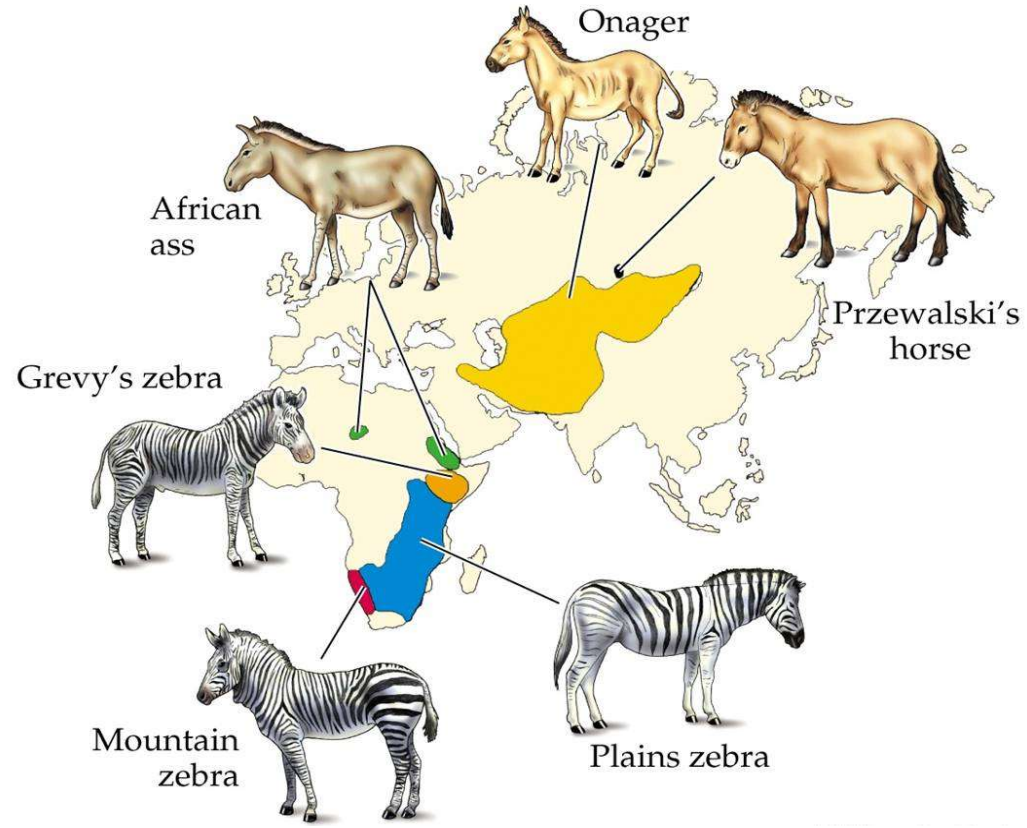
Evidence for Evolution Part 3: Embryology and Biogeography

