



SOLUTION TO F/M/17/22

QUICK ACCESS GRID

The solution to a particular question can be accessed instantly by clicking on the desired question number in the QUICK ACCESS GRID.

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S1

C

Body hair or fur is a defining characteristic of Mammals in addition to presence of mammary glands.

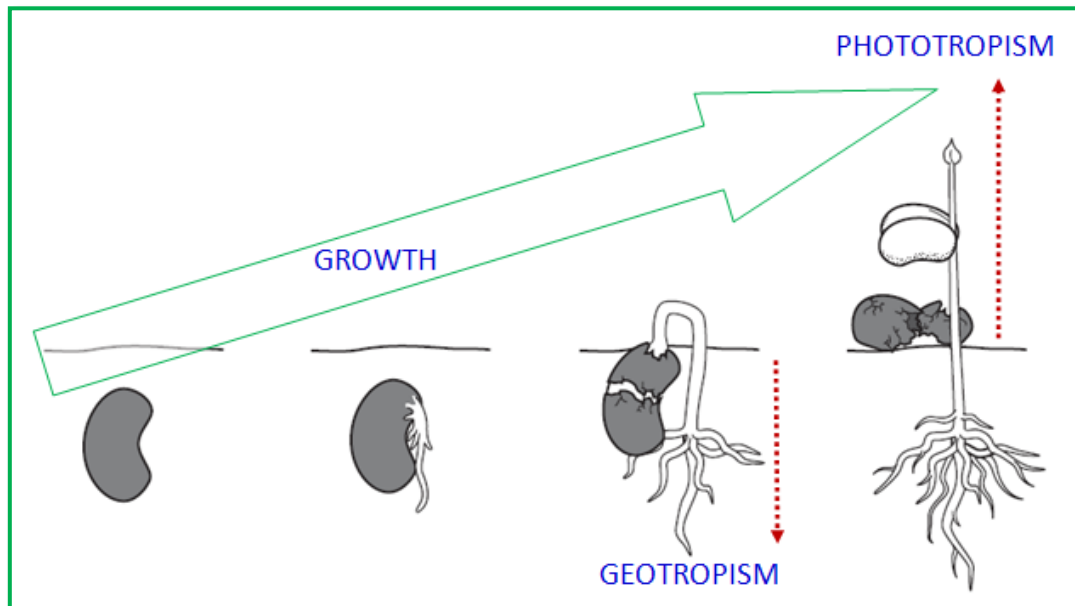
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EDUCATALYST



S2

B



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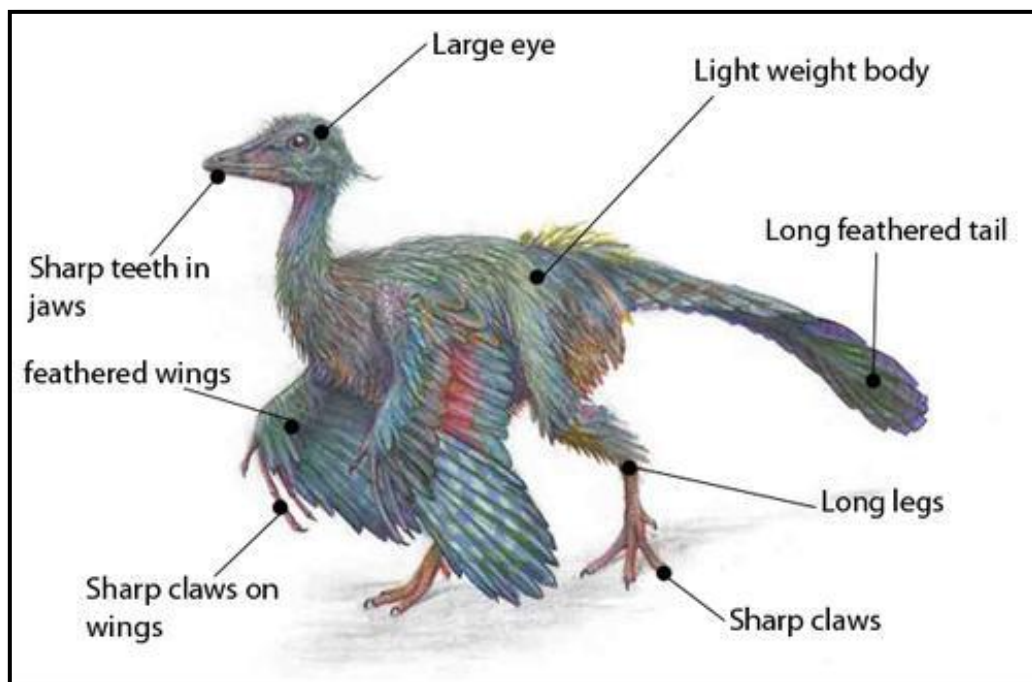


S3

C

Common ancestors for two species can be found by a study of transitional fossils which show traits of both species suggesting branching in the EVOLUTION process.

One of the most common transitional fossils is the ARCHAEOPTERYX – a bird like reptile!
(Parrot – bird, Lizard – reptile)

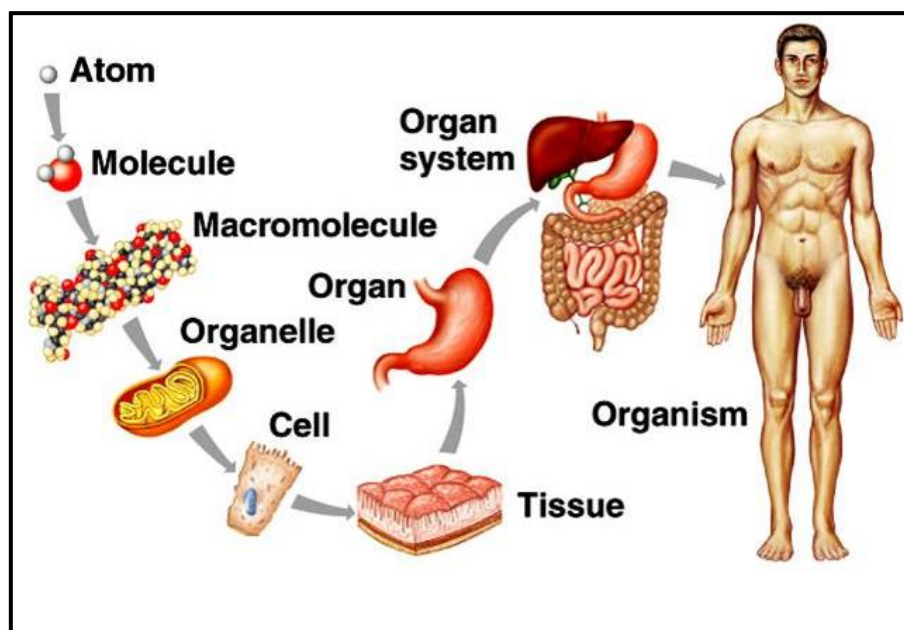
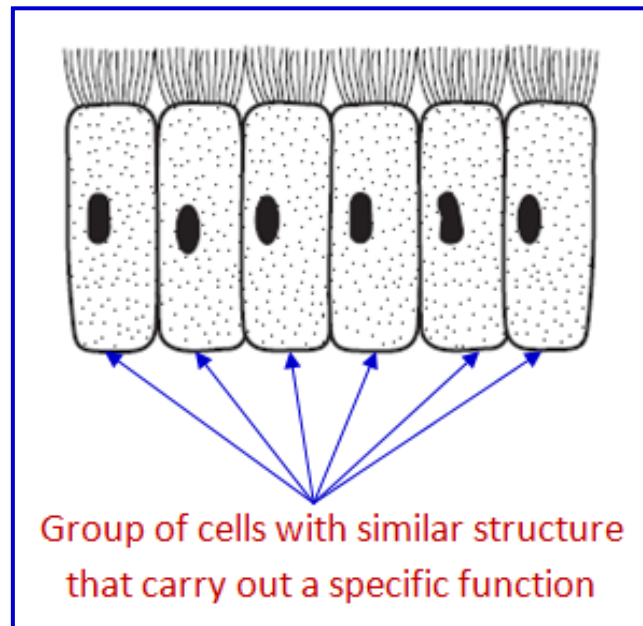
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EDUCATALYST



S4

D

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EDUCATALYST



S5

C

$$\text{Magnification} = \frac{\text{size of image}}{\text{size of specimen}} = \frac{45}{25} = 1.8$$

