Patterns of Evolution

**Evolution** refers to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
of organisms to the changing environment. It can occur quickly on a small scale (bacteria, viruses, insects) but for larger organisms it takes 100s or 1000s of years.

**Natural Selection**

* Conceived by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Organisms instinctively select mates with superior qualities in order   
    
  to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* An organism’s chances of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_are   
  also dependent on it having superior qualities.

**Mutation**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ changes in genetic code that produce offspring with different characteristics than their parents.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ increase chances of survival  
  (E.g. stronger legs for faster running)
* Animals with negative mutations likely \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  
  (E.g. a wing-less fly)

**Human-controlled processes** can also contribute to evolution

E.g. Selective breeding, hybridization (fruit and veg), genetic modification/engineering.

**Evidence in Fossils**

Evolutionary theories are based on the following:

* Examining the rapid evolution of simple organisms gives us ideas about how more complex creatures evolved. This is an example of *uniformitarianism* – the assumption that processes which operate now also operated in the past.
* **Faunal succession** – as you go through a vertical stack of rock layers, fossils always appear in the same order.
* **Adaptive Radiation** – the patterns in faunal succession show similar   
    
  species diverging (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) over time

There are two theories on how adaptive radiation has occurred.

1. **Gradualism** – slow, continuous changes in features due to natural selection.
2. **Punctuated Equilibrium** – abrupt changes in a short time, followed by very little change for a long time. Would be caused by massive environmental change (meteorites, volcanic eruptions, ice age, disease, cosmic radiation) that causes mass extinctions.