Name_____ Course/Section_____

Date_____ Professor/TA_____

Activity 24.1 What factors affect speciation?

1. The Galápagos Archipelago consists of a dozen islands, all within 64 km of their nearest neighbor. From 1 to 11 of the 13 species of Darwin's finches live on each island. Many evolutionary biologists believe that if there had been only one island, there would be only one species of finch. This view is supported by the fact that Cocos Island is isolated (by several hundred kilometers of open ocean) from the other islands in the archipelago and only one species of finch is found there.

   a. How does the existence of an archipelago promote speciation? Explain and provide an example.

   b. Is the mode of speciation that occurred on these islands more likely to have been allopatric or sympatric? Explain.

   c. Is the type of speciation seen on the Galápagos Archipelago more likely to be the result of anagenesis or cladogenesis? Explain.

2. Hybrids formed by mating two different species are often incapable of reproducing successfully with each other or with the members of their parent populations. Explain why this is the case. (*Hint:* Consider what you know about chromosome numbers and meiosis.)

3. Because most hybrids can't reproduce, their genes (and the genes of their parents) are removed from the population. Only the genes of individuals who breed with members of their own species remain in the population. This implies that there is a strong selective advantage for genes that enable individual organisms to recognize members of their own species. Today a wide range of reproductive isolating mechanisms has been identified.

   Each of the following scenarios describes a reproductive isolating mechanism. Indicate whether each is a prezygotic or postzygotic isolating mechanism. Explain your answers.

   a. Crickets use species-specific chirp patterns to identify a mate of their own species.

   b. Two species of butterfly mate where their ranges overlap and produce fertile offspring, but the hybrids are less viable than the parental forms.

   c. Two species of a plant cannot interbreed because their flowers differ in size and shape and require pollination by different species of bee.

   d. Two species of firefly occupy the same prairie and have similar flash patterns, but one is active for a half-hour around sunset while the other doesn't become active until an hour after sunset.

4. Many of our most successful grain crops arose as hybrids; most are also allopolyploids. These crops can successfully reproduce. Explain.