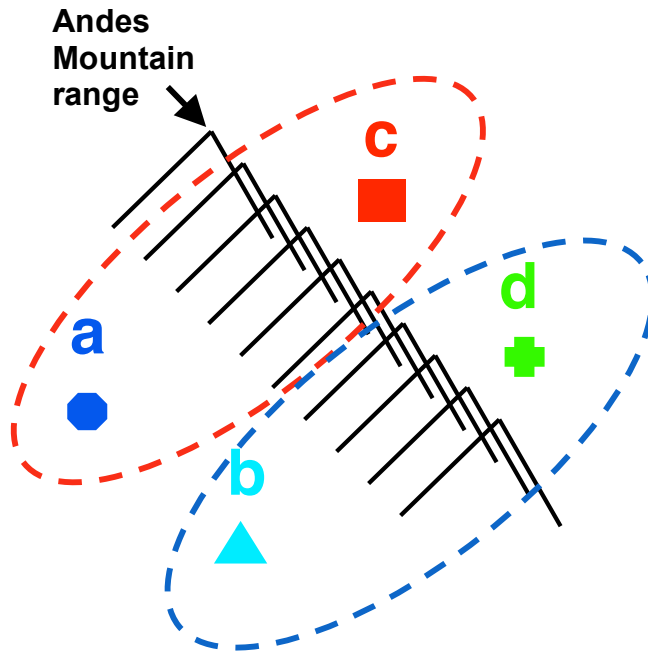


**IB 201 Genetics and Evolution 2006**  
**Questions to study for Final**

- 1.** Dr. Carl Woese during his discussion with the class was critical about the teaching of evolution from a strongly Darwinian perspective. We might consider why he thinks that.
- a.** First, describe the principal discovery by Woese that has significantly changed our understanding of early life and its evolution. (3 pts)
  - b.** How did he make this discovery—that is, what tools/methods did he use? List two. (1.5 pts for each = 3 pts)
  - c.** Draw a cladogram of his discovery. (2 pts)
  - d.** Many years of additional research have led Woese to a view of early life that contradicts Darwin's view of primordial ancestry. What is this view of early life that Woese and others have demonstrated (2.25 pts), and how does it contradict Darwin's view (2.25 pts)? [Use of diagrams can simplify and add to your explanation] (4.5 pts total)
- 2a.** Define the concept "hopeful monster" (3 pts) and name the scientist who is associated with this term (1 pt).
- b.** If there is a mutation of the *Ultrabithorax(Ubx)* gene in *Drosophila*, what happens to the halteres (2 pts), and in what segment of the body does this occur? (2 pts).
  - c.** What name has been given to this kind of mutation? (2 pts)
  - d.** Explain why this kind of mutation is unlikely to be a common mechanism in the evolution of animal diversity (2.5 pts).

**3a.** Draw a phylogenetic tree indicating the within-group and between-group relationships of the circled taxa, assuming that the circled groups are sister groups. (6 pts)

**b.** Give a hypothetical explanation of the mode of speciation of the circled species pairs, as suggested by the diagram. (6.5 pts)



**4.** Why might bees have evolved during the Cretaceous? (Note: think co-evolution) (12.5 pts)