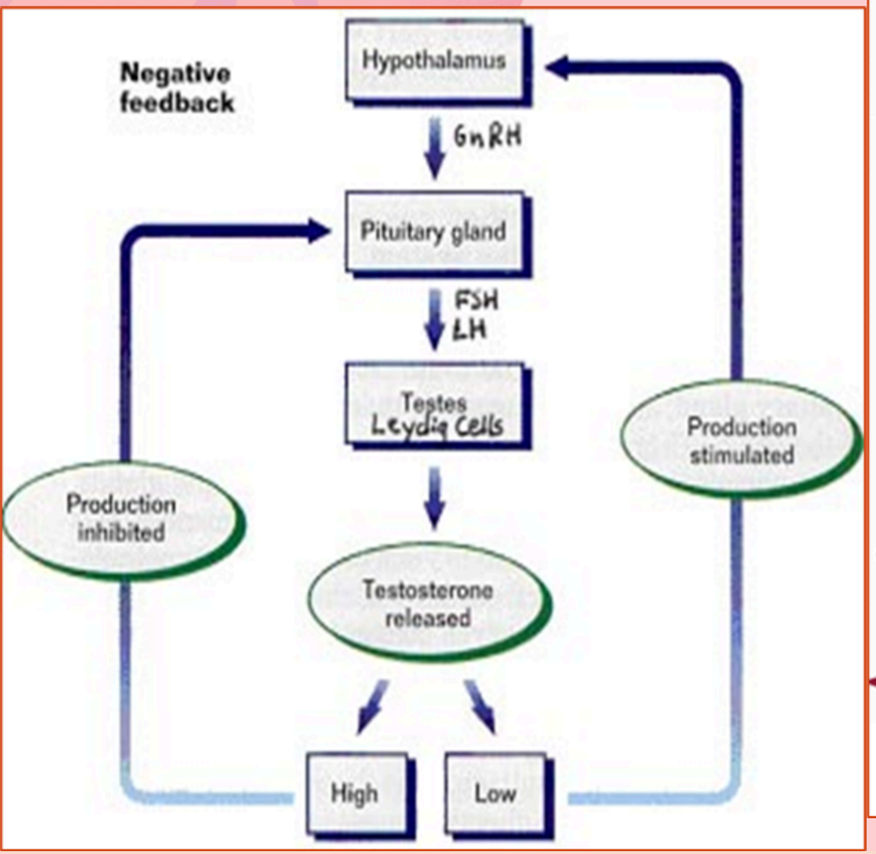


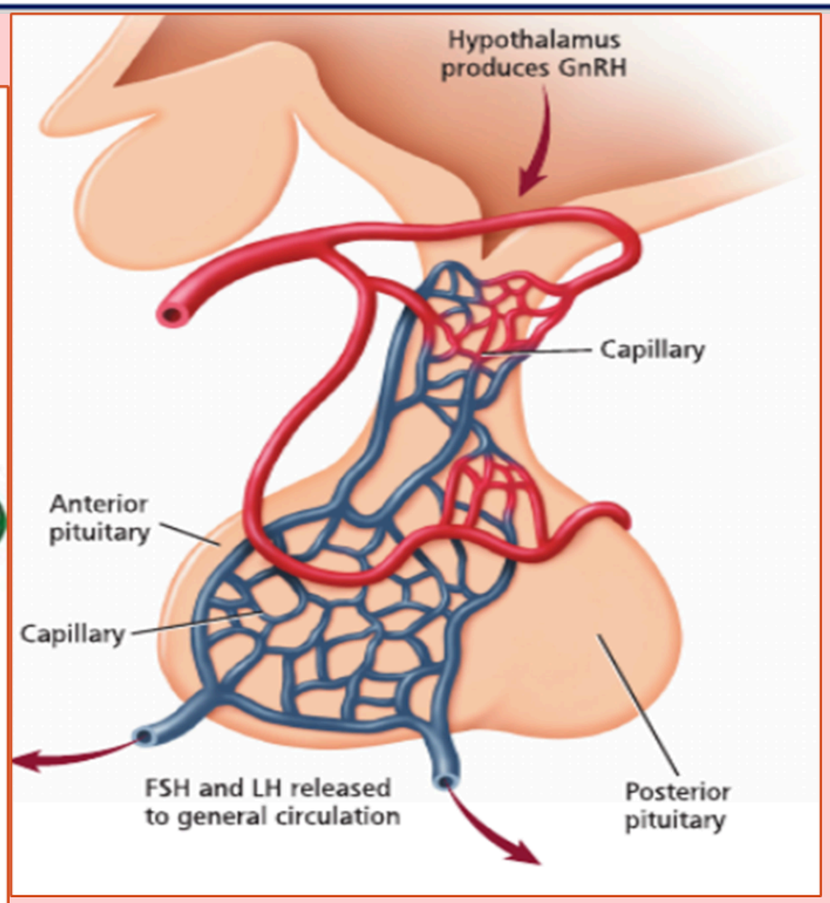
8	Compaire between mitosis and meiosis	Table1	249

Table 1 Mitosis and Meiosis

Mitosis	Meiosis
One division occurs during mitosis.	Two sets of divisions occur during meiosis: meiosis I and meiosis II.
DNA replication occurs during interphase.	DNA replication occurs once before meiosis I.
Synapsis of homologous chromosomes does not occur.	Synapsis of homologous chromosomes occurs during prophase I.
Two identical cells are formed per cell cycle.	Four haploid cells (*n*) are formed per cell cycle.
The daughter cells are genetically identical.	The daughter cells are not genetically identical because of crossing over.
Mitosis occurs only in body cells.	Meiosis occurs only in reproductive cells.
Mitosis is involved in growth and repair.	Meiosis is involved in the production of gametes and providing genetic variation in organisms.







- The **negative feedback system** starts with the hypothalamus.
- Increased levels of testosterone in the blood are detected by cells in the hypothalamus and anterior pituitary, and the production of LH and FSH is decreased.
- When testosterone levels in the blood drop, the body responds by making more LH and FSH.

- **Hypothalamus produces *gonadotropin-releasing hormone (GnRH)*, which acts on the anterior pituitary gland.**
- **GnRH increases the production of *follicle-stimulating hormone (FSH) and luteinizing hormone (LH).***
- **Both FSH and LH travel from the anterior pituitary gland through the bloodstream and to the testes.**
- **In the testes, FSH promotes the production of sperm and LH stimulates the *production and secretion of testosterone*.**

4) Which is a result of the hormone testosterone?

- female pregnancy
- female menstrual cycle
- male sperm production
- male temperature control

Q. What is the results of the FSH hormone?

Prevent ovulation

Cell cycle control

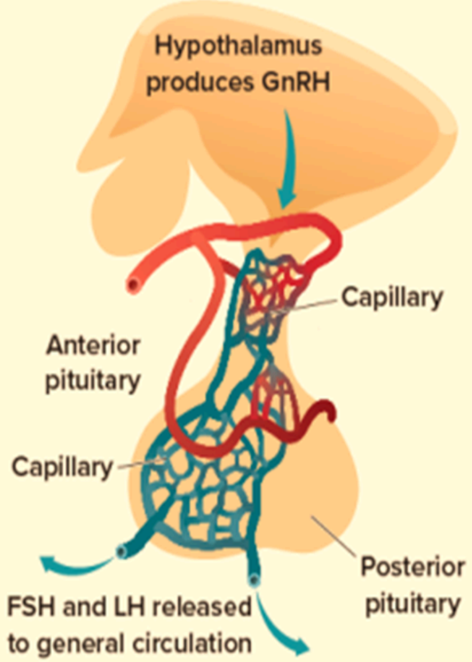
Promotes the production of sperm

Sperm temperature control

Which of the following is an effect of the hormone testosterone?

A	Female pregnancy
B	Female menstrual cycle
C	Sperm production
D	Sperm temperature control

19) What hormone stimulates the gland shown here, in order to regulate testosterone?



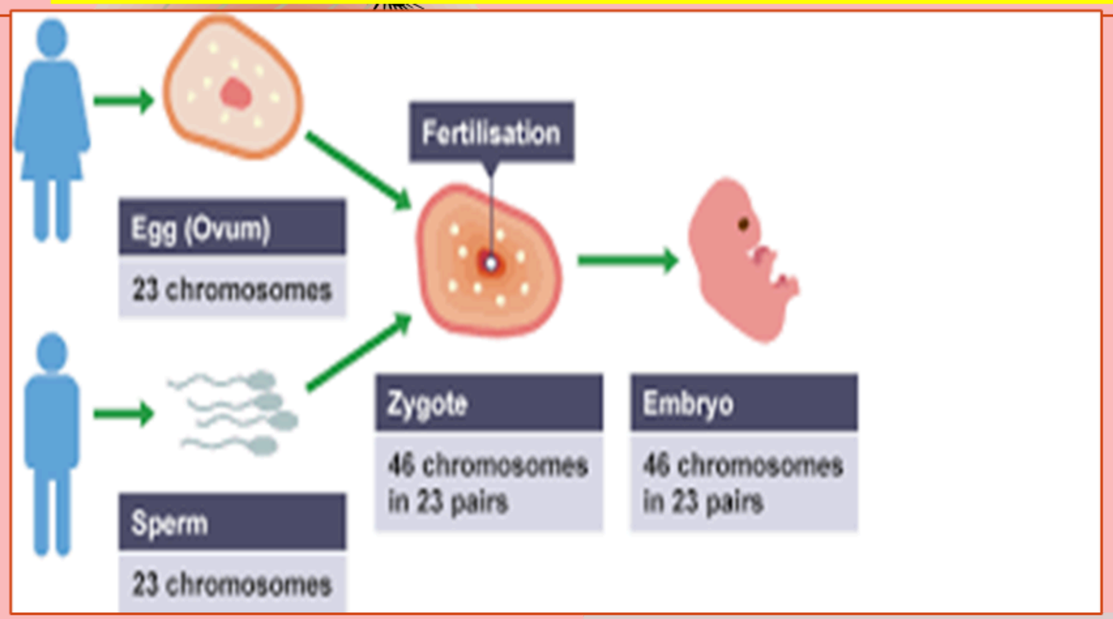
- estrogen
- progesterone
- dopamine
- gonadotropin-releasing hormone