∴ magnification of the photograph = ×1.8

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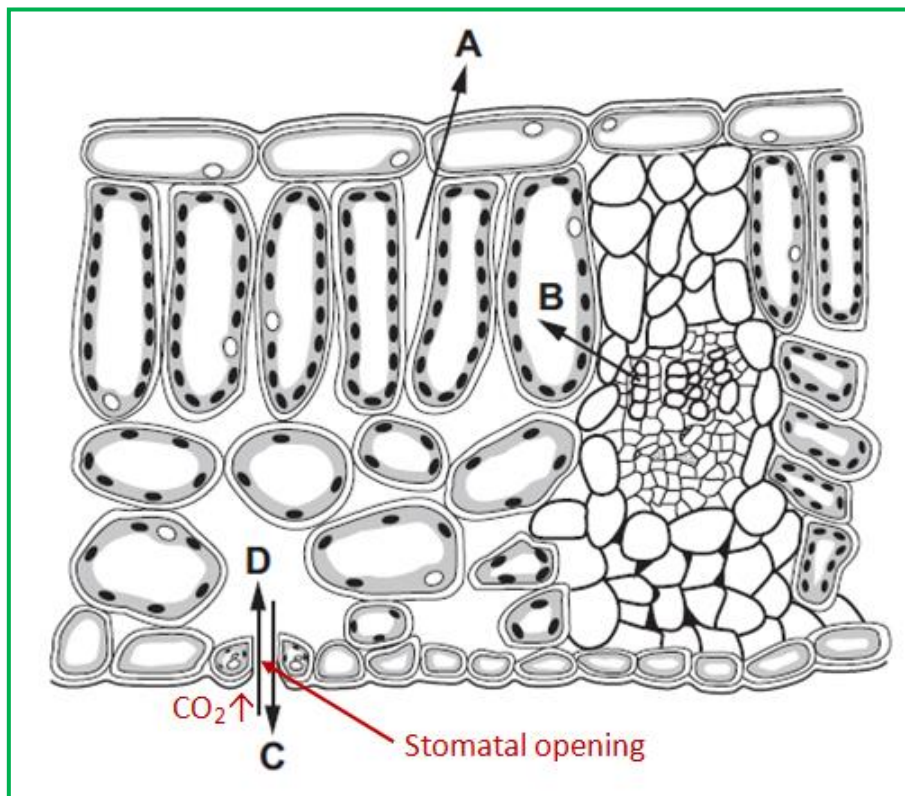
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S6

D

During daytime (sunny day), Carbon dioxide from the air diffuses into the leaves through the stomata.



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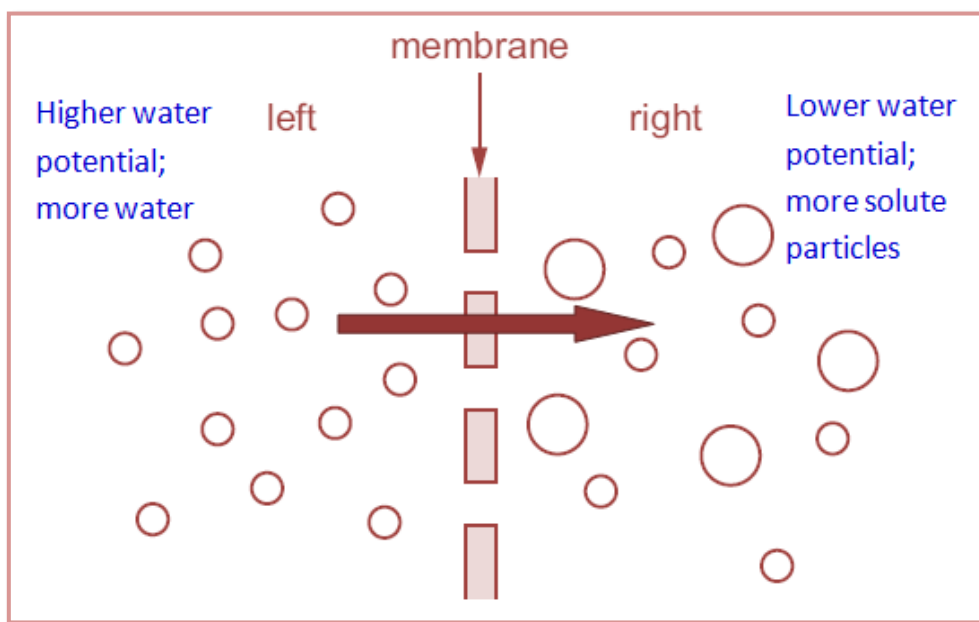
S7

C

Osmosis is the spontaneous NET (**overall**) movement of solvent molecules through a semi-permeable membrane into a region of higher solute concentration in the direction that tends to equalize the solute concentration on both the sides.

key

-  molecule of water
-  molecule of dissolved substance



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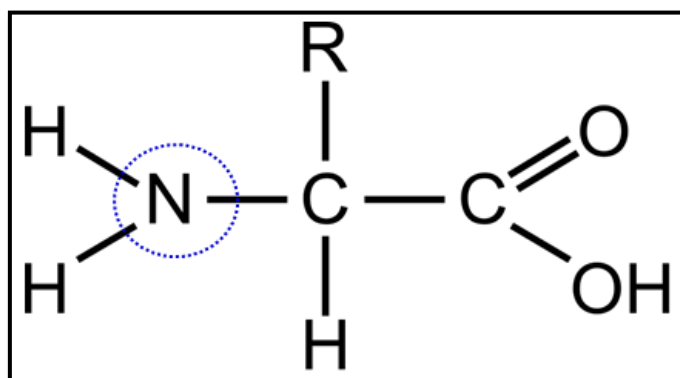


S8

C

Proteins are biological polymers of Amino acids.

General structure of an Amino acid



Carbohydrates are made up of Carbon, Hydrogen and Oxygen atoms ONLY.

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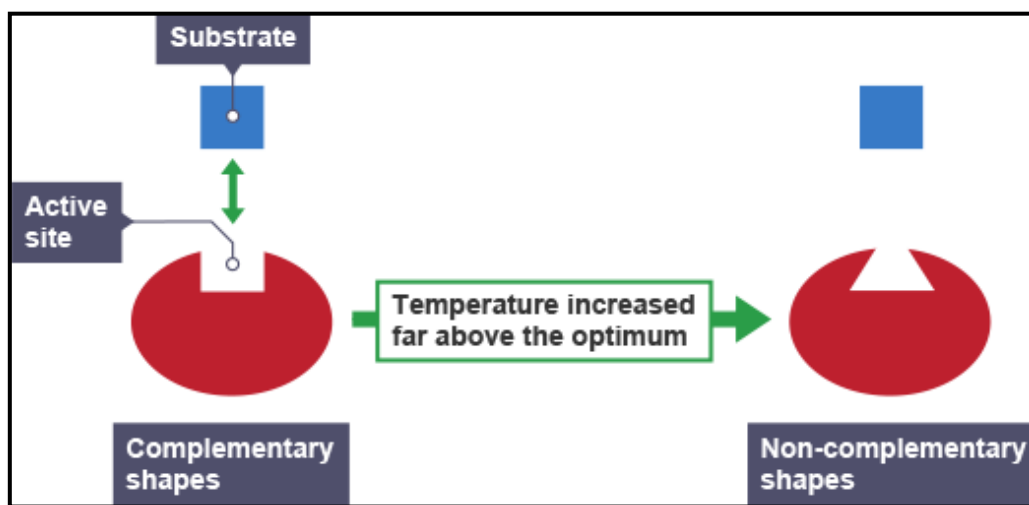
EDUCATALYST



S9

A

The Enzymes get **DENATURED** at a temperature above 60°C causing the active site to lose its natural shape. The substrate can no longer fit into the active site resulting in loss of enzyme activity.

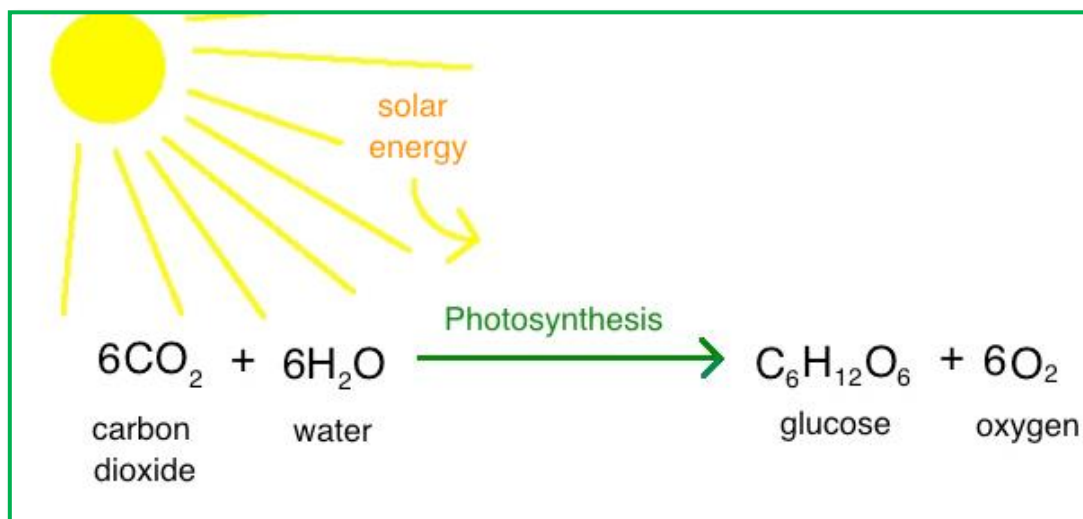

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EDUCATALYST



S10

B



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EDUCATALYST

**S11****D**

Ingestion* is the process of taking in food, drink or other substances through the mouth into the gastro-intestinal tract.