Ms. Gill

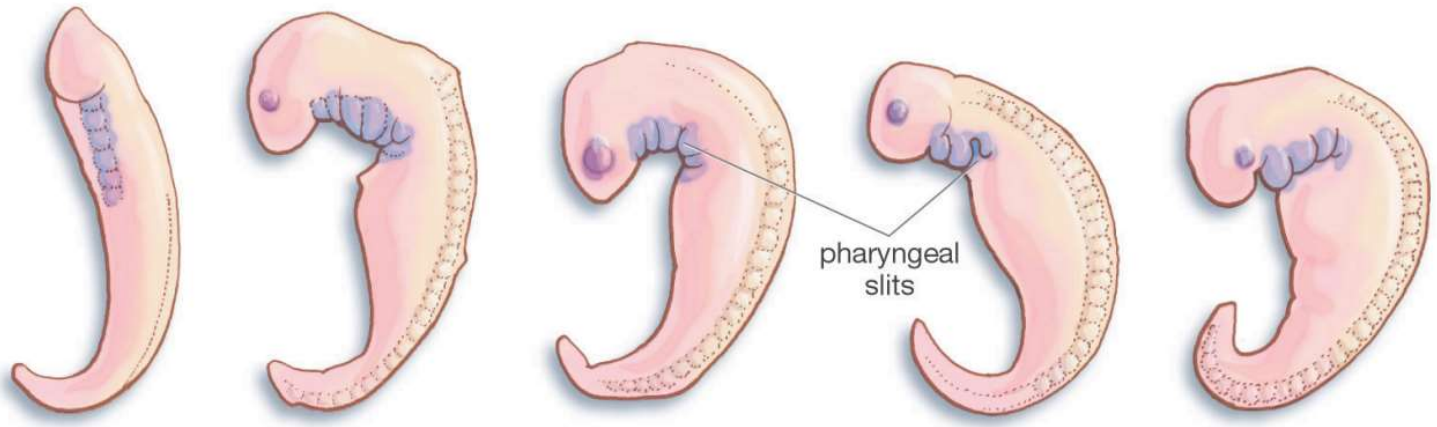
Honors Biology



Agenda

- Kahoot!!! Anatomical structure categorization
- Embryology card sort race
- Notes: Biogeography
- Biogeography and phylogeny
- Canary Island Lizard Lab: Parts 1-2

Embryology card sort race



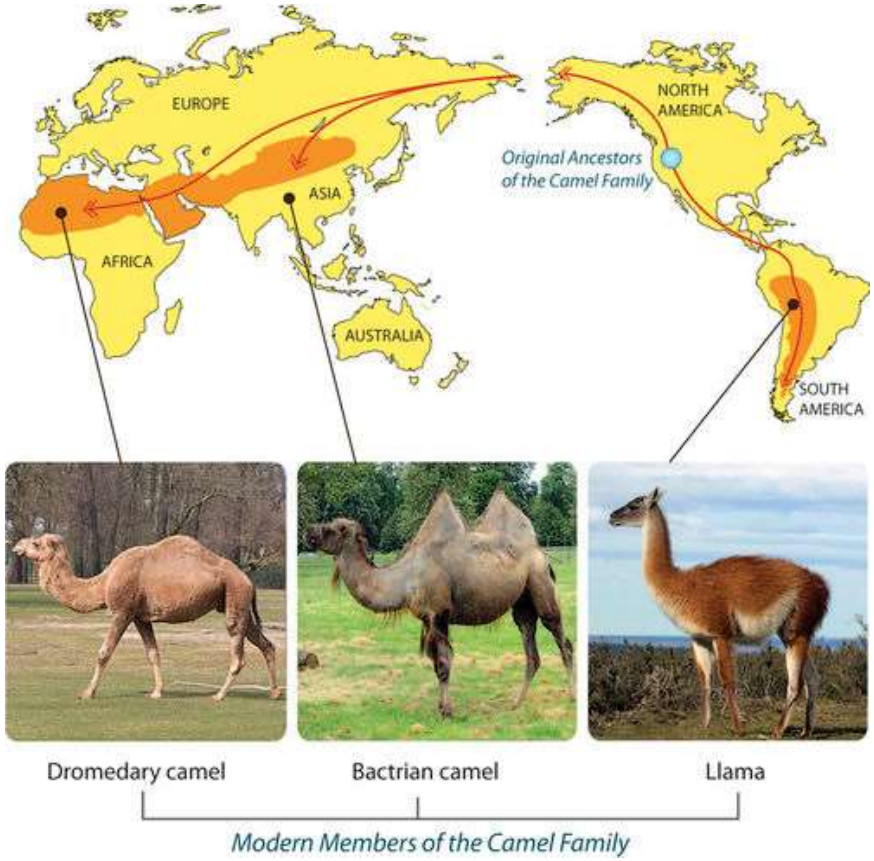
- 15 pictures of embryos
- 5 species, 3 stages of development
- Cut them up, then match them up and tape in place

- Teams of 3-4
- 5 minutes to complete, then a quick discussion
- First team with correct solution gets prizes!

