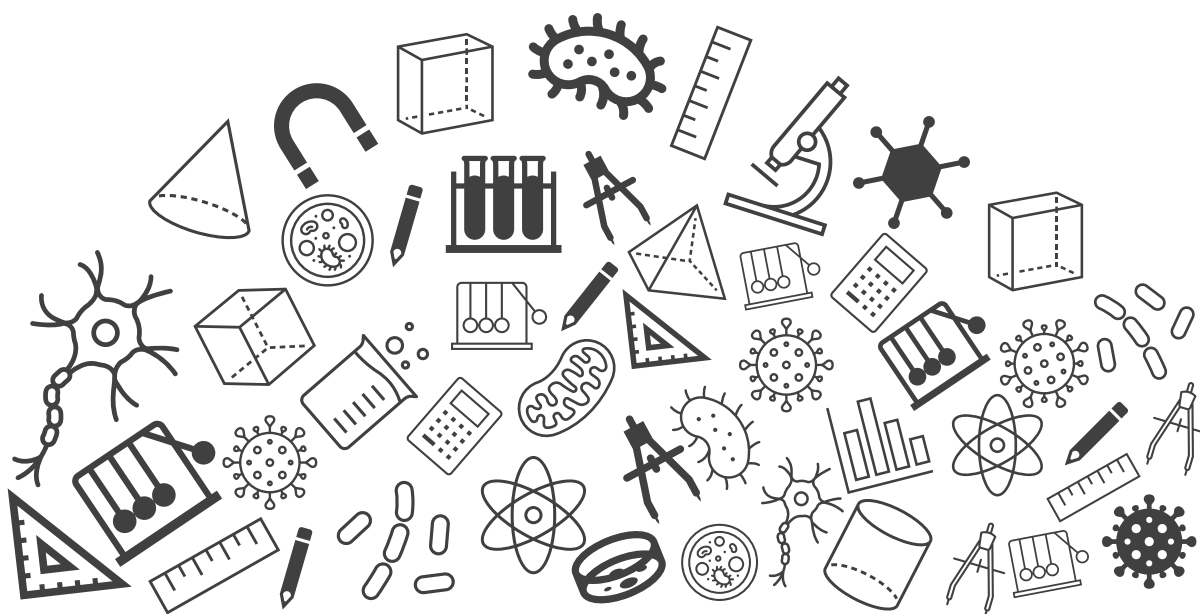




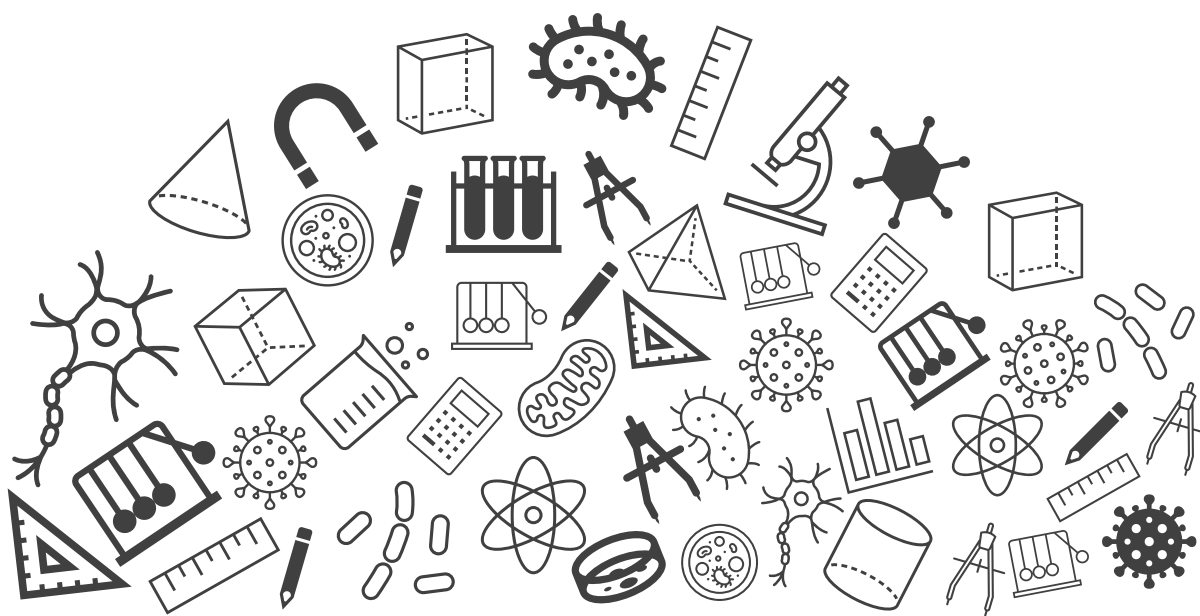
Grade 10: Science

Exam Important Questions





Heredity and Evolution



Heredity and Evolution: Mendel's Experiments and Human Evolution

1. Mention the advantages of selecting pea plant for the experiment by Mendel? [3 Marks]

Advantages of selecting pea plant :

(i) Pea plant showed visible contrasting characters, e.g., seed colour, texture, plant height, flower colour, etc. It was easy to track the passing of these characters in the progeny.