*eating, drinking, swallowing

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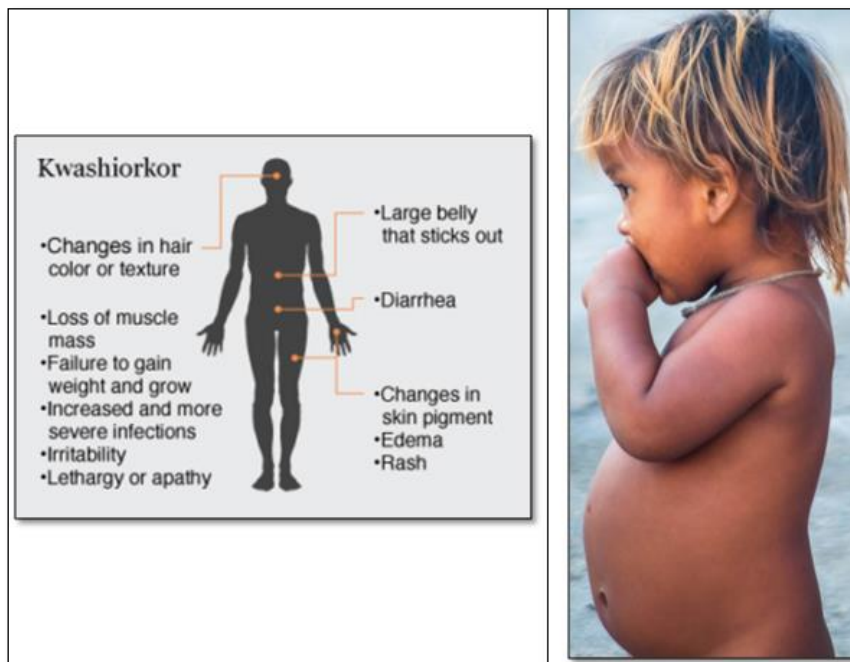
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S12

C

Kwashiorkor is caused by prolonged consumption of a PROTEIN DEFICIENT diet.



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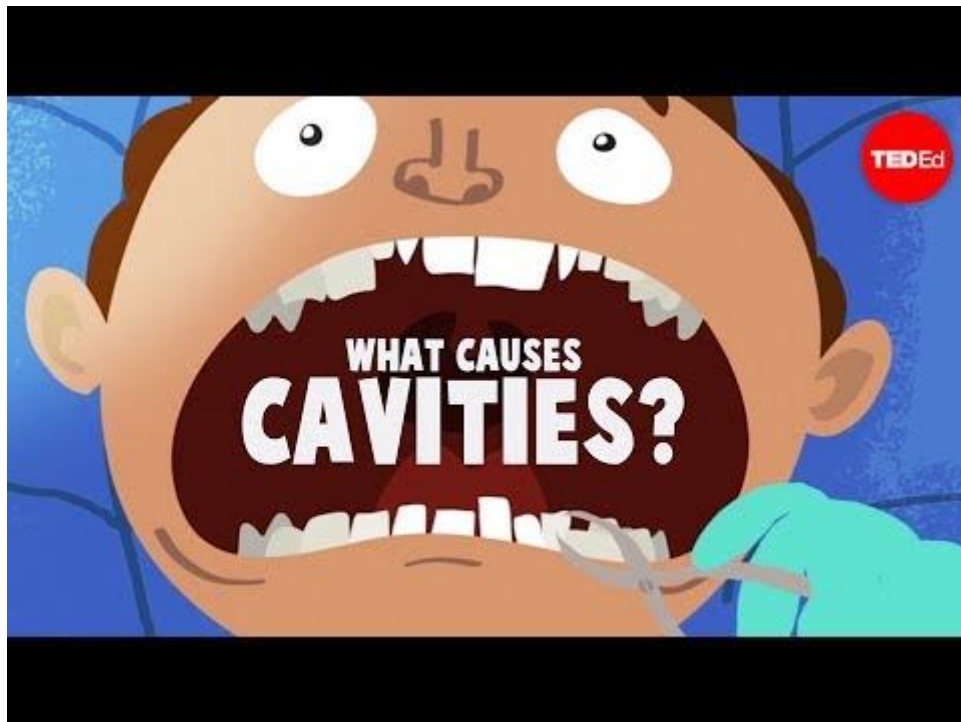
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S13

A

Tooth decay begins when small holes (cavities) form in the tooth enamel. These cavities are formed by specific types of bacteria that feed on sugars (from the food we eat) and produce acids that destroy the tooth enamel.

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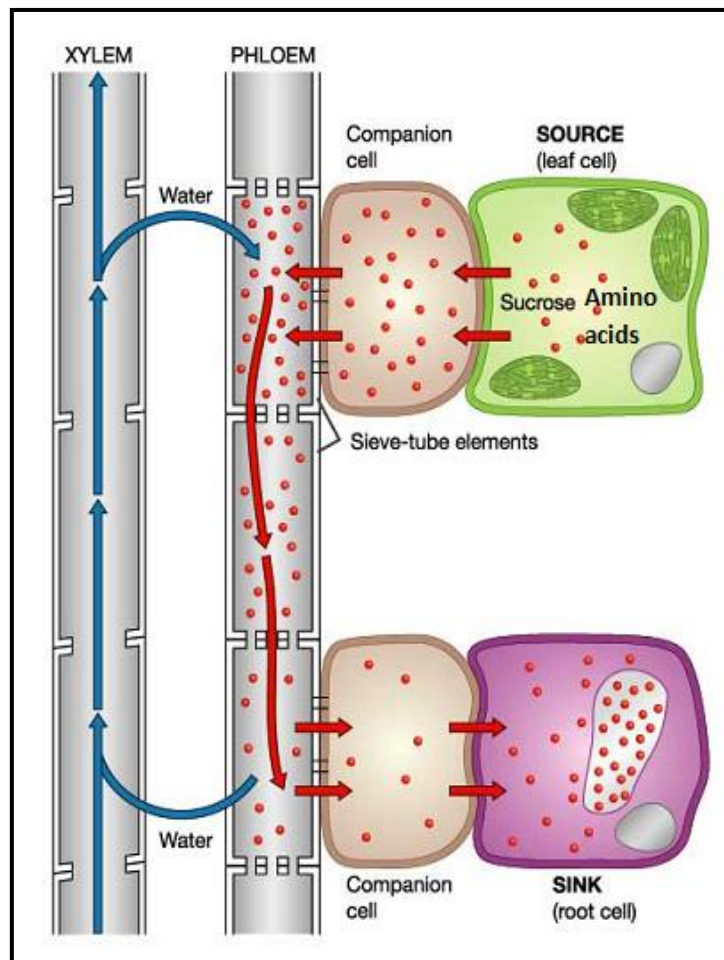
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S14

B

Translocation



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EDUCATALYST



S15

C

The **LYMPHATIC SYSTEM** is an important component of the immune system. The primary function of the lymphatic system is to transport LYMPH – a fluid containing **infection fighting** white blood cells – throughout the body.

<https://www.livescience.com/26983-lymphatic-system.html>

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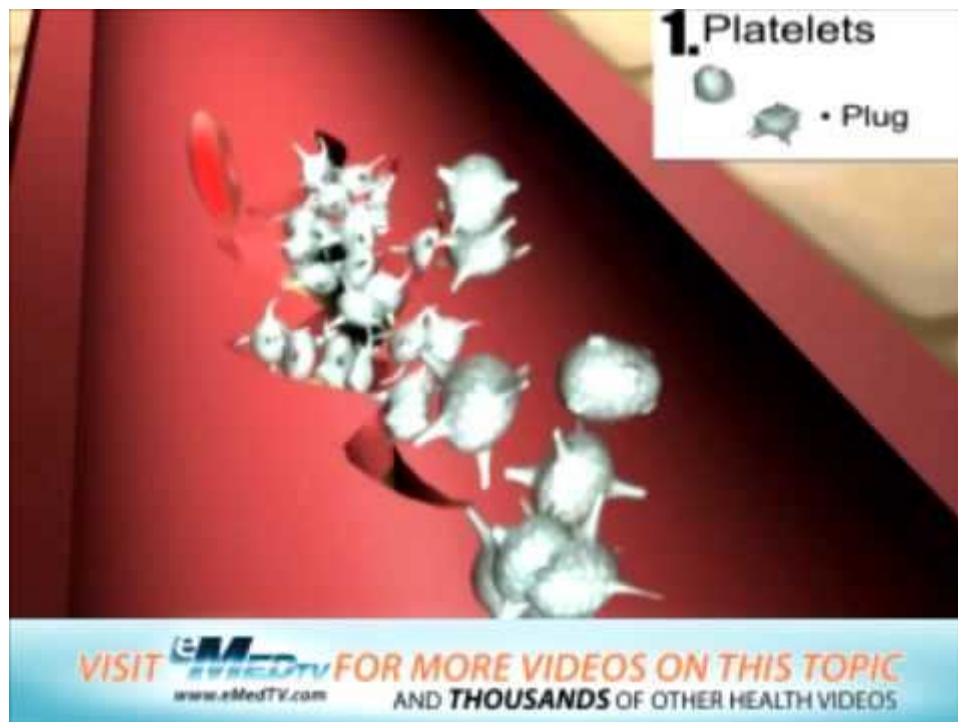
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S16

C

Platelets also called thrombocytes (blood clot cells) are components of the blood. They work along with other coagulation factors to stop bleeding by clumping and clotting blood vessel injuries.