Biogeography

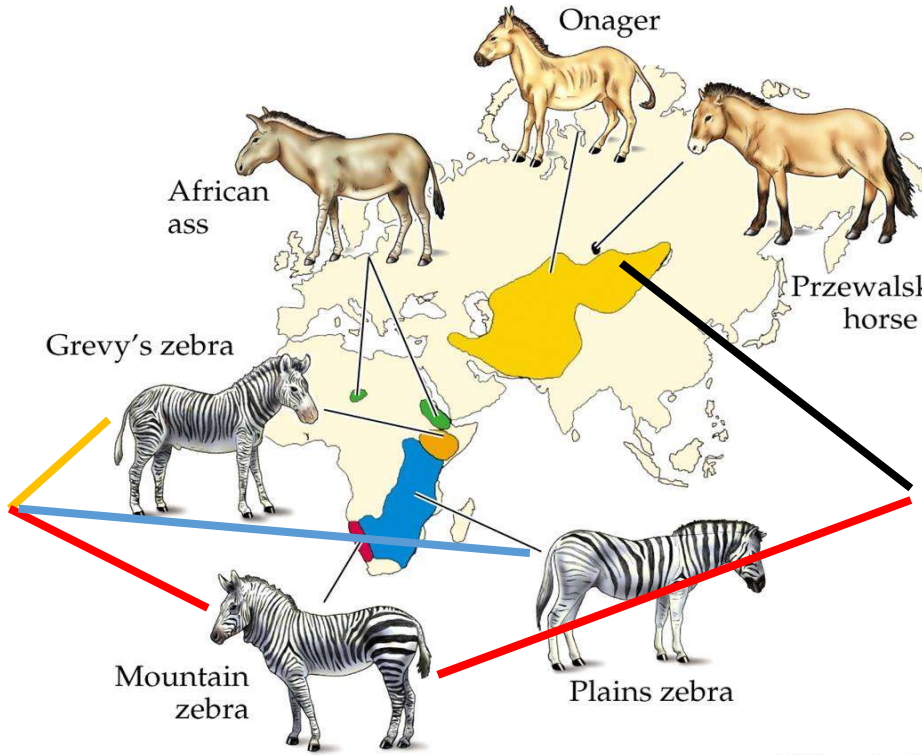
Studying the distribution of species

(where species live *and* where they don't)



Biogeography #1: geographic distance mirrors evolutionary distance

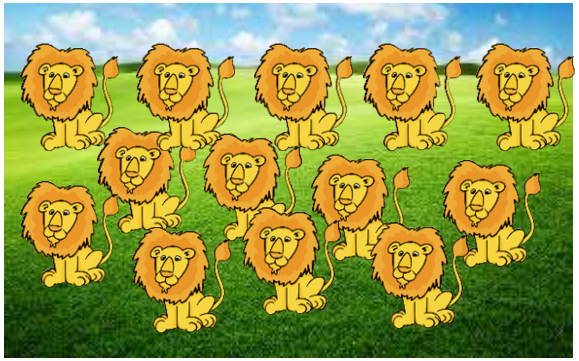
Closely related species tend to be found geographically close to each other



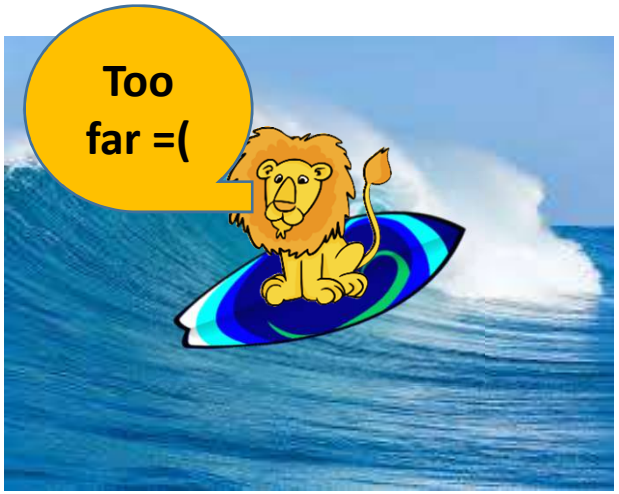
Species that are more geographically distant tend to be more distantly related