4 **Which hormone stimulates the production and secretion of testosterone in the testes?**

A	FSH
B	Estrogen
C	LH
D	GnRH

10	Describe how the egg and sperm cells contain only one chromosome of each parent's chromosome pair, and that they unite to form a new individual offspring	Figure7	214

- **Fertilization** is the process of a sperm joining with an egg. Both ***sperm and eggs are haploid,*** and each normally has ***23 chromosomes***.
- ***Fertilization restores the diploid number (46).***



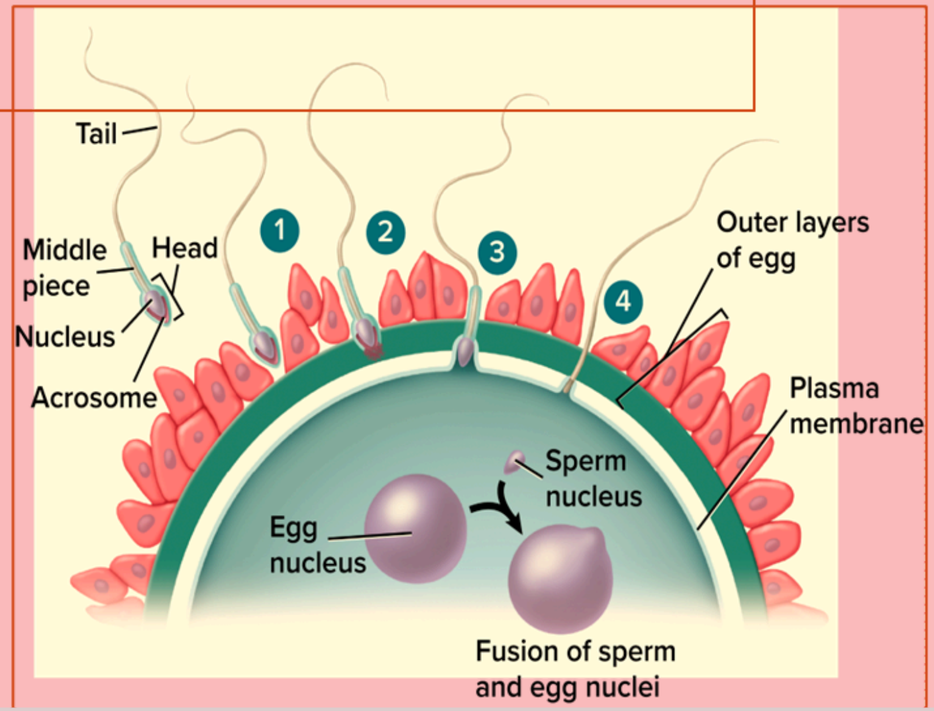
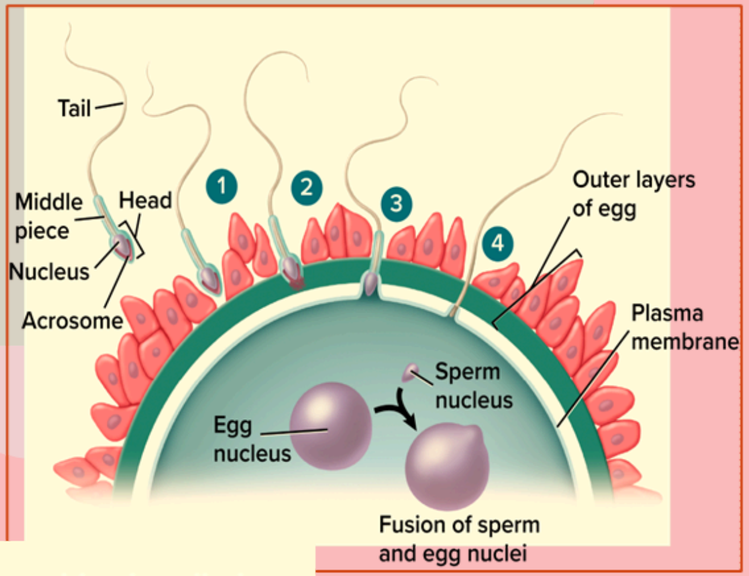


Figure 7 Although many sperm are needed to weaken the barrier that surrounds the egg, only one sperm fertilizes an egg (steps 1-4). Fertilization is complete when the sperm nucleus fuses with the egg nucleus.

What we called off this stage in the figure below?

Ovulation
Sperm formation
Fertilization
Corpus luteum



7 What organelle in a sperm acrosome weakens the plasma membrane of an egg cell?

A mitochondria
B Golgi apparatus
C lysosomes
D ribosomes

40) The process by which haploid gametes combine is called __.

- synapsis
- genetic variation
- fertilization
- interphase

Which of the following is the number of chromosomes in a haploid cell?

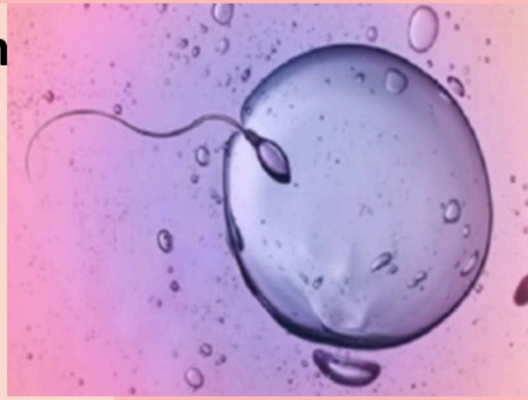
4n
3n
2n
1n

How many chromosomes are there in the human sperm nucleus?

A	15
B	30
C	23
D	46

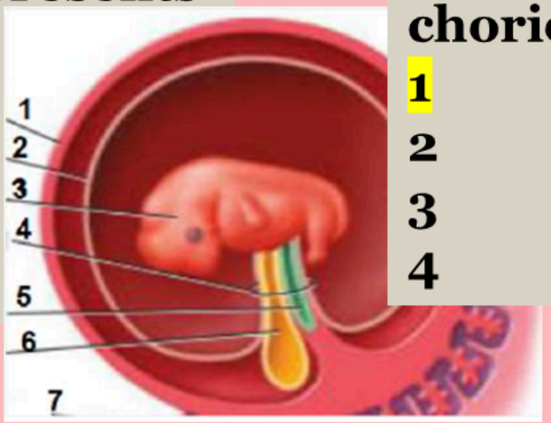
How many chromosomes are th in the fertilized egg in humans?

10
20
23
46



Which of this number represents amnion,

1
2
3
4



Which of this number represents chorion,

1
2
3
4

4. Why is the human yolk sac shown in the illustration smaller than that of the chick?

The yolk in humans is converted into muscle.

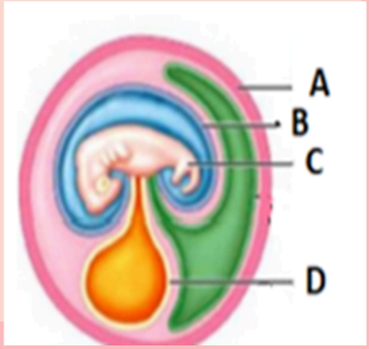
C Developing humans get their nourishment from the placenta. CORRECT

The yolk sac in chicks keeps the embryo warm.

The yolk sac serves no purpose for a developing human.

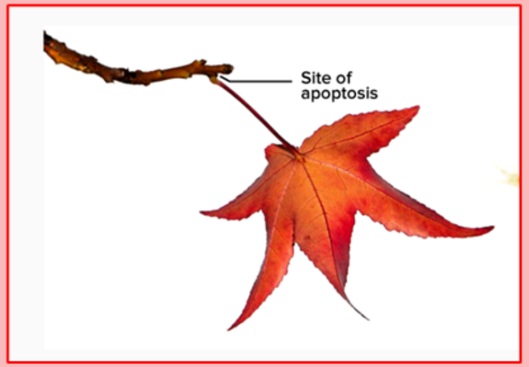
10. Which of the following letter represents the yolk sac.?

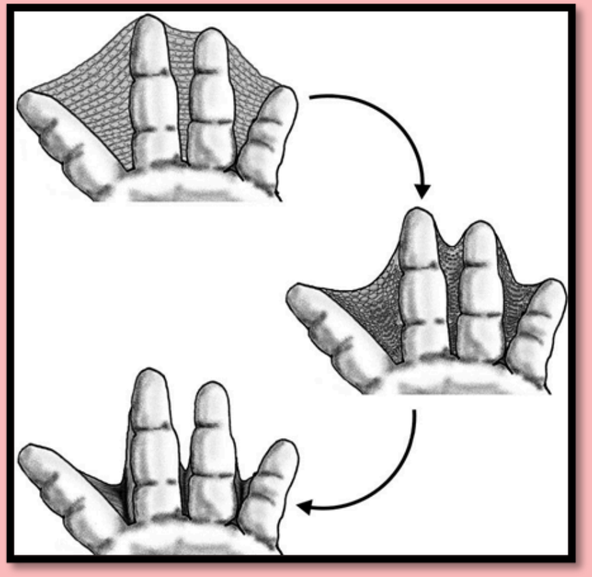
A A
B B
C C
D D



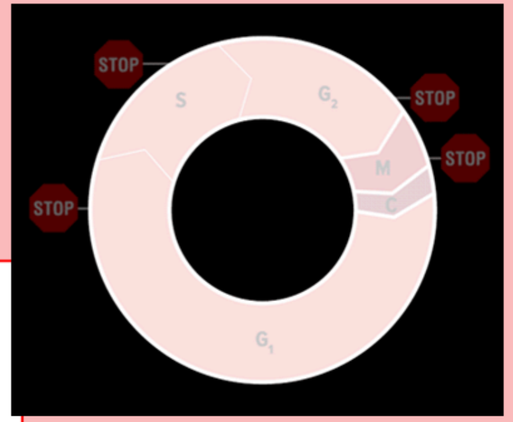
Apoptosis

- **Not every cell is destined to survive. Some cells go through *apoptosis, or programmed cell death.***
- **These cells shrink or shrivel in a controlled process.**
- **An example of apoptosis occurs in *the development of the human hand and foot. Cells in spaces between fingers and toes undergo apoptosis.***
-
- **An example *in plants is the localized death of cells that results in leaves falling from trees during autumn.***