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S17

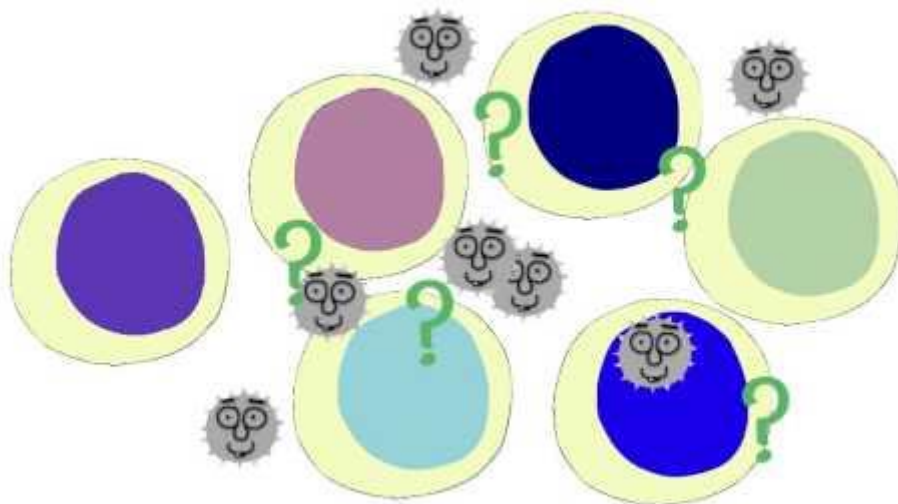
D

Active Immunity

Develops when an individual's own cells produce ANTIBODIES in response to a pathogenic infection/vaccination

Passive Immunity

Provided by giving ANTIBODIES through an external source instead of producing them through an individual's own immune system



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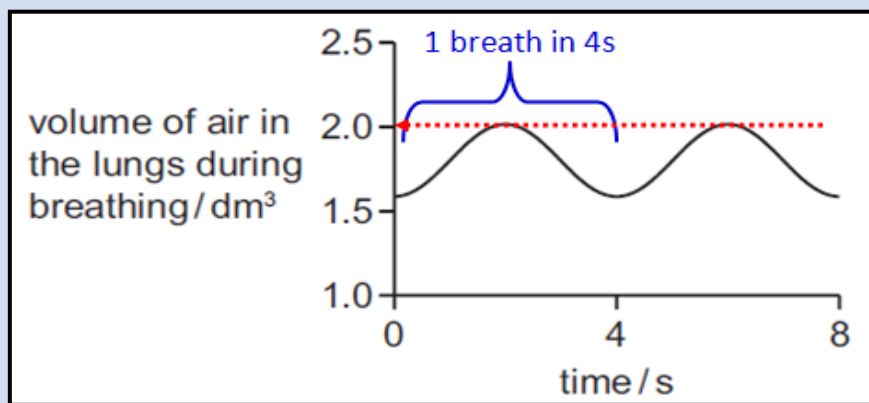
S18

C

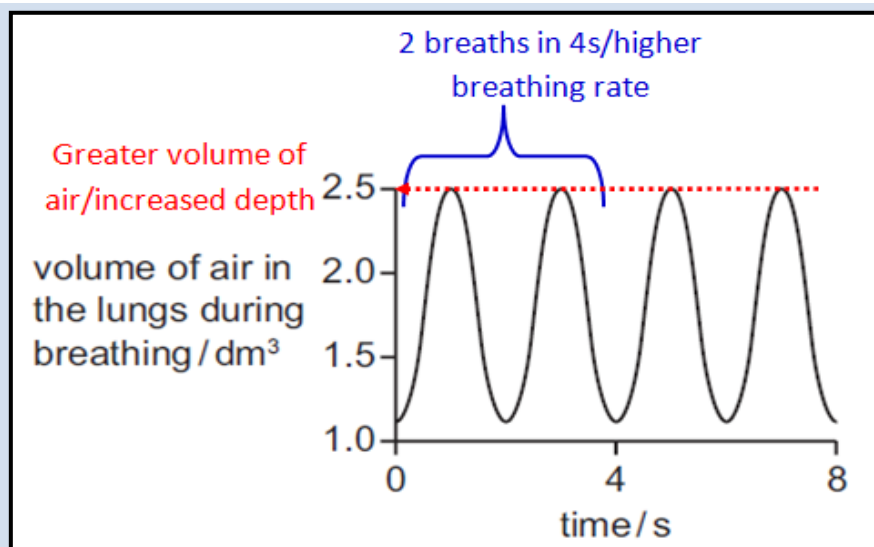
During exercise, the physical activity increases and muscle cells respire more than they do in the resting phase.

The rate and depth of breathing increases during exercise to ensure that more Oxygen is absorbed into the blood and more CO_2 is removed from it.

Before exercise



After exercise



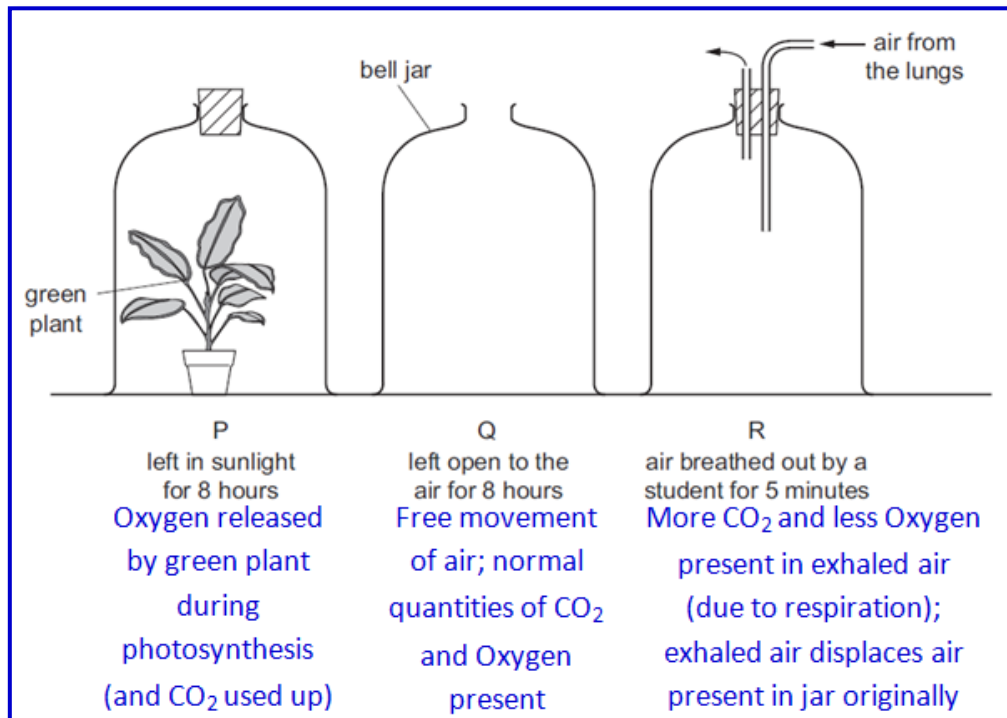
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S19

B



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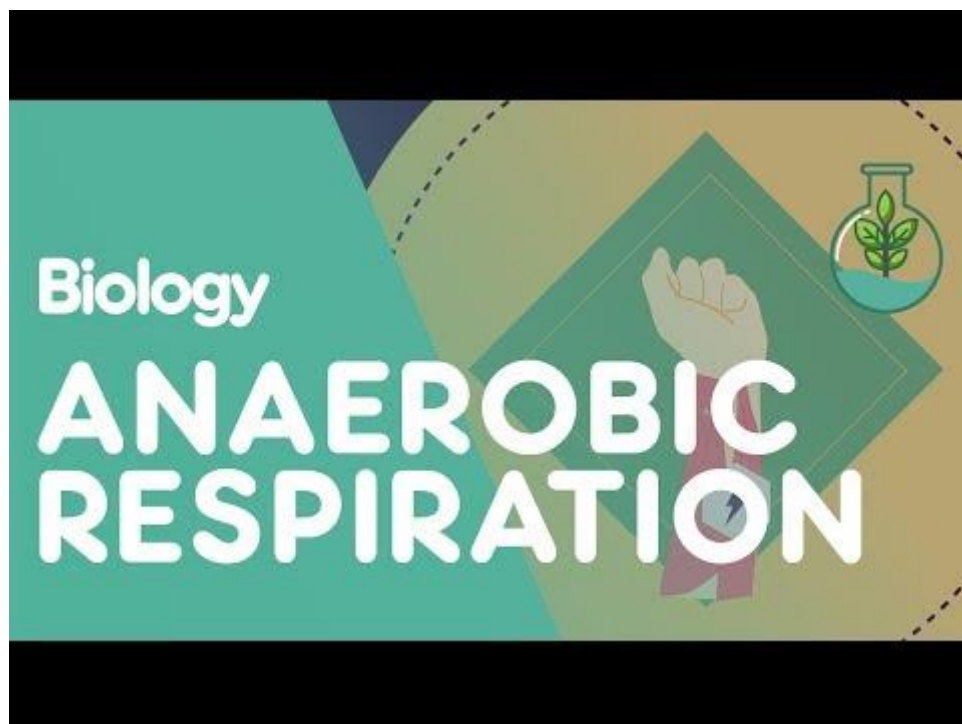
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**S20****D**

During vigorous physical activity Oxygen cannot be delivered fast enough to meet the energy requirements of the respiring muscle cells.

As a result, the cells respire anaerobically and convert Glucose to **LACTIC ACID** in the process.

The build up of lactic acid in the muscles causes fatigue.