Biogeography #2: There are boundaries that some species cannot cross

Example: Mammals are not found on islands >300 mi to sea



Lots of mammals on continents

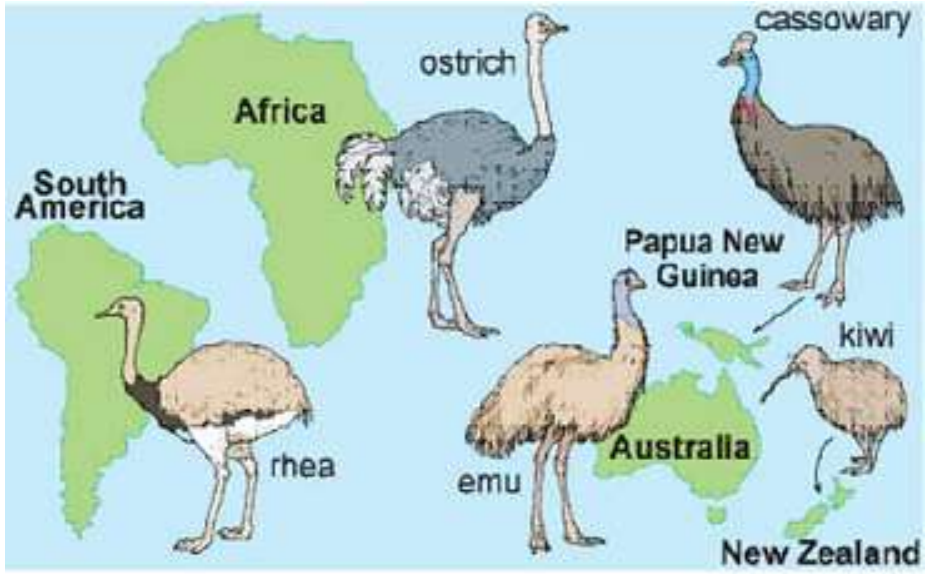


Mammals can't swim to far islands

What are some other examples of boundaries?

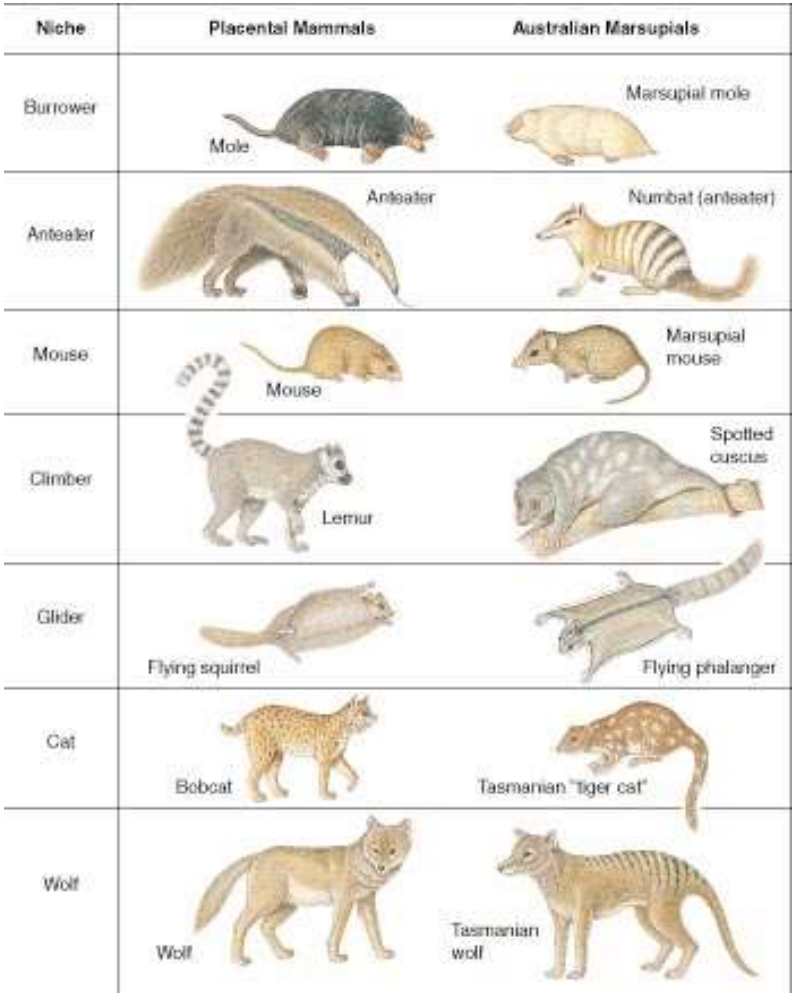
Physical (mountains) *temperature* *climate (desert)*

