

Question  
No.

The Model Hints have been constructed to train students about how to write relevant and succinct answers in exam condition.

an organism slightly better to its environment are selected for: a few more individuals with more of the helpful trait survive, and a few more with less of the helpful trait die. Very gradually, over a long time, the population changes. Change is slow, constant, and consistent.

### **Punctuated Equilibrium**

The theory of punctuated equilibrium, largely crystallised and popularised by **Eldredge and Gould** (1972), ascribes that the fossil record accurately reflects evolutionary change. It maintains that macroevolutionary patterns of species are typically ones of morphological stability during their existence, and that most evolutionary change is concentrated in events of speciation – with the origin of a new species usually occurring during a geologically short periods of time when the long-term stasis of a population is punctuated by this rare and rapid event of speciation (Gould and Eldredge 1977). The sudden transitions between species may be measured on the order of hundreds or thousands of years relative to their millions of years of existence.

Mutations are random changes in the DNA that are not inherited from the previous generation, but are passed on to generations that follow. Though mutations are often harmful, the mutations that result in punctuated equilibrium are very helpful to the individuals in their environments. Because these mutations are so different and so helpful to the survival of those that have them, the proportion of individuals in the population who have the mutation/trait and those who don't changes a lot over a very short period of time. The species changes very rapidly over a few generations, then settles down again to a period of little change.

### **Other Theories**

**Theory of neutralism by Kimura:** The theory of neutralism holds that most mutant genes are selectively neutral – that is, unaffected by natural selection, since they are functionally equivalent in terms of an individual's survival and reproduction – and yet they become passively fixed within species. That is, if evolution involves a change in allele frequency, then most evolutionary change and variability within species are not caused by natural selection, but a random drift of mutant genes.