



Evolution (Speciation)

8 Evolution is the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept:

- 8.a** *Students know* how natural selection determines the differential survival of groups of organisms.
- 8.b** *Students know* a great diversity of species increases the chance that at least some organisms survive major changes in the environment.
- 8.c** *Students know* the effects of genetic drift on the diversity of organisms in a population.
- 8.d** *Students know* reproductive or geographic isolation affects speciation.
- 8.e** *Students know* how to analyze fossil evidence with regard to biological diversity, episodic speciation, and mass extinction.
- 8.f*** *Students know* how to use comparative embryology, DNA or protein sequence comparisons, and other independent sources of data to create a branching diagram (cladogram) that shows probable evolutionary relationships.
- 8.g*** *Students know* how several independent molecular clocks, calibrated against each other and combined with evidence from the fossil record, can help to estimate how long ago various groups of organisms diverged evolutionarily from one another.

WHAT IT MEANS TO YOU

All of the organisms in your environment have adaptations that arose through natural selection. The wings of birds, the compound eyes of ants, and the shapes of leaves are all traits that are advantageous in certain environments. As traits such as these are selected for, and others are selected against, the genetic make-up of species changes over time.

STANDARD	CHAPTERS	PUPIL EDITION
8.a	10, 11	304–309, 330–333
8.b	12	376–378
8.c	11	335–338
8.d	11	344–346
8.e	11, 12	347–351, 365–367, 379–383
8.f*	17	524–528
8.g*	17	530–532

SAMPLE QUESTIONS

1. After the mass extinction that ended the Cretaceous period 65 million years ago, flowering plants radiated and became the dominant plant type on Earth’s landmasses. Flowering plants that survived the mass extinction *probably*

8.a

- A were outcompeted by seedless plants.
- B inherited advantageous traits.
- C suffered increased predation.
- D produced toxins that kept dinosaurs away.

2. Two populations of a particular bat species exist in separate caves on an island. Over many generations, these populations diverge into two distinct species. Which of the following *best* explains how this speciation event could have happened?

8.d

- A The populations became isolated after the main entrance to one of the caves became blocked.
- B Gene flow between the two populations increased through immigration and emigration.
- C Natural selection favors bats with thicker fur.
- D Individuals from both populations began to eat a new type of fruit.

Answers: 1b, 2a