Biogeography #3: related species that are isolated tend to diverge



Example: In many areas, big flightless birds have successful, but they diverged and then evolved independently

Biogeography #4: distant environments support similar but unrelated species



Similar environments support species with similar adaptations…

…but if they are very distant, the species are likely unrelated

Mammals didn't make it to Australia, but their cousins the marsupials evolved highly similar roles

How come polar bears don't eat penguins?

Think-pair-share:

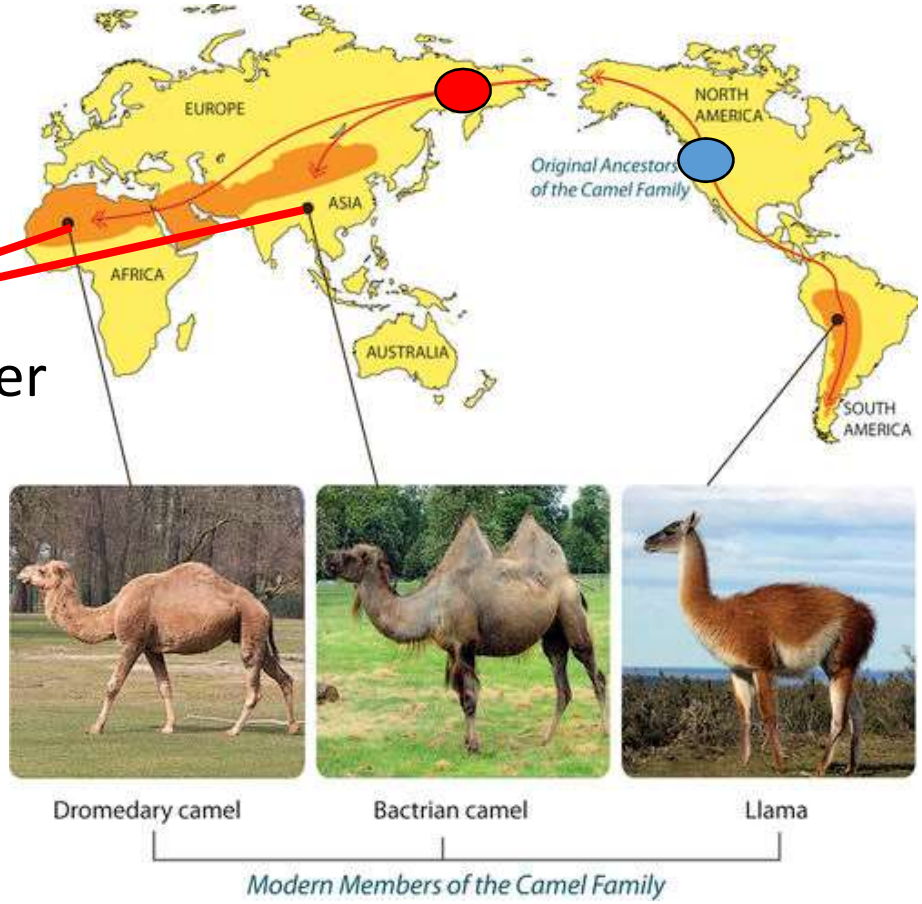
Come up with **two** explanations involving biogeography.

Using biogeography to draw phylogeny

- In general, we can use geographic distance to estimate evolutionary distance
  - Physically closer together = more closely related
  - Physically farther apart = more distantly related

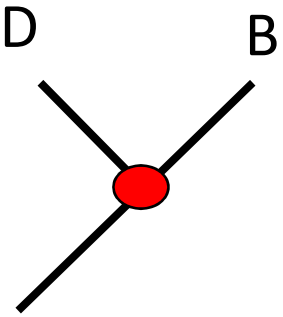
- At some point, species shared a common ancestor
  - Closely related species = more recent ancestor
  - Distantly related species = more distant ancestor