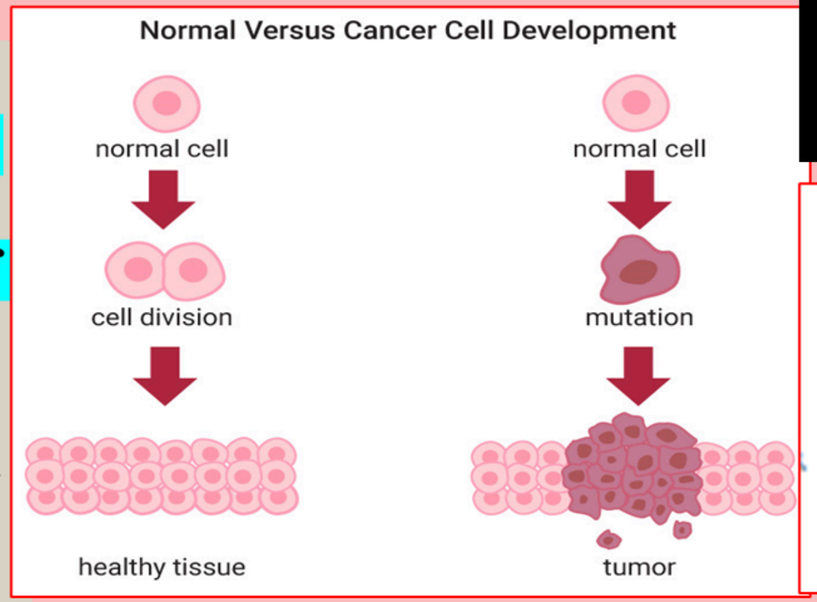


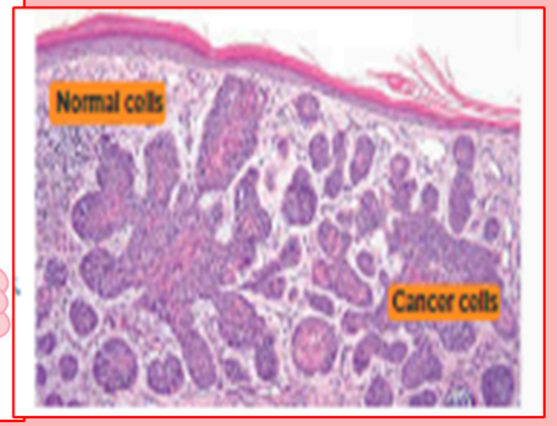


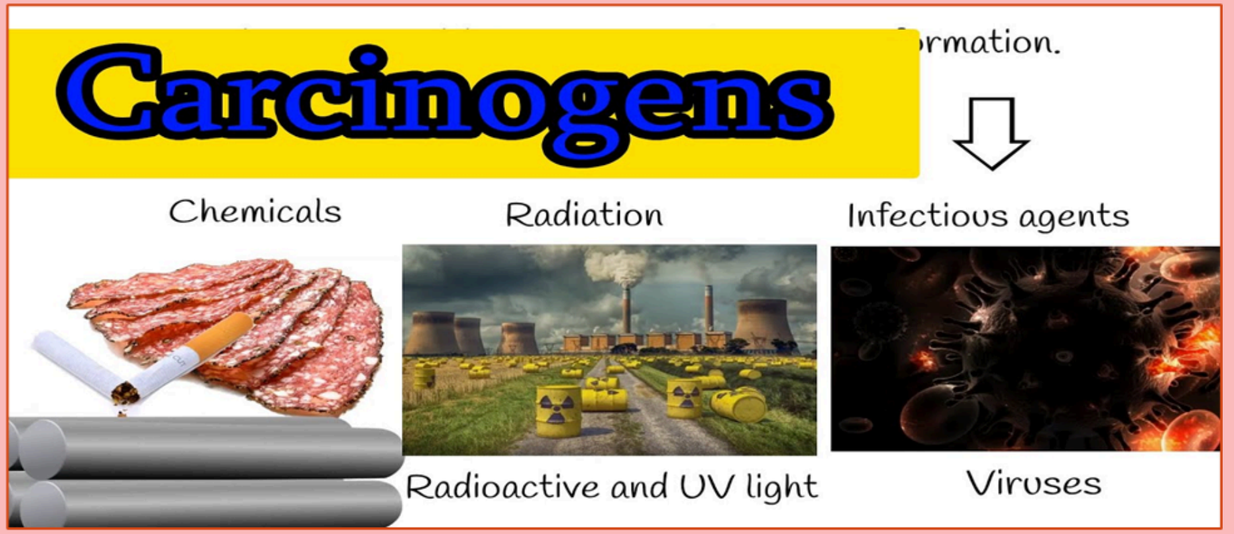
Cancer- Abnormal Cell Cycle



- **Cancer is the uncontrolled growth and division of cells. Cancer results when cells stop responding to the controls of the cell cycle.**
- **Cancer cells can kill an organism by crowding out normal cells, resulting in loss of tissue function.**
- **More than one change in DNA is required to change an abnormal cell into a cancer cell.**
- ***Mutations* cause cancer cell growth and division.**
- **Environmental factors can affect the occurrence of cancer cells.**
- ***Carcinogens* are substances or agents known to cause cancer**







Multiple changes in DNA are required to change an abnormal cell into a cancer cell.

(A.) true
B. false

2) Scott learns that his aunt has a form of cancer. Scott's science teacher explains to Scott what cancer is. Which is part of the teacher's explanation?

- Some cancer cells perform normal functions in the body.
- A cancer patient can pass the disease to other people.
- A pathogen, such as a virus, infects a cell with cancer.
- Cancer is caused when body cells divide out of control.

What is the term for the programmed death of cells that are damaged beyond repair or have harmful changes in their DNA

(A.) apoptosis
B. carcinogens
C. cytokinesis
D. mitosis

4 When carcinogens cause a failure in the regulation of cell growth and development, what condition might occur?

A normal mitosis
B uncontrolled cell growth in the form of cancer
C cell plates form
D apoptosis

6. Which describes apoptosis?

~~occurs in all cells~~

~~disrupts the normal development of an organism~~

~~a response to hormones~~

(D) is a programmed cell death

CORRECT

Which is *not* a condition that can result in cancer

A. a failure in the control mechanisms that regulate the cell cycle
B. a failure in the repair systems that fix changes or damage to DNA
(C.) a failure of the spindle fibers to move chromosomes during mitosis
D. mutations or changes in segments of DNA that control protein production

Which of these cancer-causing substances or agents is impossible to avoid completely?

A. chemicals such as asbestos
B. food and drinks that the FDA warns may contain carcinogens
C. tobacco and second-hand smoke
(D.) ultraviolet radiation from the Sun

5. Which is a characteristic of cancer cells?

~~They have controlled cell division.~~

~~The cytokinesis stage is skipped.~~

(C) They contain multiple genetic changes.

CORRECT

~~The cell cyclins function normally.~~

Which of the following best describes apoptosis?

The localized death of cells
The incomplete mitosis
The complete mitosis
The cell growth

Which of the following best describes apoptosis?

Cell death
The incomplete mitosis
The complete mitosis
The cell growth

13) Fill in the blanks using the available answer choices.

In the autumn, plants exhibit localized death of cells that results in leaves falling from trees. This is an example of _____.
(Blank 1)

Blank 1 options
- cyclin
- cancer
- apoptosis
- carcinogen

Q13.	Which of these is a risk factor for developing cancer? **CHECK ALL THAT APPLY**
a.	growing older
b.	genetic inheritance
c.	exposure to carcinogens (toxins that can damage DNA)
d.	smoking

19) Identify four carcinogens that are known to cause cancer. Select all that apply.

- ☐ radiation
- ☐ cigarette smoke
- ☐ asbestos
- ☐ plants
- ☐ viruses
- ☐ bacteria
- ☐ sugar
- ☐ X-rays

Q14.	When it occurs at the proper time, programmed cell death (apoptosis)
a.	will disrupt homeostasis
b.	may cause defective genetic info to be passed to the next generation of cells
c.	is an important regulatory process that maintains the health of a multicellular organism
d.	can contribute to the development of cancer

54) A failure in the regulation of the cell cycle will result in _____ cancer .

10) Which of the following is a characteristic of cancer cells?

- ○ Controlled growth and division of cells
- ○ Uncontrolled growth and division of cells
- ○ Cell cyclins function normally

67) Substances known to cause cancer are called ____.

- ○ aster fibers
- ○ stem cells
- ○ carcinogens
- ○ kinases

Q.1. *Biology teacher explains to students what cancer is. Which is part of the teacher's explanation?*

- ○ Some cancer cells perform normal functions in the body.
- ○ A cancer patient can pass the disease to other people.
- ○ A pathogen, such as a virus, infects a cell with cancer.
- ● Cancer is caused when body cells divide out of control.

Which of the following describes apoptosis?

- ○ A It occurs in all cells.
- ○ B It is a response to hormones.
- ● C It is a programmed cell death.
- ○ D It disrupts the normal development of an organism.

A cell that contains 2n number of chromosomes ⟷ diploid

Chromosomes that make up a pair; one from each parent ⟷ homologous chromosomes

Segments that control the production of proteins ⟷ genes

A cell with n number of chromosomes ⟷ haploid

Sex cells that have half the number of chromosomes ⟷ gametes

Process where one haploid gamete combines with another haploid gamete ⟷ fertilization

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47) Which of the following is the number of chromosomes in a haploid cell?

- 4*n*
- 1*n*
- 3*n*
- 2*n*

79) A cell with *n* number of chromosomes is called a diploid while a cell with *2n* number of chromosomes is a called a haploid.

- True
- False

13	Compare between three trimesters of development	Figure11	218

First Trimester

- All tissues, organs, and organ systems begin to develop
- At the end of *eight weeks, the embryo is called a* ***FETUS***
- The fetus begins to move its arms, fingers, and toes.
- Fingerprints also are present.
- Embryo is vulnerable to the effects of environmental influences (pollution, radiation etc.)

