# What is Evolution and Speciation?

Worksheet

Speciation happens when populations of the same species become reproductively isolated - usually after a period of separation - and accumulate enough genetic differences that they can no longer produce fertile offspring together.

## Questions

1. Which factor is the classic trigger for allopatric speciation?

A) Random mating
B) A geographic barrier
C) Identical diets
D) Constant population size

2. Polyploidy leading to instant reproductive isolation without geographic separation is an example of:

A) Allopatric speciation
B) Sympatric speciation
C) Genetic drift only
D) Convergent evolution

3. Two species produce offspring that survive but are sterile (like mules). This is an example of:

A) Prezygotic isolation
B) Postzygotic isolation
C) Gene flow
D) Convergent evolution

4. What ultimately defines two populations as separate species under the biological species concept?

A) They live on different continents
B) They cannot produce fertile offspring together
C) They have different colors
D) They eat different foods

5. Darwin's finches on the Galpagos Islands descended from one mainland ancestor. How did so many finch species form?

6. Ensatina salamanders form a 'ring species' around California's Central Valley, where neighboring populations interbreed but the two ends of the ring cannot. Is this speciation?

7. A new plant species forms instantly when a hybrid's chromosome number doubles (polyploidy), even though both parent species still live in the same field. What type of speciation is this?

8. Define: What is speciation?

9. Define: Allopatric speciation

10. Define: Sympatric speciation

# Answer Key

1. B) A geographic barrier - Allopatric speciation begins when a physical barrier geographically separates a population.

2. B) Sympatric speciation - Sympatric speciation occurs in the same geographic area, often via chromosome doubling in plants.

3. B) Postzygotic isolation - Hybrid sterility acts after fertilization, making it a postzygotic isolating mechanism.

4. B) They cannot produce fertile offspring together - The biological species concept defines species by reproductive isolation, not geography or appearance alone.

5. A few finches colonized different islands Each island population was geographically isolated from the others Natural selection favored different beak shapes for different foods (seeds, insects, cactus) Over generations, isolated populations became too different to interbreed separate species

6. Populations spread gradually around a geographic barrier Each neighboring population can still interbreed with its immediate neighbor Genetic differences accumulate gradually along the ring Where the ring closes, the two end populations are different enough to be reproductively isolated effectively separate species

7. No geographic barrier separates the parent populations Chromosome doubling instantly makes the hybrid unable to breed with either parent This is sympatric speciation - it occurs without geographic isolation Common in plants (e.g., modern wheat, cotton)

8. The evolutionary process by which one population splits into two or more populations that can no longer interbreed.

9. Speciation that occurs when populations are separated by a geographic barrier.

10. Speciation that occurs without geographic separation, e.g. via polyploidy.