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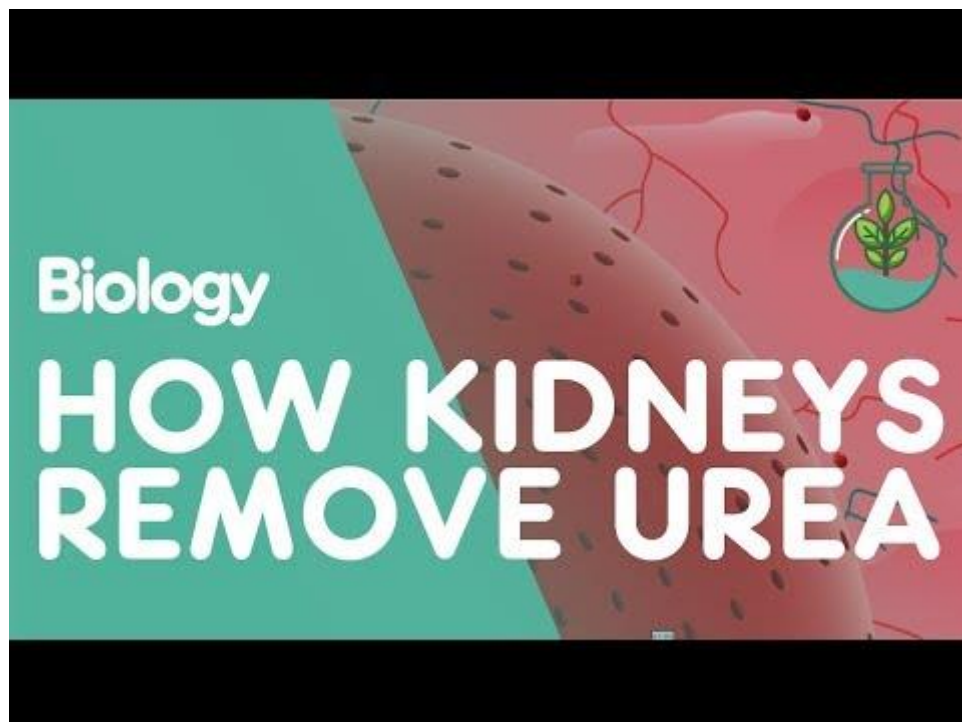


S21

A

Blood cells and plasma PROTEINS are not filtered through the glomerular capillaries because they are relatively larger in size.

Water, salts, glucose and urea form the glomerular filtrate which is eventually excreted as urine after reabsorption in the renal tubules.



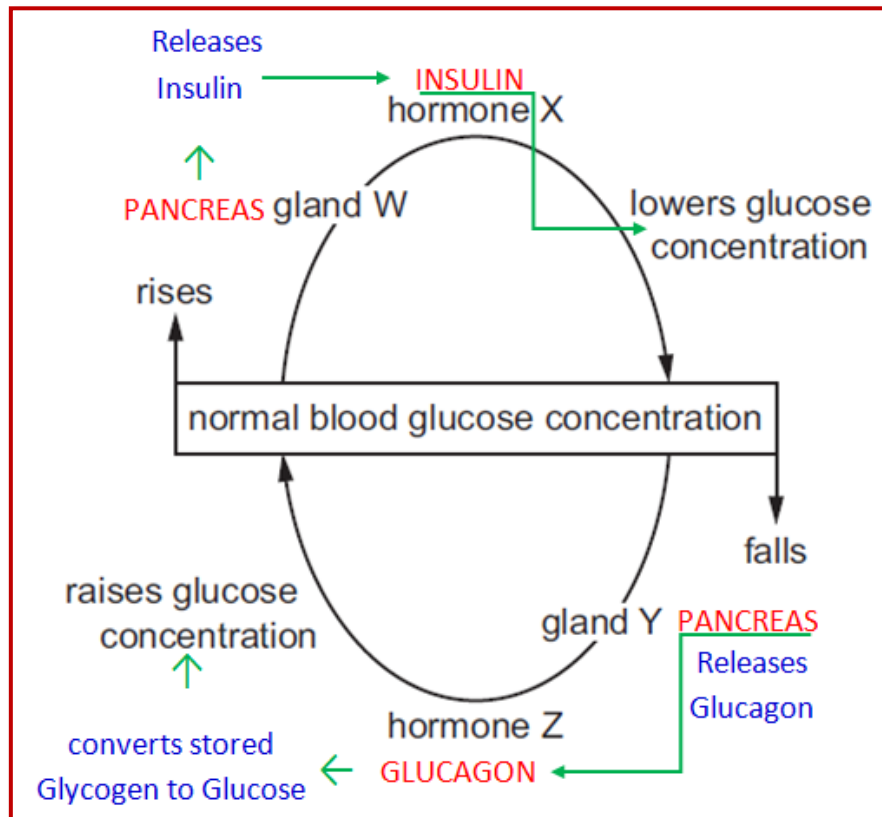
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EDUCATALYST



S22

D



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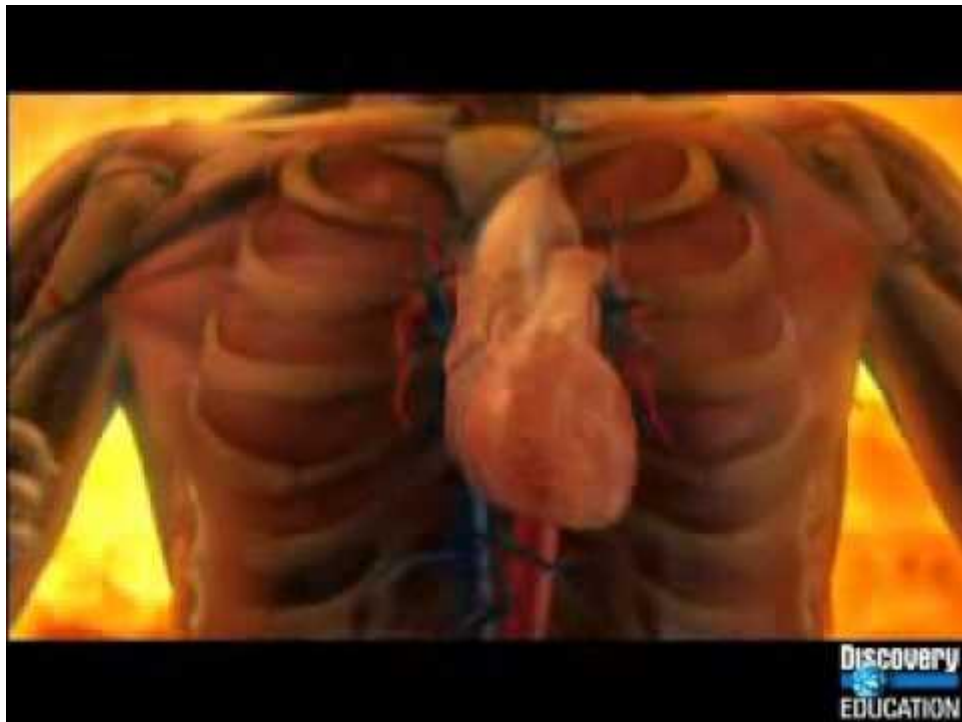
EDUCATALYST



S23

D

Adrenaline plays an important role in the fight or flight response by increasing the blood flow to the muscles. This causes an increase in the cardiac output leading to **increase in breathing rate**, **higher pulse rate** and **dilation of pupils**.

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EDUCATALYST

**S24****A**

The rate of Photosynthesis increases with light intensity but is eventually limited by the percentage of Carbon dioxide.

Once the maximum rate of fixation of CO₂ at a particular concentration is reached, further increase in light intensity will not increase the rate of Photosynthesis.

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EDUCATALYST



S25

B

REPRODUCTION IN PLANTS

SEXUAL

- TWO PARENTS ARE NEEDED
- SLOW INCREASE IN POPULATION
- GENETIC VARIATION OCCURS
- SPECIES CAN ADAPT TO NEW ENVIRONMENTS

ASEXUAL

- ONLY ONE PARENT IS NEEDED
- POPULATION INCREASES RAPIDLY
- NO GENETIC VARIATION
- SPECIES CANNOT ADAPT TO NEW HABITATS

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EDUCATALYST

**S26****D**

Sexual reproduction leads to genetic variation in offspring by combining characters from both male and female parent.

Different male and female plant would provide scope for **more variation due to different set of genes.**

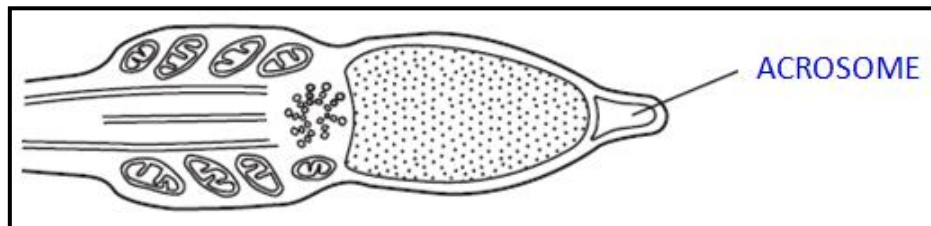
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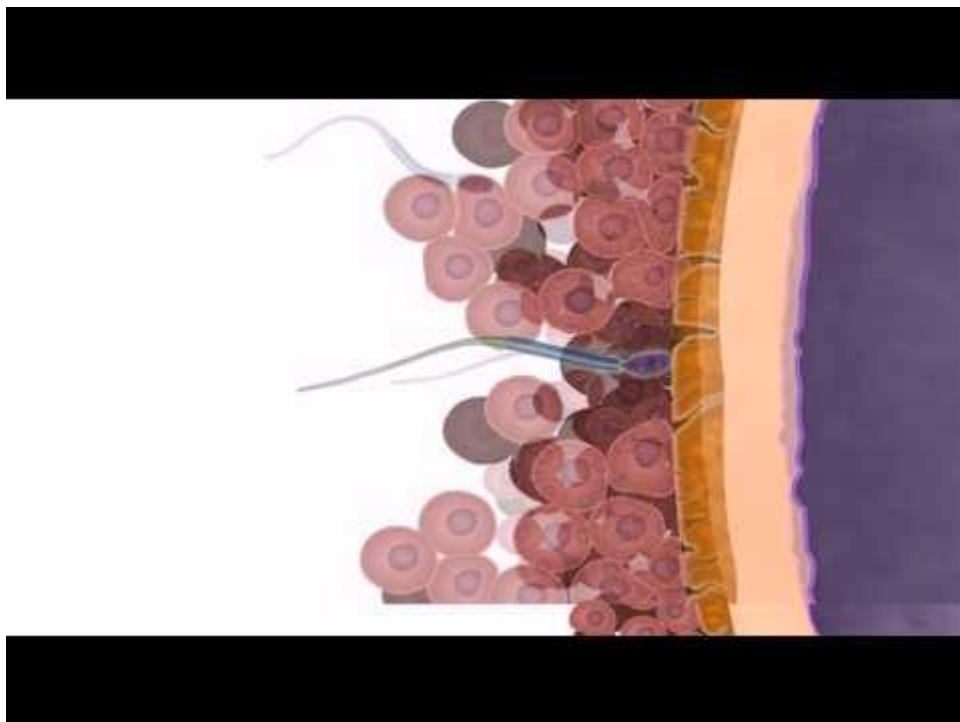
S27

