**SPECIATION ACTIVITY**

The map provided by your teacher shows where the eastern indigo snake (*Drymarchon corais couperi*) can be found.

Each letter represents a different population of snakes.

**Questions:**

1. How many species of snakes are showing up on the map?
2. How many populations are on the map?
3. Populations A, B, and C have access to one another.
   1. Draw green arrows to show the gene flow (through interbreeding) that can occur.
   2. How many gene pools currently exist and what are their approximate sizes?
4. Which population is isolated from the others and what type of isolation is it?
5. If this has been the situation for approximately one thousand years, how would you expect allele frequencies of population D to compare to the others? Explain.
6. Over three million years, a new mountain range emerges, running north-south between populations A and C.
7. Draw (with orange) the mountain range.
8. How many gene pools exist and what are their approximate sizes?
9. Draw orange arrows to show the gene flow that can occur.
10. Predict how allele frequencies of a different gene pool might compare after another million years.
11. At this point in time (4.1 million years from the beginning),

-Justify the possibility that these snakes are all the same species.

-Justify the possibility that there are more than one species.

1. A massive flood of “BIG LAKE” causes death of all but 55 of the snakes in population C. After the flood recedes,
2. How might the allele frequencies in this population be affected?
3. What dangers does this population now face?
4. Imagine that population B had lost all but 55 snakes. How would population B’s situation be different from population C’s?
5. How would the allele frequencies in population B’s gene pool be affected?
6. Due to run-off from the new mountains, a large river forms between populations A and B over the next 1000 years.
7. Sketch the river (using blue).
8. How many gene pools now exist and what are their approximate sizes?
9. Draw blue arrows to show the gene flow that can occur.
10. Predict how allele frequencies of the different gene pools might compare after yet another half-million years.
11. At this point in time, (4.7 million years from the beginning)

-Justify the possibility that these snakes are all the same species.

-Justify the possibility that there is now more than one species.

1. The melting of glacial ice within the valley of the oldest mountain range (between B and D) opens up a low elevation pass that these snakes can safely move through.
2. Sketch the pass between the two populations (using red).
3. How many gene pools now exist and what are their approximate sizes?
4. Draw red arrows to show the gene flow that can occur.
5. Predict how allele frequencies of the different gene pools might compare after another three thousand years.
6. The climate remains pretty stable for the next 2 million years. After that time (7 million years from the beginning),
7. How many species do you think exist? Circle each species in black.
8. Explain the reasons for your predictions about the number of species.
9. Consider the idea of genetic diversity (variation) and the ability of a population to survive if a new threat arises.
10. Which population has the least genetic diversity? Why?
11. Which group of snakes is most vulnerable to extinction? Why?
12. What other factors that were not discussed might also cause changes in the allele frequencies in any of the populations?
13. What are some ways that humans might affect the gene flow, the gene pool size, or the allele frequencies of any of the populations? Name at least three plausible suggestions.