Speciation

AP Biology · Unit 7: Natural Selection

The Teaching Analogy

"Think of speciation like a bad breakup caused by geography. Two squirrel populations living together — then the Grand Canyon forms between them. One adapts to desert heat, the other to cold forests. Millions of years later, they can't even breed anymore. A barrier split them for good."

Key Concept

Speciation is the process by which one population splits into two or more reproductively isolated groups that eventually become separate species. **Allopatric speciation** occurs when a physical barrier (mountain, river, canyon) stops gene flow. **Sympatric speciation** occurs in the same location when behavioral or ecological differences — like food preferences or mate choice — create reproductive isolation without any physical barrier.

Guided Practice

1. The Grand Canyon splits a squirrel population. After one million years, the two groups can no longer interbreed. Which type of speciation occurred, and what was the key mechanism that stopped gene flow?
2. Two species of cichlid fish live in the same lake. One eats algae near rocks; the other eats plankton in open water. Over time, they only mate within their feeding group. Is this allopatric or sympatric speciation? What type of isolation is occurring?
3. A student says, "Speciation requires a physical barrier." How would you correct this using the bad breakup analogy, and which type of speciation disproves their claim?

Extension Activity

Have students research the Kaibab squirrel (north rim of the Grand Canyon) and the Abert's squirrel (south rim). These two populations were separated by the canyon and are now distinct subspecies. Students draw a timeline diagram showing: original population → barrier forms → divergent adaptation → reproductive isolation → speciation. Then they write a one-paragraph "breakup story" from the squirrel's perspective using correct vocabulary (gene flow, reproductive isolation, allopatric).