

GECKODAILY CLASSROOM RESOURCES · ACTIVITY

Activity: Build a Cladogram of Five Gecko Species

A cladogram is a branching diagram that represents hypothesised evolutionary relationships, grouped by shared derived traits (traits inherited from a common ancestor, not present in more distantly related lineages). In this activity, students build a simple cladogram using traits already documented in the GeckoDaily Species Fact Sheets, then check their grouping against the accepted taxonomic families.

Materials

- Species Fact Sheets for all five species (or the Comparative Reptile Biology Chart as a shortcut reference)
- This activity sheet
- Blank paper or a whiteboard for sketching branching diagrams

Trait table

Species	Movable eyelids	Adhesive toe pads	TSD	Obligate parthenogenesis	Diurnal
Leopard Gecko	Yes	No	Yes	No	No
African Fat-Tailed Gecko	Yes	No	Yes	No	No
Crested Gecko	No	Yes	No	No	No
Mourning Gecko	No	Yes	No	Yes	No
Bearded Dragon	No	No	No (ZZ/ZW system)	No	Yes

Steps

- **Step 1.** Using the trait table, identify which two species share the most traits with each other. Group them together as your first branch.
- **Step 2.** Identify the species that shares the fewest traits with the others. This species likely branches off earliest (closest to the 'root' of your diagram).
- **Step 3.** Sketch a simple branching diagram (a cladogram) placing the most different species furthest from the group you formed in Step 1, and your two most similar species as the most recently branched pair.
- **Step 4.** Compare your cladogram to the actual taxonomic families listed on the Comparative Reptile Biology Chart: Eublepharidae (leopard gecko, fat-tailed gecko), Diplodactylidae (crested gecko), Gekkonidae (mourning gecko), and Agamidae (bearded dragon). Did your trait-based grouping match the real family groupings?

Discussion questions

- Which trait in the table turned out to be the most useful for grouping species correctly, and which was the least useful (or even misleading)?
- The bearded dragon shares zero traits in this table with any other species. Does that mean it is unrelated to all of them, or just that this particular trait table doesn't capture the traits that would show its relationships to other agamids not included here?
- Adhesive toe pads appear in both the crested gecko and mourning gecko, but these two species are in different families (Diplodactylidae and Gekkonidae). What does this tell you about using a single trait, on its own, to build a cladogram?

- If you added a sixth species — a snake — to this table, which traits would need to change or be dropped, and why?

Teacher's note

This activity is intentionally designed so that one trait (adhesive toe pads) produces a misleading grouping if used alone, since it evolved independently in two unrelated families (convergent evolution). This is a deliberate teaching moment: real cladistics uses many traits and, increasingly, DNA sequence data specifically to avoid being misled by convergent traits like this one.