

# Investigating Biodiversity.

**Lesson Map:** [Click here to open the map](#)

## Engage

*What does biodiversity look like?*

- ? If you were invited to go on a big-game wildlife tour, what locations come to mind? *[Answers may include a Jeep tour in the African Serengeti, a boat tour in the Amazon, or a hike in the Papua New Guinea hills.]*
- Humans have made the most extensive use of the planet's surface in history. Which areas have lost the greatest amount of species diversity? *[Dark orange/brown areas].*
- Click on these dark areas of the map to find out what biomes these areas represent.
- ? What biomes have we changed most extensively? *[Grasslands and bordering deciduous forests].*
- ? Why have we changed these particular areas so extensively? *[Grains or feed for cattle grow in these regions.]*
- Click **Layers** on the dark toolbar.
- Turn off two layers, **Global biomes** and **Abundance of original species**, by pointing your mouse at each in the Layers pane and clicking the eye icon that appears.

## Explore

*How does speciation relate to biodiversity?*

- Predation drives speciation in plants.
- Turn on the layer Vascular Plant Diversity by clicking its eye icon in the Layers pane.
- ? Where is the highest variety of vascular plants? *[Near mountainous edges, Andean or Himalayan]*
- Turn off the layer **Vascular Plant Diversity** and turn on the layer **Flowering Plant Diversity**.
- ? Why would flowering plants have subtle differences in distribution from other vascular plants? *[Flowering plants spread through fruits, seeds, & pollen carried by animals, winds, & currents. Central America originated as island chains & provided isolation - allowing flowering plants to migrate & speciate.]*
- Turn off the layer **Flowering Plant Diversity**.

Download student worksheet [here](#).

**Time**

30 minutes

**Activity**

Examine species richness to gain insight to evolutionary selection factors that encourage greater diversity.

**Learning Outcome**

Students will be able to:

- Identify biological factors that encourage speciation by examining centres of high biodiversity.
- Prioritize regions globally for conservation with maximum species and minimal cost to set aside.

**ACARA Curriculum Link**

[Year 10 Science: Science Understanding.](#)

[ACSSU185](#)

Senior secondary Curriculum –  
Science - Biology. Unit 1:  
Biodiversity and the  
interconnectedness of life

[ACSBL006](#) | [ACSBL014](#) | [ACSBL017](#)

[ACBSBL015](#)

## Explain

*Where are the hot spots for mammalian diversity?*

- Turn on the two mammal diversity layers.
- ? Upon visual inspection, where is the centre of highest mammal diversity?

*[Amazon rainforest]*

- ? What mammals can take advantage of these big areas of flowering plants and trees?  
*[Bats add to the great diversity of animals in the Amazon. Africa has a large contingent of hoofed animals but more than 900 types of bats pollinating the rich diversity of flowering plants.]*

*What factors support predation?*

- ? What places have you heard of that have a lot of predators in the wild? *[Africa, based on students' experiences from movies, or zoo visits with their large African cats, hyenas, snakes, and so on].*
- ? What is it about Africa that has allowed it to contain such a rich variety of large mammals?  
*[Herd animals can migrate easily through grasslands with abundant seasonal food sources.]*
- ? Would this influence the numbers of mammalian carnivores?  
*[Open grassy habitats help young blend in, and abundance of food species from which to diversify, thus avoiding competition and potential conflict.]*

## Extend

*How does species density relate to species diversity?*

- ? What are the species densities of all mammals in hot spot areas? (Hint: Use the legend.) *[~217]*
- ? How do these numbers compare to the mammalian carnivores? *[Six times larger or more].*
- ? Is that expected based on trophic energy availability? *[Yes, typically it takes 10 times the number of preys to keep the next trophic level fed.]*
- ? Do the numbers of species act as a proxy for total animals? *[Perhaps as an estimate. There will always be fewer predators in a system than prey species.]*

## Next Steps:

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### Teacher Feedback:

To share your feedback on this, or any Spatial Activity, please contact [education@esriaustralia.com.au](mailto:education@esriaustralia.com.au)