C



The Acrosome releases Hyaluronidase enzyme which digests the Hyaluronic acid present on the cell membrane of ovum.

This enables the haploid nucleus in the sperm cell to join with the haploid nucleus in the ovum.



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EDUCATALYST

**S28****B**

Some women experience difficulty in becoming pregnant because they are unable to produce enough FSH* to allow their eggs to mature.

Fertility drugs contain FSH, which stimulate the follicle (egg) to develop and mature in the ovary.

FSH also stimulates the development of multiple eggs for in-vitro fertilization.

*FSH – follicle stimulating hormone

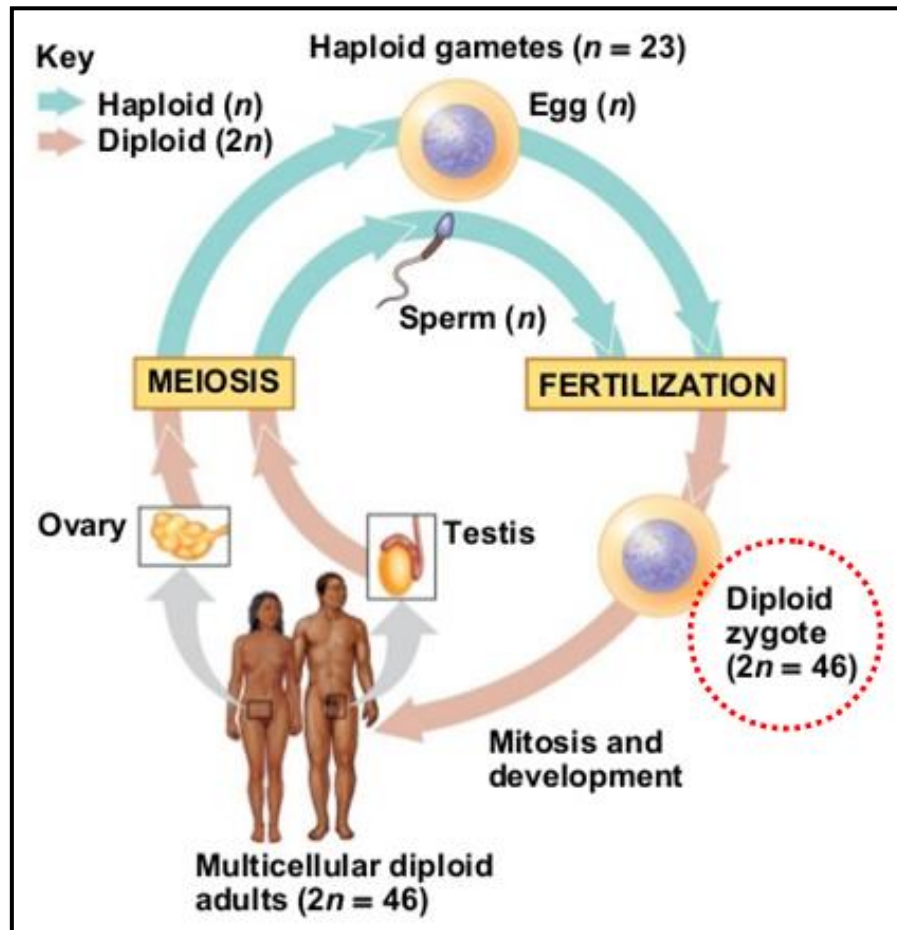
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EDUCATALYST



S29

B



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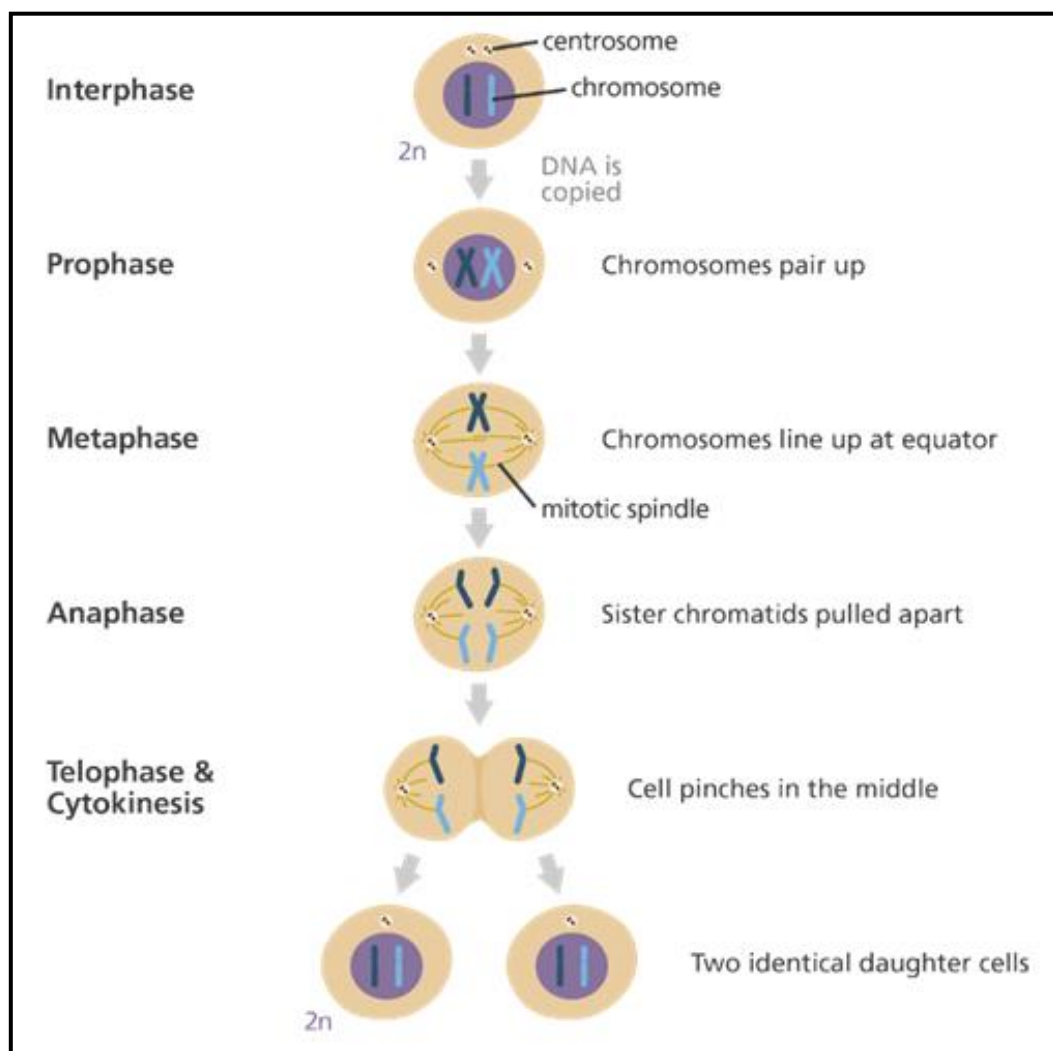
EDUCATALYST



S30

C

In mitosis, the daughter cells formed are identical to the parent cell.
Hence, when a cell with 16 chromosomes divides twice by mitosis, the daughter cells formed have 16 chromosomes.


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EDUCATALYST



S31

C

I^A = dominant over I^o

I^B = dominant over I^o

I^o = recessive

Man of genotype $I^A I^o$ × Woman of genotype $I^A I^o$

	Male gametes	
Female gametes	I^A	I^o
	$I^A I^B$	$I^o I^B$
	$I^A I^o$	$I^o I^o$

∴ the chance that the child has the same blood group as one of its parents = $\frac{2}{4} = \frac{1}{2}$

* $I^A I^B \rightarrow$ blood group AB

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EDUCATALYST

**S32****B**

Body size is governed by both genetic and environmental factors.

For instance, a person may have inherited the genes for being tall, but lack of proper nutrition in the active growth years may prevent him/her from gaining height.

Blood group, gender and tongue rolling are exclusively governed by genetic factors.

