Species diversity

Lesson Map: http://esriaustralia.com.au/education/SpatialActivity8

Engage

How are populations of native species changing globally?

➔ Click on the lesson map link above to commence the lesson.

➔ Zoom in to view Australia. Australia experiences all 3 levels of abundance of original species.

? On the map, click on each coloured zone. What do each of these categories of original species mean? *[Each category represents the relative number of native species that still exist within each given area]*

➔ Zoom out to view the global breakdown of abundance of original species.

? Which countries have retained a high abundance of native species? *[Answers will vary but may include most of Australia, Russia, North America etc.]*

? Why may these regions have sustained a high abundance of native species? *[Answers will vary but may include: low population density in these areas.]*

? Which countries have retained a low abundance of native species? *[Answers will vary but may include Europe, India, Eastern China, etc.]*

? Why may these regions have such a low abundance of native species? *[Answers will vary but may include: high population density resulting in deforestation.]*

Explore

Where does the greatest diversity of vascular plants exist?

➔ In the 'details' pane, open the 'content' tab. Click the checkbox to turn on the layer 'vascular plant diversity.' Turn off all other layers.

? Where is the highest variety of vascular plants? Hint: the topographic base map will assist you in answering this question. *[Near mountainous edges]*

Explain

Where are the global hotspots of mammalian diversity?

Download student worksheet here.

Time
30 minutes

Activity
Investigate the global distribution of flora and fauna, and understand the reasons for this distribution.

Learning Outcome
Students will be able to:

- Recognise and propose reasons for change in original species abundance
- Identify regions of high flora and fauna speciation
- Understand the role of trophic levels and the food chain in species distribution

ACARA Curriculum Links

Year 7 Science – Biological sciences
ACSSU111 | ACSSU112 | ACSIS129 |

Year 9 Science – Biological sciences
ACSSU175 | ACSSU176 | ACSIS169

Senior secondary Curriculum – Biology – Unit 1: Biodiversity and the interconnectedness of life
ACSBL015 | ACSBL017 | ACSBL019 | ACSBL020

→ Click the checkbox to turn on the two layers titled 'global mammal diversity.'

? Where is the most globally significant area of mammal diversity? *[South America/ Amazon rainforest]*

→ Flick between the three layers 'vascular plant diversity', 'flowering plant diversity' and 'global mammal diversity'. Zoom in to view Central and South America.

? What sort of species may take advantage of this dense area of flowering plants and trees? *[Answers may vary, but can include birds and bats. Both these species are responsible for spreading the seeds of flowering plants in the Amazon]*

Extend

Why do differences exist between carnivorous vs non-carnivorous mammals?

? What is the density of mammals within the Amazon? *[~ 217 diverse species]*

? What is the density of carnivorous mammals within the Amazon? *[~ 20-30 diverse species]*

? Why is there such a large difference between carnivores and non-carnivores? *[Carnivores rely on other mammals for food, therefore there needs to be a greater amount of prey required to sustain them.]*

– Trophic level refers to the status of an organism within the food chain. It takes approximately10 times the number of prey to provide the trophic energy necessary to sustain their predators.

Next Steps:

Request a free ArcGIS Online Account for your school:

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Learn more about ArcGIS Online, and apply for your ArcGIS Online School subscription at http://esriaustralia.com.au/education

Acknowledgements:

This lesson map uses data sourced from an Esri GeoInquiry.

Accompanying lesson material has been amended to align with the Australian National Curriculum.

Teacher Feedback:

To share your feedback on this, or any Spatial Activity, please contact education@esriaustralia.com.au