

Evolution and speciation Define evolution.	Evolution and speciation Why are acquired characteristics not evolution?
Evolution and speciation Lamarckism	Evolution and speciation What do sequence differences between two species show?
Evolution and speciation Why do base sequences show more differences than amino acid sequences?	Evolution and speciation How is selective breeding evidence for evolution?
Evolution and speciation Name crop varieties bred from wild cabbage.	Evolution and speciation Homologous structures

They are not genetic in origin, so they are not passed to offspring.

Change in the heritable characteristics of a population.

Fewer differences in base or amino acid sequences mean more recent common ancestry.

The rejected idea that characteristics acquired during an organism's life are inherited.

Breeds and crop varieties differ greatly from wild ancestors, showing how rapidly heritable characteristics can change.

The genetic code is degenerate, so some base substitutions do not change the amino acid.

Structures with the same basic structure, inherited from a common ancestor, that may have different functions.

Cabbage, kale, broccoli, cauliflower, Brussels sprouts and kohlrabi (all *Brassica oleracea*).

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Bones of the pentadactyl forelimb

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Analogous structures

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Give an example of analogous structures.

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Speciation

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Is gradual change within one species speciation?

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Two processes needed for speciation

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What separated bonobos and common chimpanzees?

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Allopatric versus sympatric speciation

Structures with the same function but different evolutionary origins, produced by convergent evolution.

Humerus; radius and ulna; carpals; metacarpals; phalanges in five digits.

Formation of new species by splitting of a pre-existing species. It increases the number of species; extinction decreases it.

Wings of birds and insects; camera eyes of octopuses and vertebrates; fins of sharks and dolphins.

Reproductive isolation (stops gene flow) and differential selection (gene pools diverge).

No. The number of species does not increase.

Allopatric: geographic isolation in different places. Sympatric: same place, behavioural or temporal isolation.

The Congo River: bonobos to the south, common chimpanzees to the north.

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Temporal isolation

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Adaptive radiation

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Example of adaptive radiation

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Why is a mule sterile?

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**What often prevents hybridization
between animal species?**

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**How does polyploidy cause abrupt
speciation?**

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**Plant genus with many species formed
by hybridization and polyploidy**

Rapid evolution of many species from one ancestor, each using a different niche, so related species coexist without competing.

Populations breed or flower at different times of day or year, so they do not interbreed.

It has 63 chromosomes (32 horse, 31 donkey) that cannot form homologous pairs in meiosis, so no viable gametes.

Galápagos finches, with beaks adapted to seeds, insects, cactus flowers or larvae.

A sterile hybrid doubles its chromosome number, becomes fertile and is reproductively isolated from both parents.

Courtship behaviour: species-specific signals mean individuals mate only with their own species.

Persicaria (knotweeds and smartweeds).