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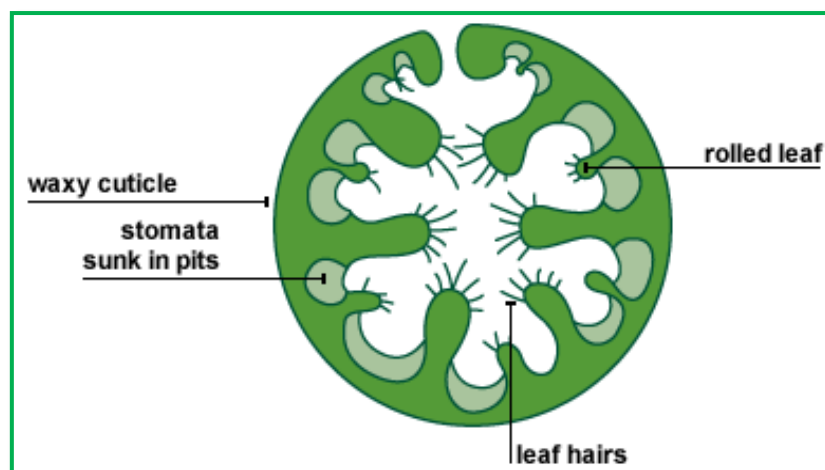
S33

C

Xerophytes are adapted to survive in environments with scarce water. Accordingly, they possess waxy cuticle, sunken stomata lined with fine hairs and rolled leaves, all of which help in **reducing the loss of water due to transpiration**.

The stomatal hairs trap the moist air and lengthen the diffusion pathway, thereby reducing evaporation.

Rollled leaves reduce the surface area exposed to wind (prevent drying).



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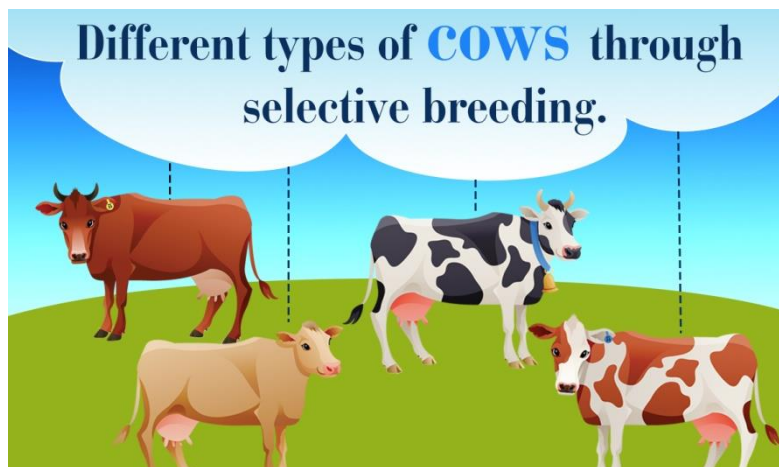
EDUCATALYST



S34

C

Artificial selection is selective breeding which puts **humans in control of choosing traits** that will show up in future generations regardless of the natural environment of species. It is used extensively in plant and animal breeding.

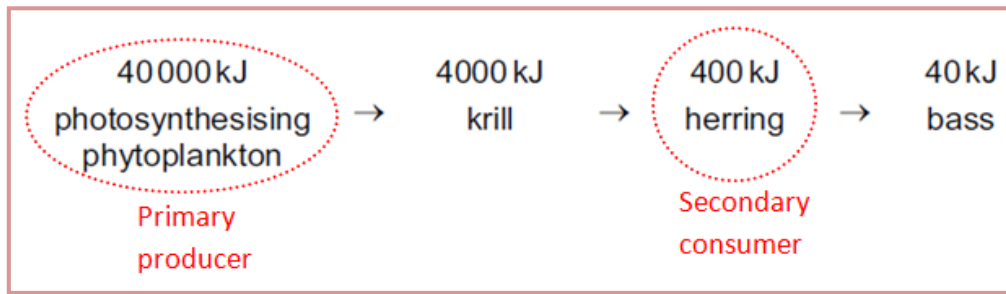
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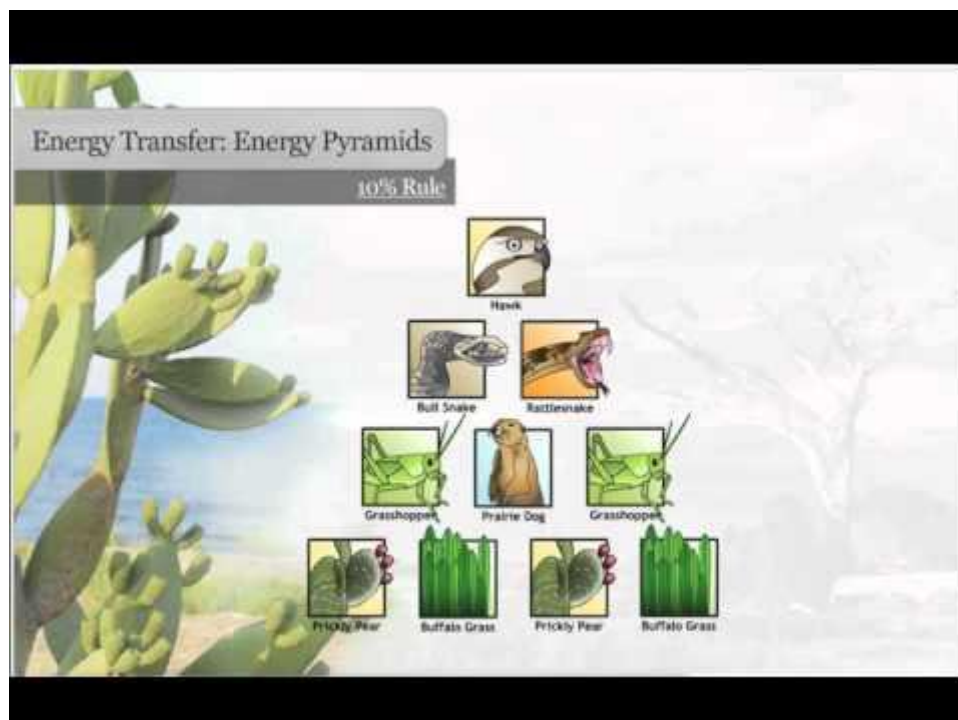


S35

C



$$\frac{400}{40000} \times 100 = 1\%$$



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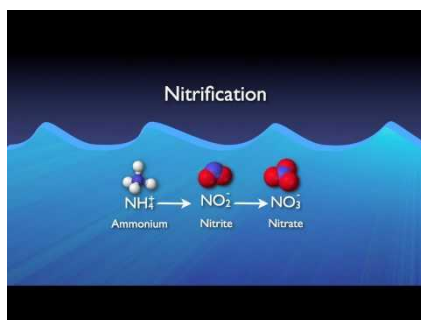
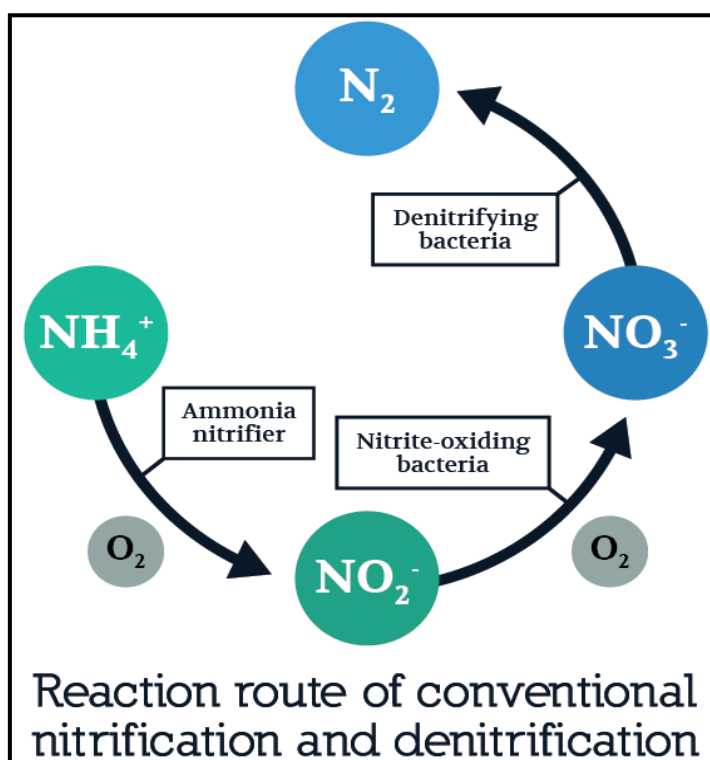


S36

C

Denitrification is the reverse of nitrification.

The process involves the reduction of nitrates to gaseous Nitrogen by denitrifying bacteria through a series of biochemical processes. It is an undesirable process as it reduces the percentage of Nitrogen in the soil.