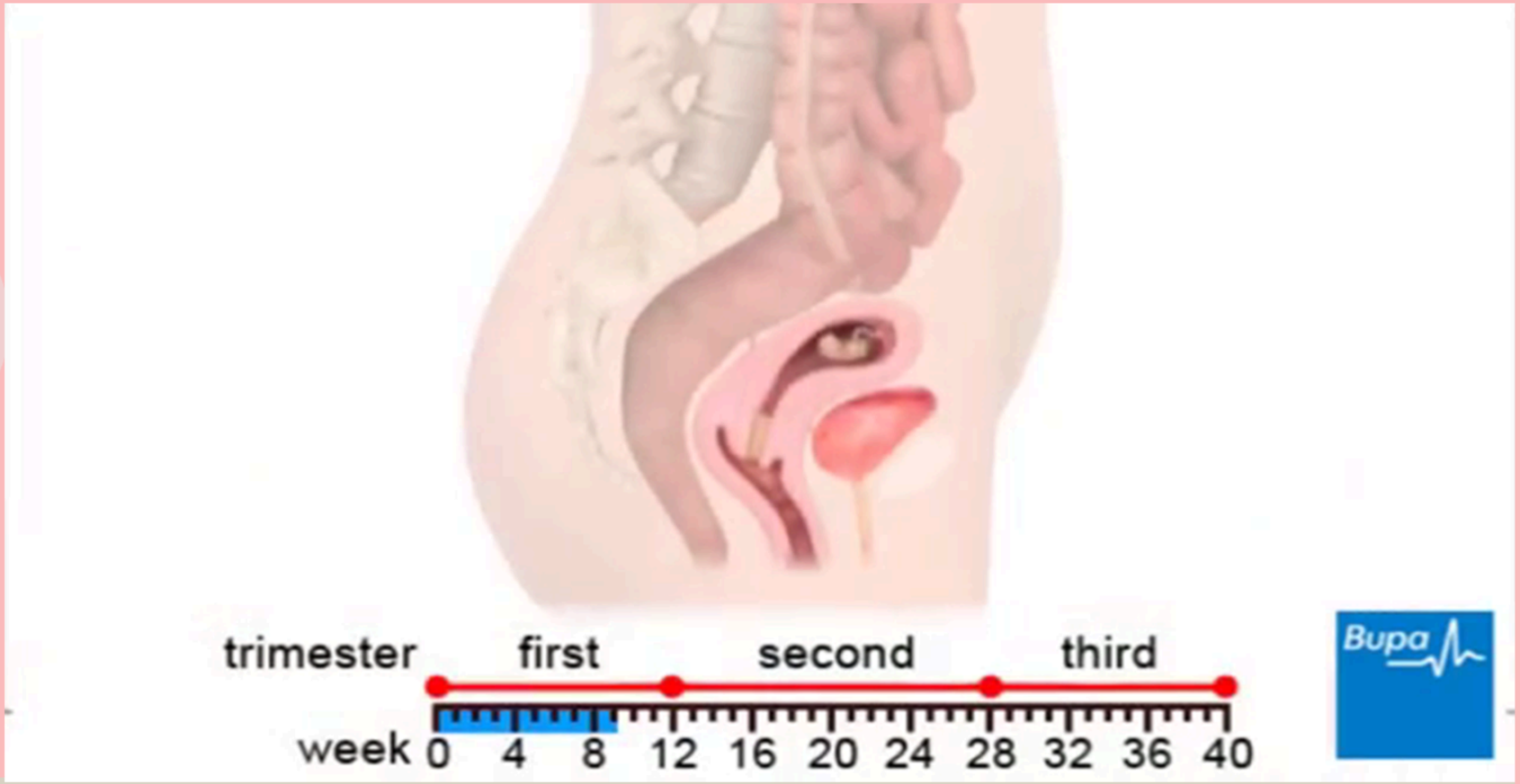
- Lack of nutrients, such as folic acid might cause irreversible damage to the developing embryo (brain and spine and birth defects).

Table 2 Preventable Causes of Birth Defects

Cause	Defect
Alcohol consumption	• Mental retardation
Cigarette smoking	• Health problems related to premature births and underweight babies
Lack of folic acid in diet	• Anencephaly (head and brain do not completely form) • Spina bifida (nerve cells from the spinal cord are exposed, leading to pa
Methamphetamine	• Premature birth • Extreme irritability

Second Trimester

- It is a time of growth
- The fetal heartbeat can be heard
- Hair usually forms, and the eyes will open
- It is capable of sucking its thumb and can develop hiccups.
- The survival rate of the fetus is less if it is delivered at the end of this trimester (baby cannot maintain a constant body temperature, respiratory failure, no immunity etc.).



Third Trimester

- *A period of rapid growth rate*
- The fetus will respond to external stimuli (music/ mother's voice)
- Fat accumulates under the skin to provide insulation for the fetus once it is born
- *Rapid brain growth* (250,000 cells form in the brain per minute, protein is essential for this

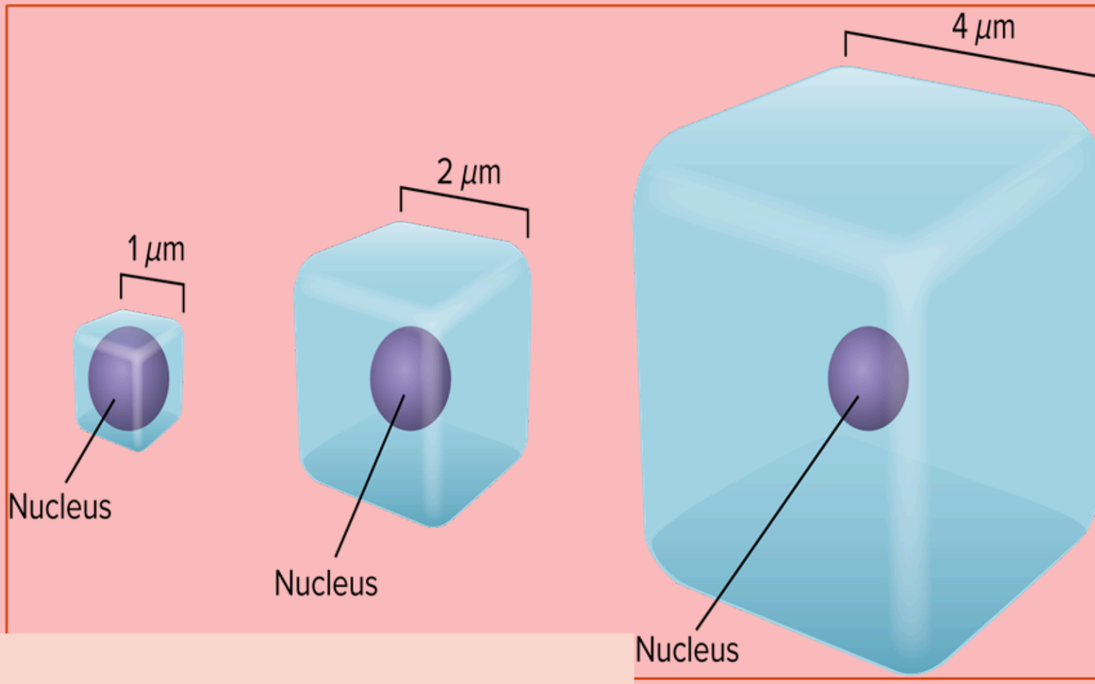
14	Describe and calculate the ratio of surface area to volume	Figure1	233

Small cells transport substances more efficiently. The surface area to volume ratio decreases as the cell grows larger.

Surface area to volume ratio

Surface Area= all of the area available for reactions to occur (covered by the plasma membrane….)
Formula= length x width x 6 surfaces / 6a^2

Volume= space inside (includes organelles and cytoplasm…)
Formula= length x width x height= a^3



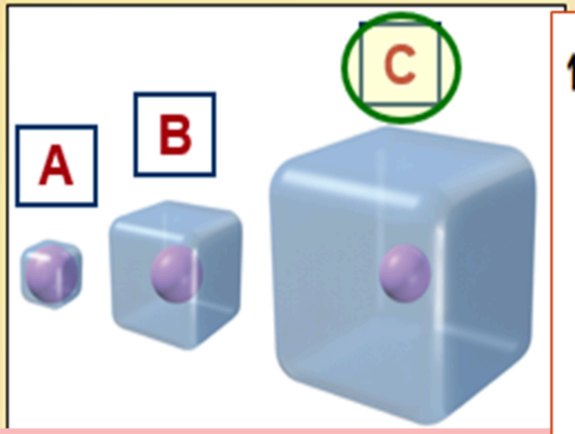
Transport of Substances

- Smaller cells can transport substances more easily.
- Diffusion is inefficient over long distances.
- The cytoskeleton transportation network becomes less efficient for a cell if the distance to travel becomes too large.

Cellular Communication

- Cellular communication is more efficient in smaller cells.

Which cell has the lowest ratio of surface area to volume?



1) Carlos is studying human skin cells under a microscope during science class. He asks his teacher why cells are small. Which response does his teacher give him?

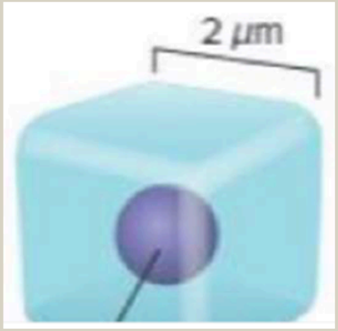
- Larger cells could not efficiently transport nutrients.
- Cells divide too rapidly to grow much larger in size.
- A large cell rapidly becomes a dangerous cancer cell.
- Small cells place fewer energy demands on an organism.

Which can more efficiently supply nutrients and expel waste products?

A. larger cells
B. smaller cells
C. cells with lower surface area to volume ratio
D. cells shaped like a cube

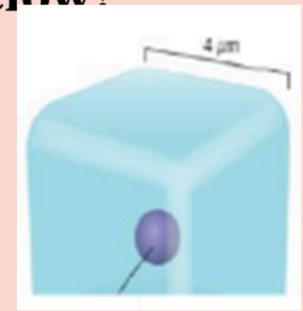
Q: What is the ratio of surface area to volume of the cubic cell below?