Example: camel phylogeny from biogeography



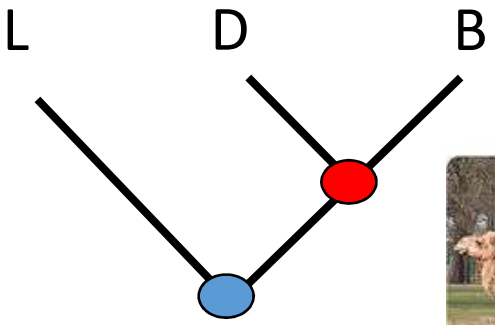
Original ancestor

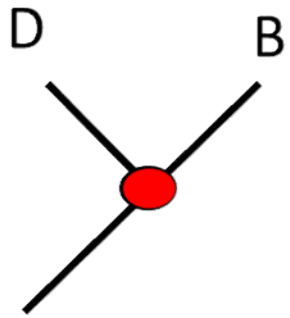
D,B closest together → most recent ancestor

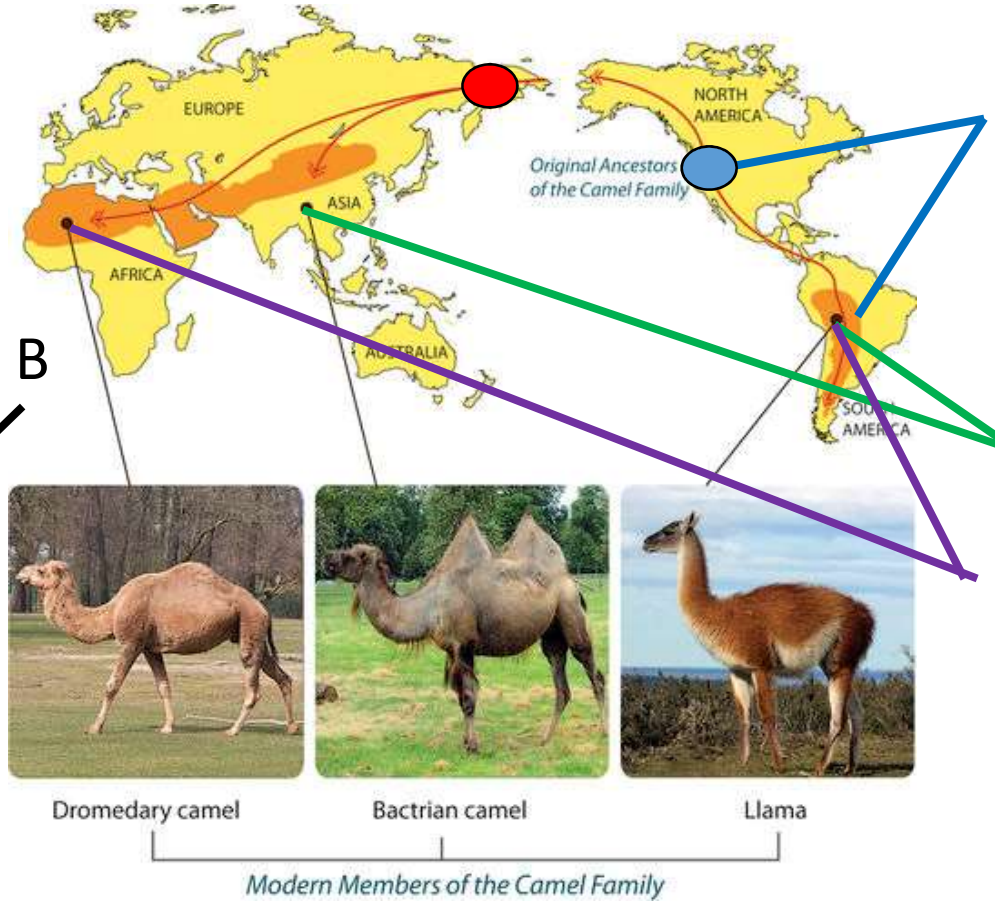


Species D Species B Species L

Example: camel phylogeny from biogeography







Species D Species B Species L

L is closest to site of original ancestor – closest relative

D,L and B, L far apart → distant ancestor