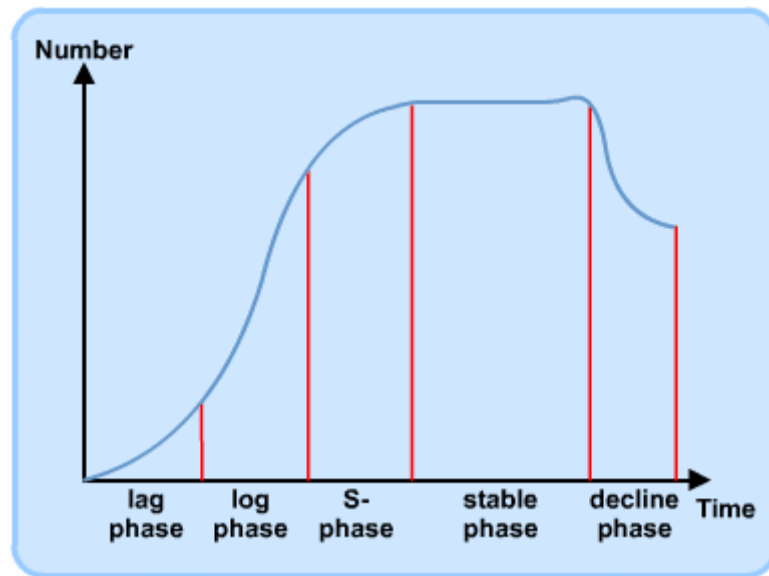
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S37

D



In the log phase, the population grows exponentially; availability of food, water and space is ideal and maximum growth rate can be achieved if the rate of reproduction is high.

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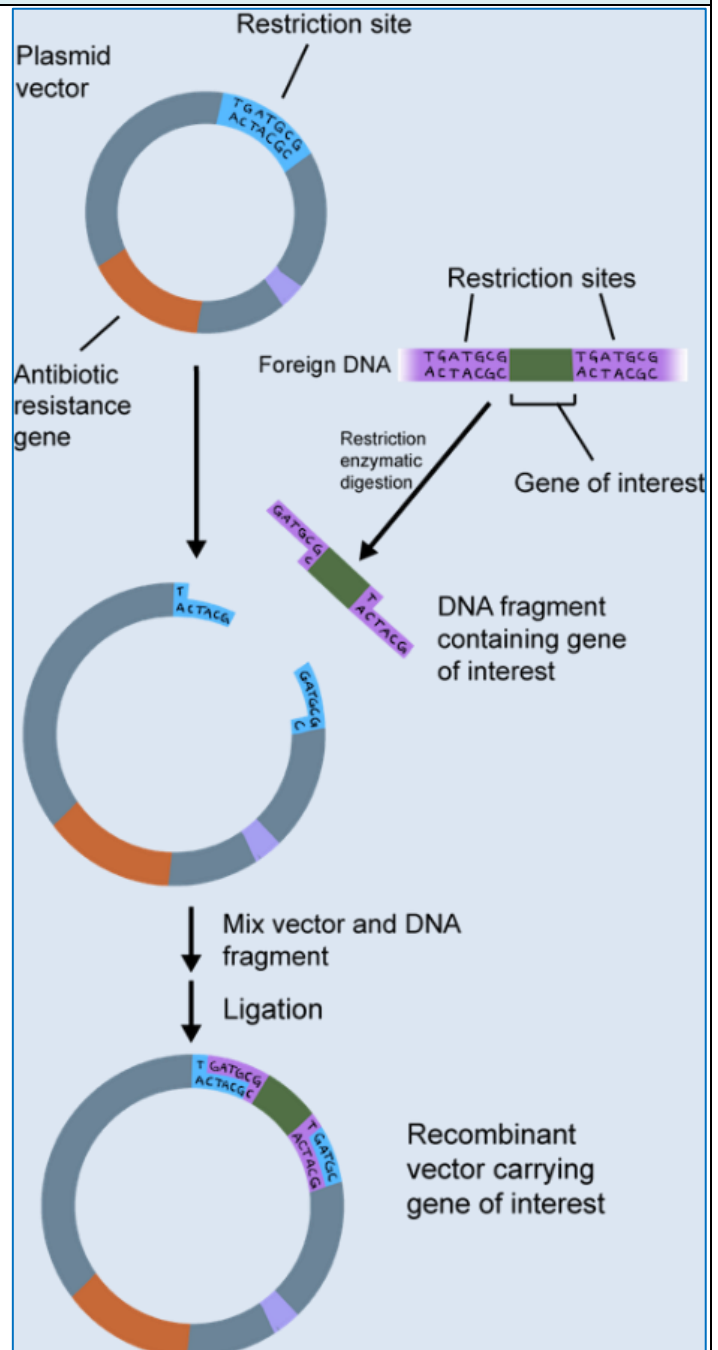
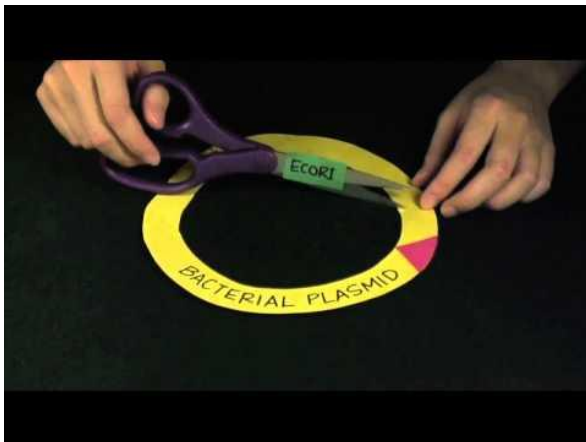
S38

D

Genes are isolated from human DNA using **RESTRICTION** enzymes.

A bacterial plasmid is cut with the same enzyme forming **STICKY ENDS**.

The human DNA is inserted into the bacterial plasmid using the enzyme **LIGASE** forming a **RECOMBINANT** plasmid.



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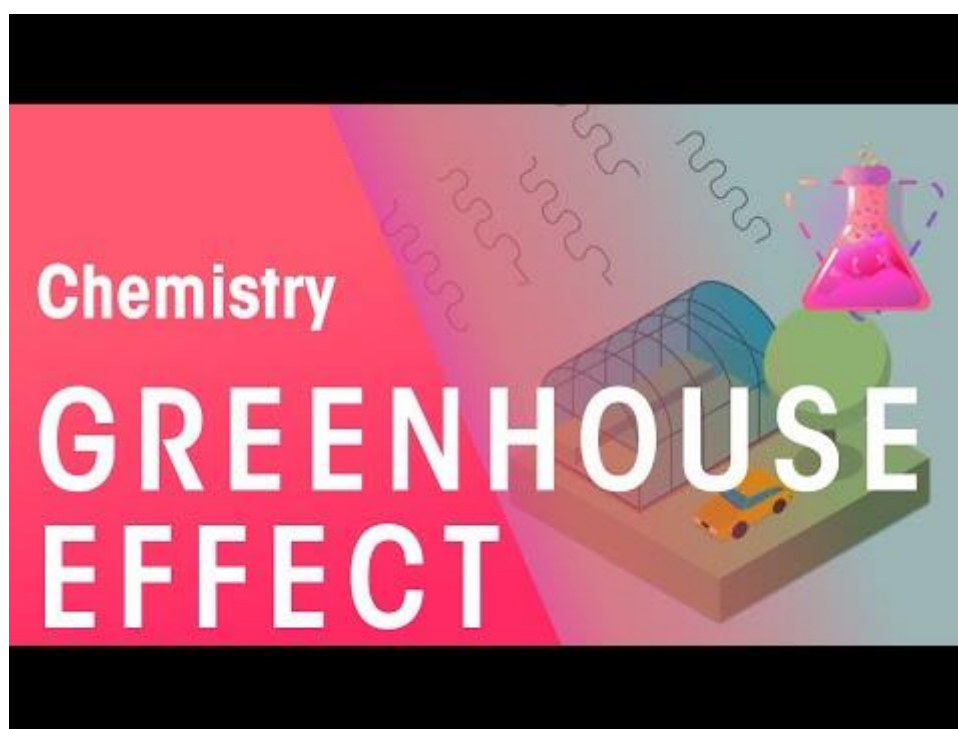
S39

A

Greenhouse effect leads to global warming – an increase in the average global temperature.

CO₂ is a greenhouse gas – traps radiation!!!

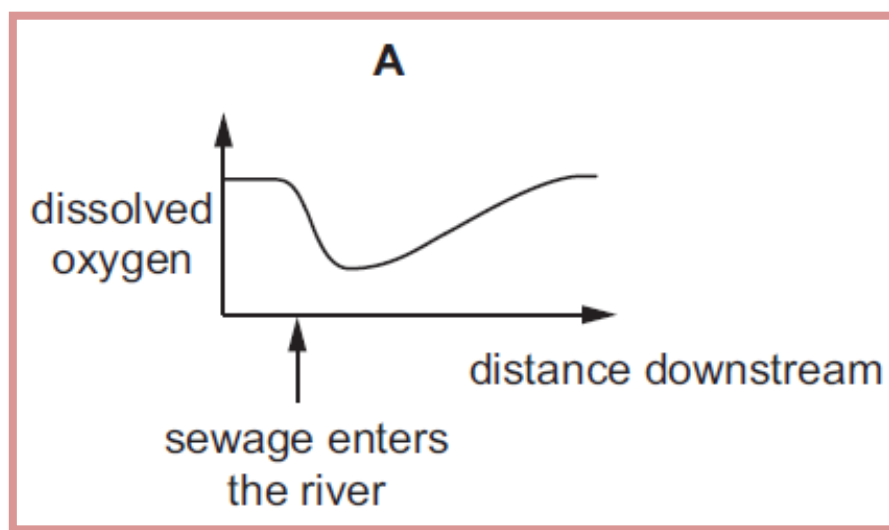
Trees use up CO₂ during photosynthesis. Cutting down trees would reduce this uptake and disturb the CO₂ balance.

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EDUCATALYST

**S40****A**

Raw sewage* contains several mineral ions and organic materials that react with the Oxygen and decrease the dissolved oxygen content.
Hence the dissolved Oxygen decreases as the raw sewage enters the river.



*Raw sewage = Untreated sewage

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