1:1
2:1
3:1
4:1



Q: What is the ratio of surface area to volume of the cubic cell below?

1:1
2:2
3:2
6:1



1. Which is a reason why cells remain small?

- Large cells have difficulty diffusing nutrients rapidly enough.
- As cells grow, their ratio of surface area to volume decreases.
- Transportation of wastes becomes a problem for large cells.
- D All of the above.

CORRECT

What is the ratio of surface area to volume of the cubic cell below?

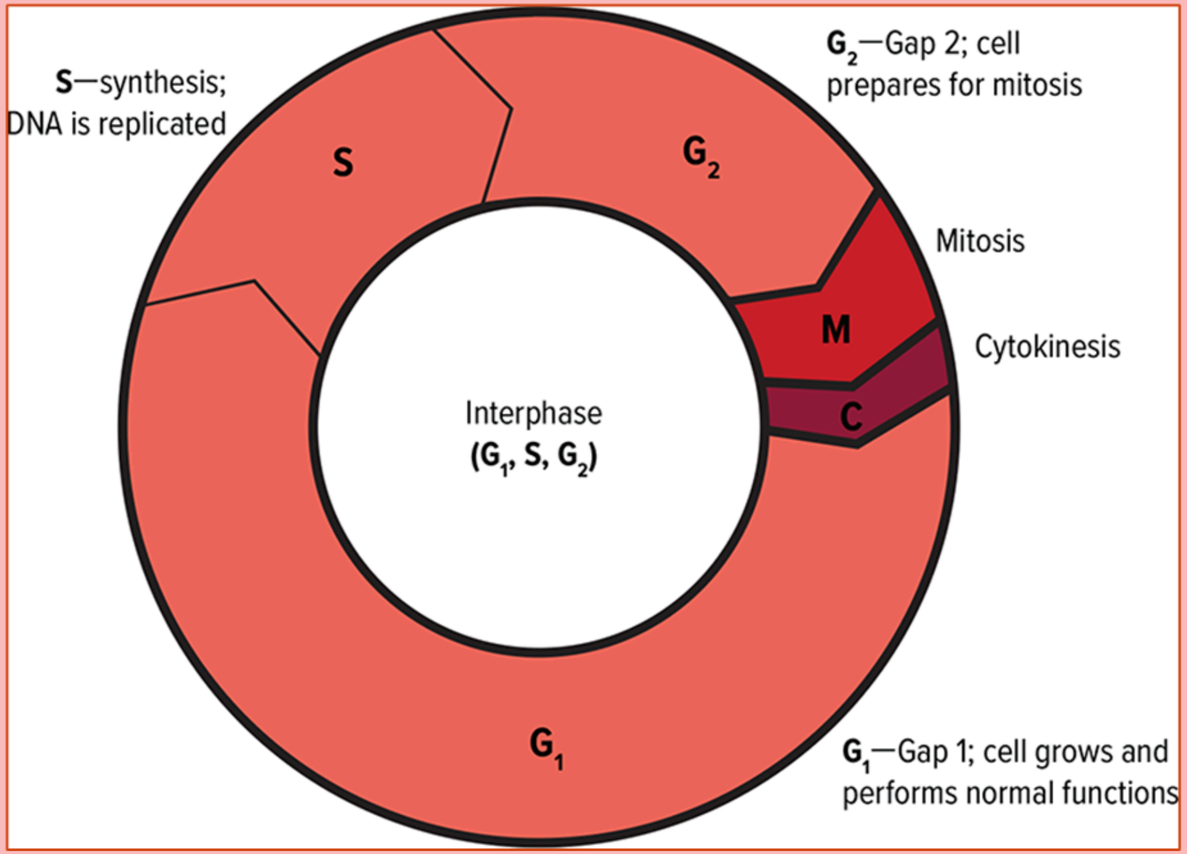
A 1:1
B 2:1
C 3:2
D 6:1

15	Conclude that the processes of the cell cycle and mitosis, through which cells grow and divide, allow organisms to grow	Figure4	235

- **Interphase** is the stage during which the cell grows, develops into a mature, functional cell, duplicates the DNA in its nucleus, and prepares for division.
- Interphase is divided into three stages: Gap 1(G_1), synthesis (S), and Gap 2 (G_2).

Gap 2 (G2): preparing for the division of the nucleus/ mitosis.

Synthesis (S): *copying DNA* to prepare for division



Mitosis: cell nucleus and nuclear material divide (4 substages).

Cytokinesis: cytoplasm divides creating a new cell. *shortest time spent here.

Gap 1(G_1): Immediately after a cell divides. ***Growing, carrying out normal cellular functions, and preparing to replicate DNA***

Q12.	In which stage of the cell cycle are cells most susceptible (likely to experience) to mutations?
a.	G1
b.	S
c.	G2
d.	G0

At what stage does a cell spend most of its life?

A. cytokinesis
B. interphase
C. mitosis
D. synthesis

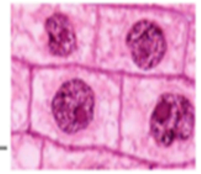
3 **Which description best fits the activity of a cell during interphase?**

A The cell carries on metabolism.
B The cell differentiates to have a new function.
C The cell splits in two.
D The cell splits in two but with half the normal number of chromosomes.

At what stage of interphase does the cell take inventory and make sure it is ready for the division of its nucleus?

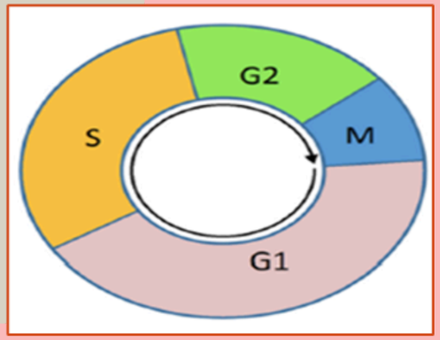
A. G_1
B. S
C. G_2
D. M

Q9.	Name the phase that all of these cells are in. Hint: Cells spend most of their time in this phase preparing to divide.
a.	prophase
b.	anaphase
c.	interphase
d.	metaphase



Q: which stage in the picture below represented the preparation for mitosis?

S
G2
G1
M



2. Which describes the activities of a cell that include cellular growth and cell division?

A cell cycle
CORRECT

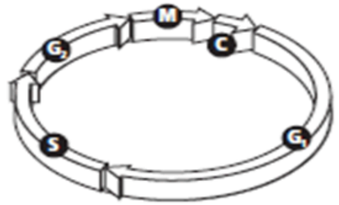
mitosis

chromatin

cytoplasm

Q2.	When a cell is not actively dividing, it is in what phase?
a.	interphase
b.	anaphase
c.	prophase
d.	telophase

9 **During which stage of the cell cycle does the cell duplicate its DNA?**



A M stage
B G_1 stage
C S stage
D G_2 stage

During which stage of the cell cycle does the cell duplicate its DNA?

A	S
B	G1
C	G2
D	M

13 **The timing and rate at which a cell divides is coordinated by which complexes?**

A cyclin/CDK combinations
B DNA replication
C nuclear division
D protein synthesis

Second Trimester

- It is a time of growth
- The fetal heartbeat can be heard
- Hair usually forms, and the eyes will open
- It is capable of sucking its thumb and can develop hiccups.
- The survival rate of the fetus is less if it is delivered at the end of this trimester (baby cannot maintain a constant body temperature, respiratory failure, no immunity etc.).

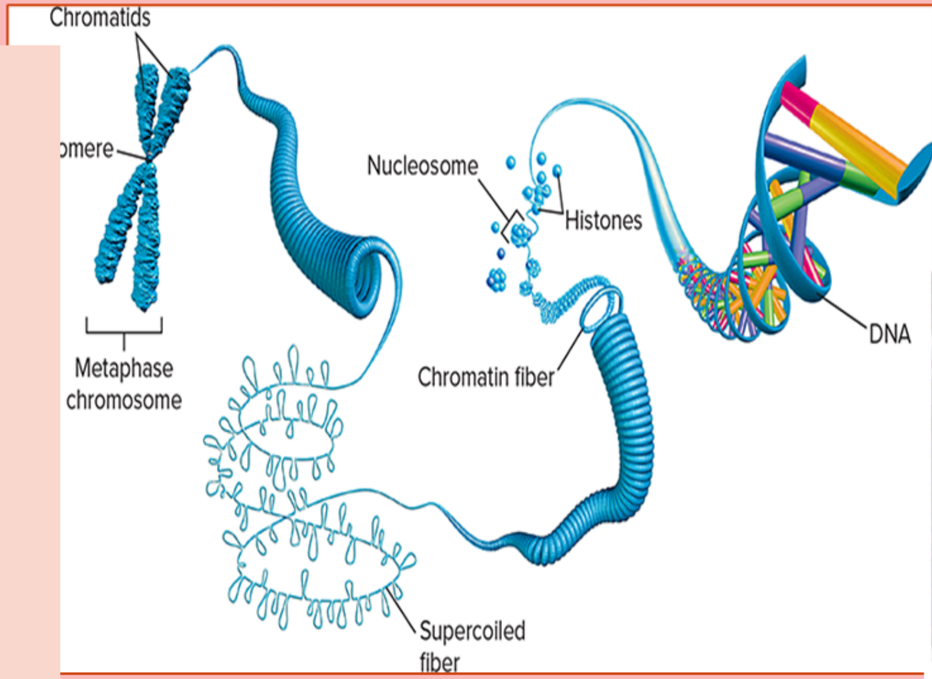
Third Trimester

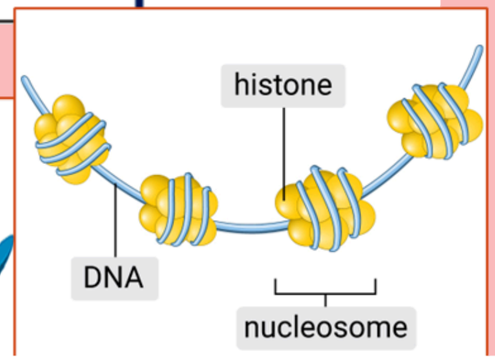
- *A period of rapid growth rate*
- The fetus will respond to external stimuli (music/ mother's voice)
- Fat accumulates under the skin to provide insulation for the fetus once it is born
- *Rapid brain growth* (250,000 cells form in the brain per minute, protein is essential for this

20	16 Describe how the egg and sperm cells contain only one chromosome of each parent's chromosome pair	Figure3	234
17	Describe how the egg and sperm cells contain only one chromosome of each parent's chromosome pair	Figure5	236

Chromatin and Chromosomes

- **Chromatin** is the ***relaxed form of DNA.***
- **Chromosomes** are condensed structures that contain the DNA that is ***visible during mitosis***.
- They are passed from generation to generation.
- Eukaryotic DNA is organized into chromosomes.
- The phosphate groups in DNA create a negative charge, which attracts the DN to the ***positively charged histone proteins and forms a*** **nucleosom**
- The nucleosomes group together into chromatin fibers, which supercoil to make up the chromosome.