(0.5 Mark)

(ii) The pea flowers are bisexual. Therefore, it undergoes self-pollination and produces true breeding varieties.

(0.5 Mark)

(iii) It was easy to practice cross-pollination.

(0.5 Mark)

(iv) Many offsprings produced in one generation.

(0.5 Mark)

(v) Pea plant has a short life cycle.

(0.5 Mark)

(vi) It is easy to grow.

(0.5 Mark)

2. How does genetic drift affect evolution? [3 Marks]

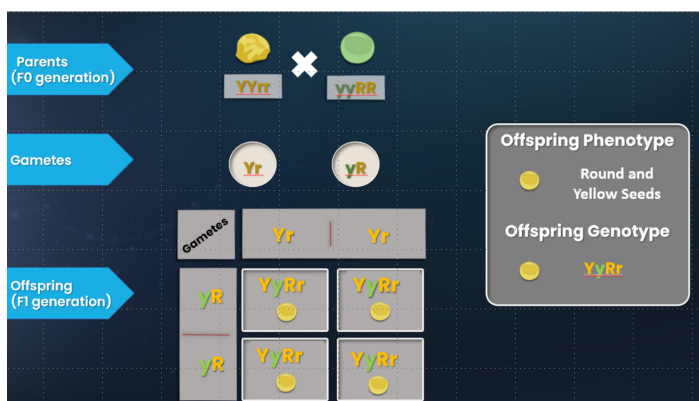
Genetic drift is the change in the gene frequency that leads to large changes in small populations over a short period. [1 Mark]

Evolution is the series of gradual changes which an organism undergoes over some time. [1 Mark]

With time, the random genetic drift accumulates in a population and can cause a change in the genetic makeup because of the loss of alleles. This may lead to evolution. [1 Mark]

Heredity and Evolution: Mendel's Experiments and Human Evolution

3. A pea plant having homozygous yellow and wrinkled seeds is crossed with a pea plant having homozygous green and round seeds. What will be the genotype and phenotype for the cross in the F₁ generation? [3 Marks]



[2 Mark for cross], [1 Mark for genotype and phenotype]

4. Name the information source for making proteins in the cells. [2 Marks]

Deoxyribonucleic acid (DNA) present in the chromosomes of cell nucleus is the information source for making proteins. [1 Mark]

The DNA has genes which have the genetic information encoded for the release of enzymes. The enzymes are responsible for functioning and the expression of traits. [1 Mark]

5. Human skin has different colours, what kind of trait is this? What can be the reason behind these colour variations? [3 Marks]

The different colours of human skin occur due to changes in the genetic makeup, and they are inherited from one generation to another. This implies that they are inherited traits. [1.5 Marks]

The variation in skin colour can be a result of errors during DNA copying, crossing over, and mutations. [1.5 Marks]

Heredity and Evolution: Mendel's Experiments and Human Evolution

6. Natural selection is a factor which decide the survival of a variation. Explain this statement, giving examples. [5 Marks]

Natural selection is a process in which organisms better adapted to their environment tend to survive and produce more offspring. [2 Marks]

So as the definition explains if the variation of any organism doesn't fit in the environment around it, natural selection will discard that variation and that organism won't survive. [1 Mark]

For instance, suppose there's a patch where a population of red beetles was living. Now, there was a group of crows which came on that patch and start hunting the red beetles.

Now, the red colour beetles were easily visible to the crows and so they got easily hunted.

Over time a sudden variation arose in the colour and a new green colour beetle was born. Now, this green colour beetle merges with the patch around it and can't be seen by the crows, which saves it from getting hunted.

And these green beetles further reproduce to increase in number. This clearly shows how the variation adapted in nature and successfully survived. [2 Marks]

7. State one characteristic which shows that the birds are very closely related to dinosaurs. [1 Mark]

The presence of feathers on birds indicates that they are very closely related to dinosaurs. This is because, like birds, even dinosaurs had feathers, though they could not fly using their feathers. Feathers were used for insulation. [1 Mark]

8. How analogous organs can be evidence of evolution? [2 Marks]

The presence of analogous organs in different animals provides evidence for evolution by telling us that though they are not derived from common ancestors, they can still evolve to perform similar functions to survive, flourish and keep on evolving in the prevalent environment. Thus, the presence of analogous organs provides a mechanism for evolution. [2 Marks]