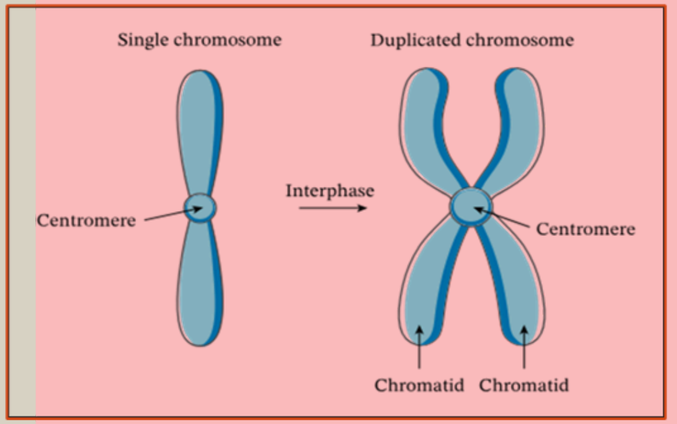




SEM Magnification: unavailable

Figure 5 Chromosomes in prophase are actually sister chromatids that are attached at the centromere.

A chromatid is one of the two identical halves of a chromosome that has been replicated in preparation for cell division. The two "sister" chromatids are joined at a constricted region of the chromosome called the centromere.



5) Fill in the blanks using the available answer choices.

Match each of the following definitions with its term.

Definition	Vocabulary term
Repeating subunits of fibers which consist of DNA coiled around histones	**Correct Answer** nucleosomes chromatin chromosomes
Relaxed form of DNA	
Condensed structures of DNA that are visible during mitosis	

75) __ is a relaxed form of DNA in the nucleus of a cell.

- Chromosome
- Chromatin
- Sister chromatid
- Homologous chromsome

Q6.	What is the image below?
	
a.	Chromosome
b.	Chromatid
c.	Centromere
d.	Centriole

The figure below illustrates the genetic material inside the nucleus. Which of the following number represents the nucleosome?

1
2
3
4

74) A __ is the DNA-containing structure that carries genetic material from one generation to another.

- chromatin
- chromosome
- sister chromatid
- homologous chromosome

Q3.	Where does a cell contain it's genetic material?
a.	cytoskeleton
b.	nucleolus
c.	golgi apparatus
d.	nucleus

77) What is the cell structure that joins two sister chromatids?

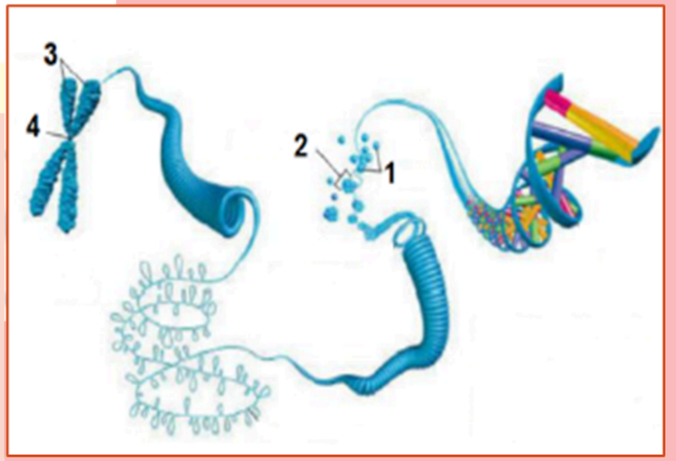
- centriole
- centromere
- spindle apparatus
- equator

6) Chromatin fiber is made up of nucleosomes, which are made up of __ wrapped around beadlike proteins called __.

- DNA; chromosomes
- DNA; histones
- histones; DNA
- histones; chromosomes

Which number represents chromatids?

1
2
3
4



1) Mika has learned that his aunt is pregnant with her first child. His aunt is taking a course about pregnancy and reading books on the topic to become knowledgeable about the development of the baby. About once a week, Mika's aunt comes over for dinner, and his family discusses how the fetus is developing inside the uterus. During her pregnancy term, which would Mika's aunt include in her dinner conversations?

- Her doctor told her that she could drink alcohol during the first trimester.
- The baby's heartbeat can be heard without a stethoscope after 24 weeks.
- She feels the first kicks of the baby at week 21, during the second trimester.
- The fetus' lungs and heart begin to develop during the third trimester.

41) Which occurs during the third trimester?

- rapid lung development
- rapid brain development
- formation of facial expressions
- formation of fingerprints

40) Which first occurs during the second trimester?

- arm movement
- response to outside sounds
- toe wiggling
- development of hiccuping

Q: Which number below the picture represents fetus 9-10 weeks?

1, 2, 3 , 4

Q: Which number below the picture represents fetus 4 weeks?

1, 2, 3 , 4

Q: Which number below the picture represents fetus 12 weeks?

1, 2, 3 , 4

Which of the following events in embryonic development occurs during the third trimester?

A All tissues begin to develop

B Formation of nerve cells in the brain

C Formation of facial expressions

D Formation of fingerprints

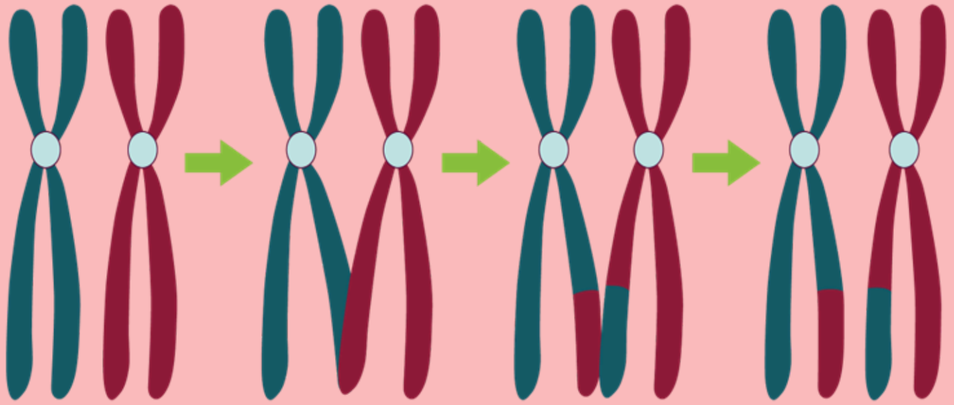
5. When can a pregnant woman first feel the movements of her fetus?

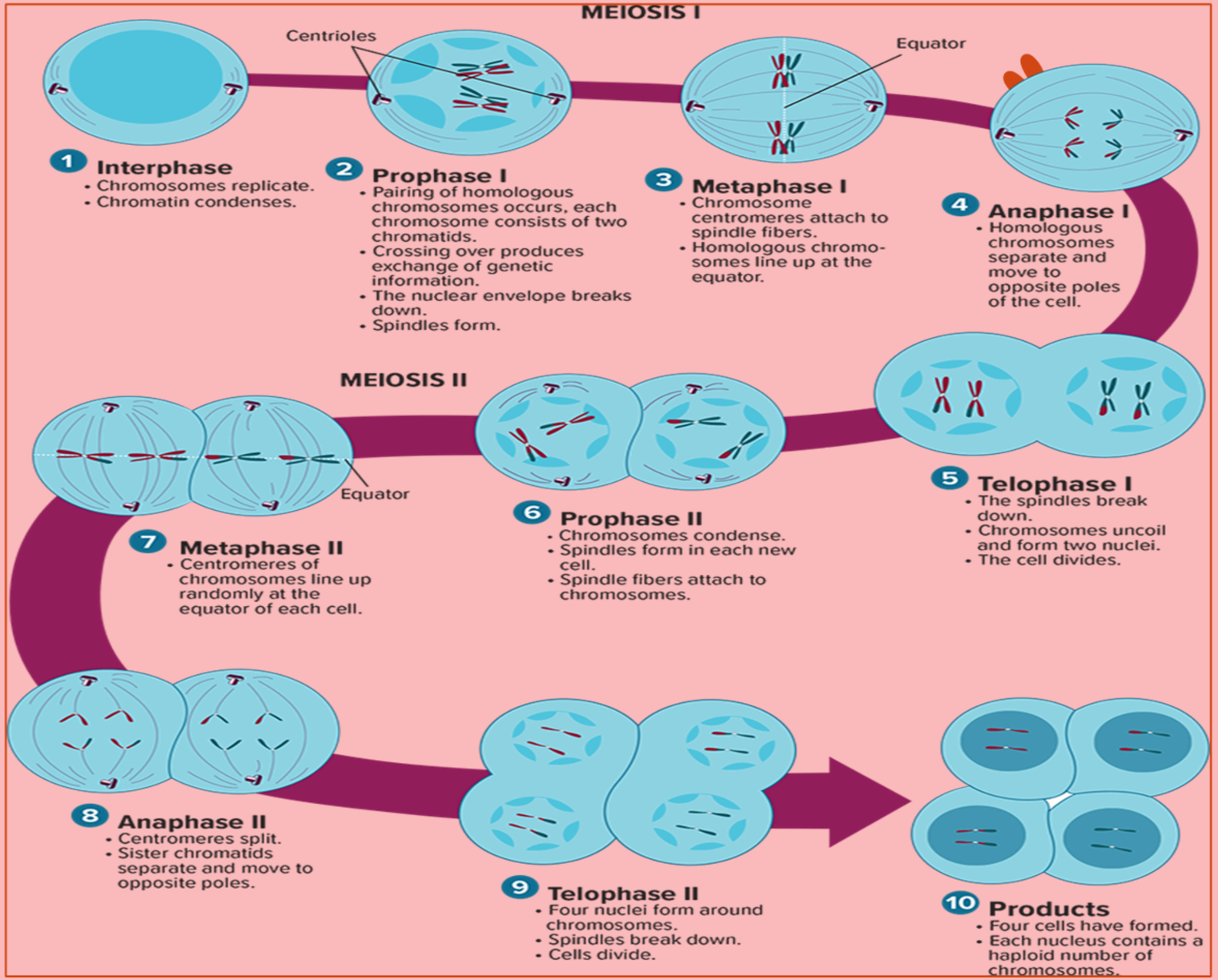
- in the first trimester
- in the third trimester
- B in the second trimester
- in the last month only

CORRECT

18	Recall that meiosis, a specialized type of cell division in sexual reproduction	Figure18	248

Crossing over is a process during which chromosomal segments are exchanged between a pair of homologous chromosomes.





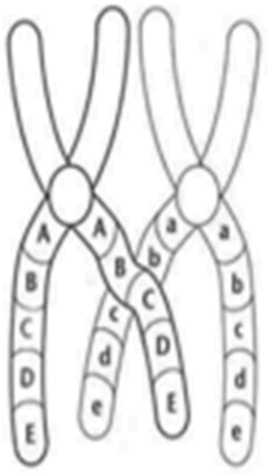
23) Which of the following statements characterize meiosis I? Select all that apply.

- ☐ Homologous chromosomes line up at the cell equator.
- ☐ Crossing over can occur during synapsis.
- ☐ Sister chromatids line up at the cell equator.
- ☐ Sister chromatids are pulled apart at the centromeres.
- ☐ The chromosome number remains the same from *n* to *n*.
- ☐ Four nuclei start to form around the chromosomes.
- ☐ The chromosome number is reduced from 2*n* to *n*.
- ☐ Each chromosome consists of two sister chromatids.

Q1.	How many chromosomes would a cell have during metaphase I of meiosis if it has 12 chromosomes during interphase?
a.	6
b.	12
c.	24
d.	36

1. What does the diagram show?

- It shows crossing-over of genes between a pair of homologous chromosomes.



2. During what phase of meiosis does this process occur?

- It occurs during prophase I of meiosis.

3. What is the result of this process?

- The result is a new combination of alleles.

27) In what stage of meiosis does genetic variation occur?

- ○ Metaphase I
- ○ Metaphase II
- ○ Prophase I
- ○ Prophase II

59) Fill in the blanks using the available answer choices.

Match the following description to the correct stage of meiosis I. Answers may be used only once or not at all.

Description	Stage of meiosis I
Chromosome number is reduced from 2*n* to 1*n*.	
Two sister chromatids reach opposite poles of the cell.	
Homologous chromosomes become visible, condense, and form pairs. Crossing over can occur.	
Homologous pairs of chromosomes line up on the equator.	
DNA is replicated and proteins are synthesized.	

Correct Answer

anaphase I
telophase I
prophase I
metaphase I
interphase

36) Fill in the blanks using the available answer choices.

During anaphase I of meiosis, _____ separate.
(Blank 1)

Blank 1 options
- centromeres
- microtubules
- homologous chromosomes
- diploid parent cells

3. Which does not occur during telophase II?

A Chromosomes condense.

CORRECT

Spindles break down.

Four nuclei form around chromosomes.

Cells divide.

48) Which event occurs during meiosis II but not during meiosis I?

- haploid number of chromosomes line the equator
- cytokinesis occurs after the final phase
- sister chromatids are pulled to opposite poles
- spindle apparatus forms inside the cell

35) Fill in the blanks using the available answer choices.

Meiosis produces genetic variation in _____.
(Blank 1)

Blank 1 options
- genes
- diploids
- haploids
- gametes

24) Which of the following statements characterize meiosis II? Select all that apply.

- [x] Sister chromatids line up at the cell equator.
- [ ] The chromosome number is reduced from 2*n* to *n*.
- [ ] Crossing over can occur during synapsis.
- [ ] Homologous chromosomes line up at the cell equator.
- [x] Sister chromatids are pulled apart at the centromeres.
- [x] Four nuclei start to form around the chromosomes.
- [ ] Each chromosome consists of two sister chromatids.
- [x] The chromosome number remains the same from *n* to *n*.

---

60) Fill in the blanks using the available answer choices.

Match the following description to the correct stage of meiosis II. Answers may be used only once or not at all.

Description	Stage of meiosis II
The spindle fibers break down and the cells divide.	
Centromeres of chromosomes line up on the equator.	
The spindle apparatus forms and the chromosomes condense.	
Four haploid cells are created with *n* number of chromosomes.	_____ (Blank 4)
The sister chromatids separate and move towards opposite poles.	_____ (Blank 5)

Correct Answer

telophase II
metaphase II
prophase II
cytokinesis
anaphase II

Q13.	In a cell undergoing meiosis, during which stage do the sister chromatids separate from each other?
a.	Anaphase I
b.	Anaphase II
c.	Telophase I
d.	Telophase II

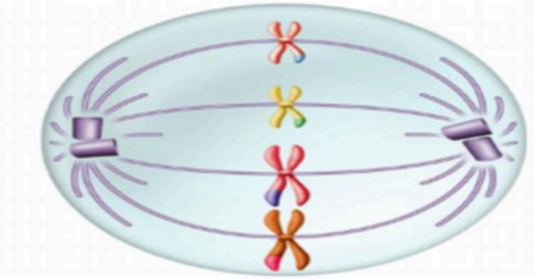
Q: Which is the following mention to Meiosis?

One division occurs during.
Occurs only in body cells.
Involved in growth and repair
Occurs only in reproductive cells.

7 During which stage of sex cell formation does the number of chromosomes decrease from diploid *(2n)* to haploid *(n)*?

A prophase I
B anaphase I
C prophase II
D anaphase II

Use the diagram below to answer Q2 and Q3.

Q2.	 Which stage of meiosis is illustrated above?
a.	Prophase I
b.	Prophase II
c.	Metaphase I
d.	Metaphase II

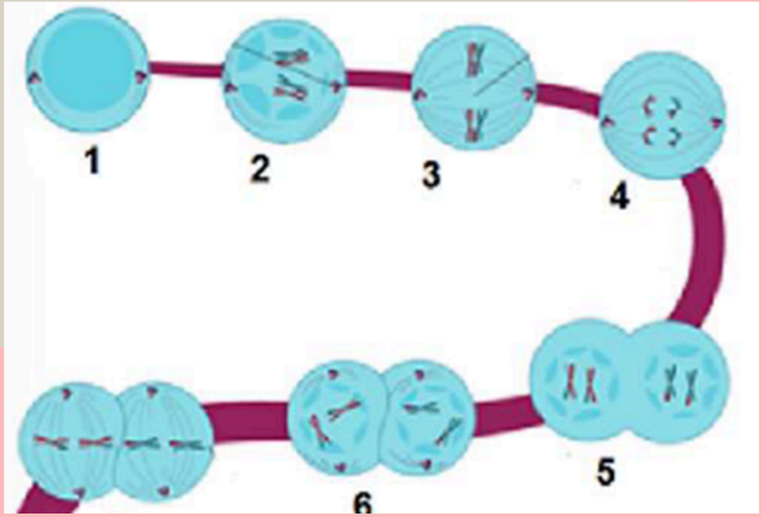
Q3.	What is the next step for the chromosomes illustrated above?
a.	They will experience replication.
b.	They will experience fertilization.
c.	Their number per cell will be halved.
d.	They will divide into sister chromatid.

11 What process is taking place in the illustration shown below?

A fertilization
B prophase II
C polyploidy
D crossing over

Q: Which number represented prophase II in the picture?

2
4
6
8



2 What term is used to describe pairs of chromosomes having DNA segments, or genes, for the same traits?

A homologous
B analogous
C homozygous
D parallel

5 You are given a sample of unknown hum cells to examine. Analysis of their nuclei reveals that each cell contains 23 chromosomes. What types of cells might these be?

A ova
B skin cells
C liver cells
D white blood cells

19	Describe the cell cycle in plants and animals, and explain the importance of mitosis for the growth of cells and repair of tissues	Figure10	239

Cytokinesis

- Towards the end of mitosis, the cell begins **cytokinesis** by which a cell's cytoplasm divides, resulting in two cells with identical nuclei.
- During cytokinesis in animal cells, microfilaments constrict/pinch off to form two cells.**(cleavage furrow)**
- In plant cells, instead of pinching in half, a new structure called the **cell plate** forms between the two daughter nuclei.

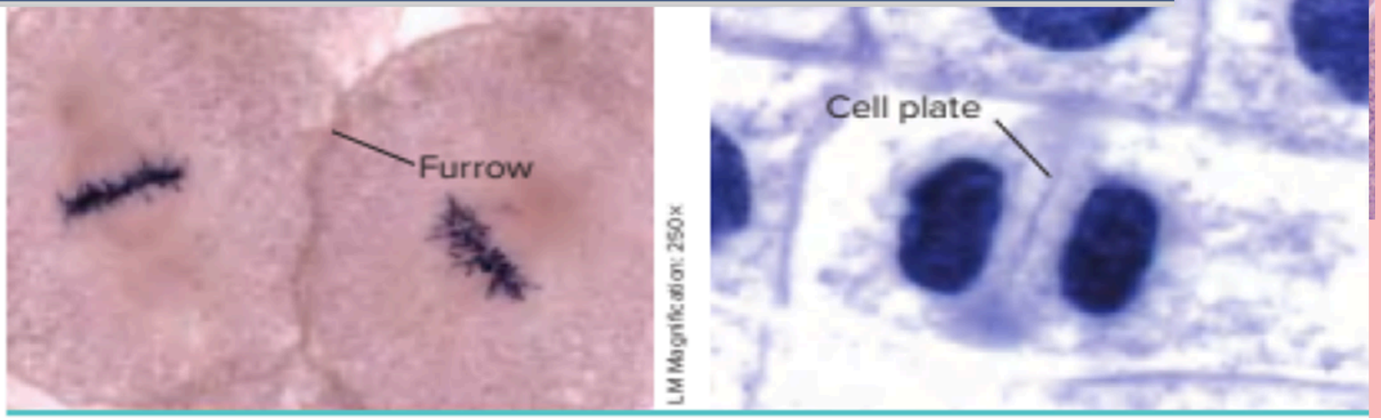
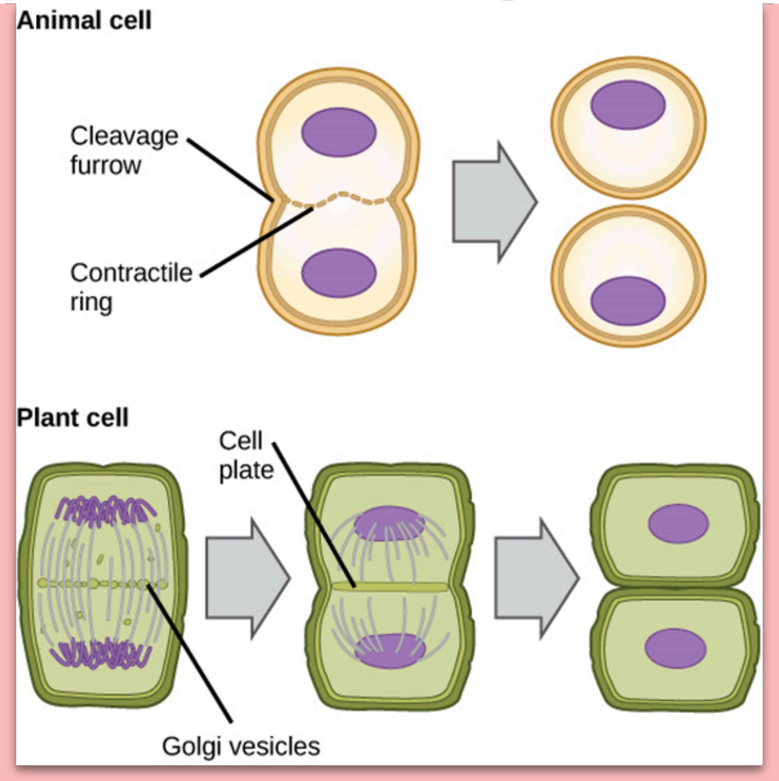


Figure 10 **Left:** In animal cells, cytokinesis begins with a furrow that pinches the cell and eventually splits the two cells apart. **Right:** Plant cells build a cell plate that divides the cell into the two daughter cells.



15 **Telophase is accompanied by the division of cytoplasm between two daughter cells. What is this process called?**

A prophase
B cytokinesis
C interphase
D synthesis phase

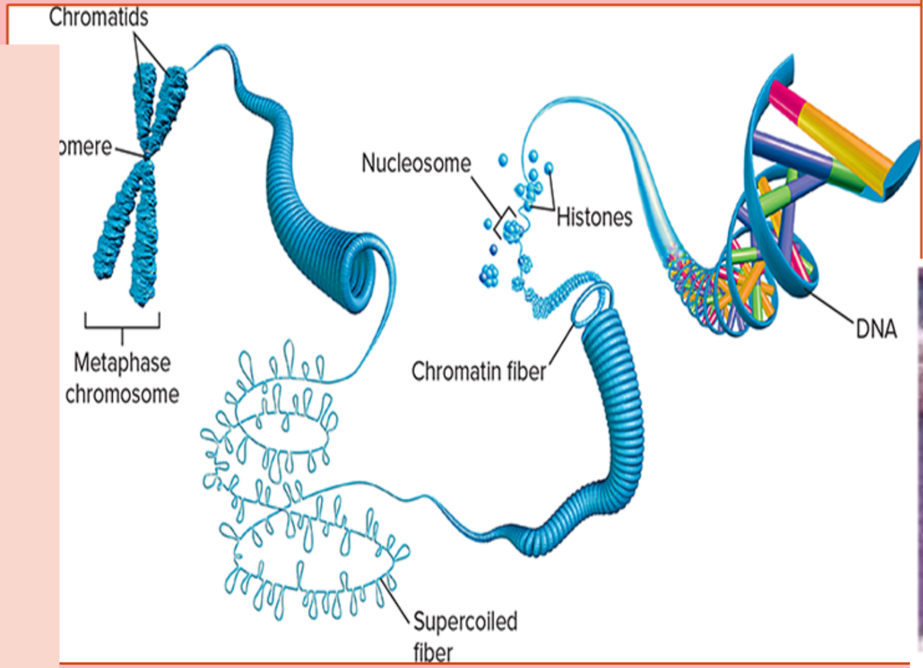
14 **In what organism would you find cell division being completed by cytokinesis, a process in which a new plate forms between two daughter nuclei?**

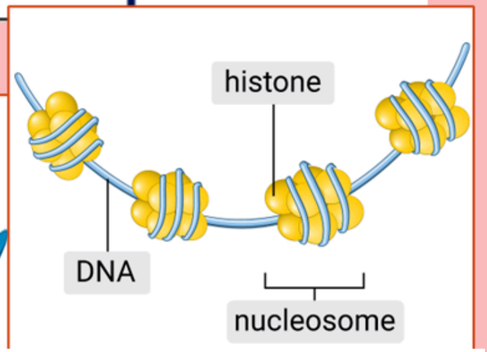
A animal
B bacterium
C plant
D protist

20	16 Describe how the egg and sperm cells contain only one chromosome of each parent's chromosome pair	Figure3	234
17	Describe how the egg and sperm cells contain only one chromosome of each parent's chromosome pair	Figure5	236

Chromatin and Chromosomes

- **Chromatin** is the ***relaxed form of DNA.***
- **Chromosomes** are condensed structures that contain the DNA that is ***visible during mitosis***.
- They are passed from generation to generation.
- Eukaryotic DNA is organized into chromosomes.
- The phosphate groups in DNA create a negative charge, which attracts the DN to the ***positively charged histone proteins and forms a*** **nucleosom**
- The nucleosomes group together into chromatin fibers, which supercoil to make up the chromosome.

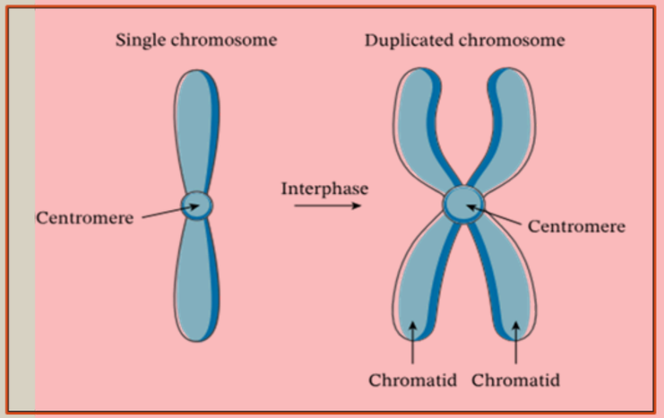




SEM Magnification: unavailable

Figure 5 Chromosomes in prophase are actually sister chromatids that are attached at the centromere.

A chromatid is one of the two identical halves of a chromosome that has been replicated in preparation for cell division. The two "sister" chromatids are joined at a constricted region of the chromosome called the centromere.



5) Fill in the blanks using the available answer choices.

Match each of the following definitions with its term.

Definition	Vocabulary term
Repeating subunits of fibers which consist of DNA coiled around histones	**Correct Answer** nucleosomes
Relaxed form of DNA	chromatin
Condensed structures of DNA that are visible during mitosis	chromosomes

75) __ is a relaxed form of DNA in the nucleus of a cell.

- ○ Chromosome
- ○ Chromatin
- ○ Sister chromatid
- ○ Homologous chromsome

Q6.	What is the image below?
a.	Chromosome
b.	Chromatid
c.	Centromere
d.	Centriole

The figure below illustrates the genetic material inside the nucleus. Which of the following number represents the nucleosome?

1
2
3
4

74) A __ is the DNA-containing structure that carries genetic material from one generation to another.

- ○ chromatin
- ○ chromosome
- ○ sister chromatid
- ○ homologous chromosome

Q3.	Where does a cell contain it's genetic material?
a.	cytoskeleton
b.	nucleolus
c.	golgi apparatus
d.	nucleus

77) What is the cell structure that joins two sister chromatids?

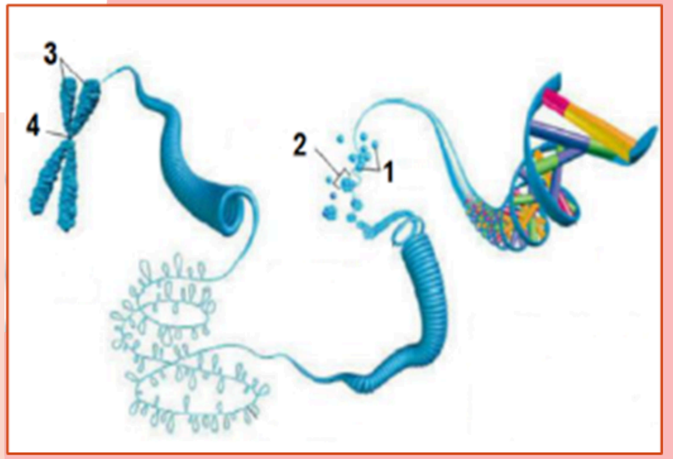
- ○ centriole
- ○ centromere
- ○ spindle apparatus
- ○ equator

6) Chromatin fiber is made up of nucleosomes, which are made up of __ wrapped around beadlike proteins called __.

- ○ DNA; chromosomes
- ○ DNA; histones
- ○ histones; DNA
- ○ histones; chromosomes

Which number represents chromatids?

1
2
3
4



اسأل الله ان يوفقنا جميعاً

اذكروني بدعوة لعلها تسعدني دهرًا او تبعد عني شراً او تقرب لي خيراً 🤍؟..

https://t.me/grade9ADV27