

Macroevolution

Species formation

Adaptive radiations

Extinctions

The History of Life

The title 'The History of Life' is written in a bold, italicized, sans-serif font. The text is colored with a gradient from dark brown at the top to bright yellow at the bottom. Below the main text, there is a shadow effect consisting of several horizontal lines that create a sense of depth and perspective, making the text appear to float above a surface.



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Fossil formation

- Burial in sediment (mud, ash, sand) = low O₂ environment
- Little decomposition

HOW FOSSILIZATION OCCURS



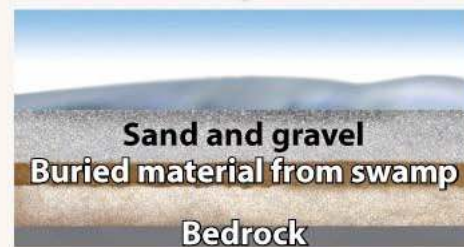
1. A tree lives in a swampy habitat. The tree drops leaves, pollen, and seeds into the mud, where decomposition is slow.



2. The tree falls. The trunk and branches break up as they rot.



3. Flooding brings in sand and mud, burying the remains of the tree.



4. Over many years, the mountains erode and the swamp is filled with sediment. The habitat dries.

Figure 26-6 Biological Science, 2/e
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(a) Intact fossil



The pollen was preserved intact because no decomposition occurred.

(b) Compression fossil



Sediments accumulated on top of the leaf and compressed it into a thin carbon-rich film.

(c) Cast fossil



The branch decomposed after it was buried. This left a hole that filled with dissolved minerals, faithfully creating a cast of the original.

(d) Permineralized fossil



The wood decayed very slowly, allowing dissolved minerals to infiltrate the cells gradually and then harden into stone.

Phylogenetic Trees 101 (OK, maybe only 01)

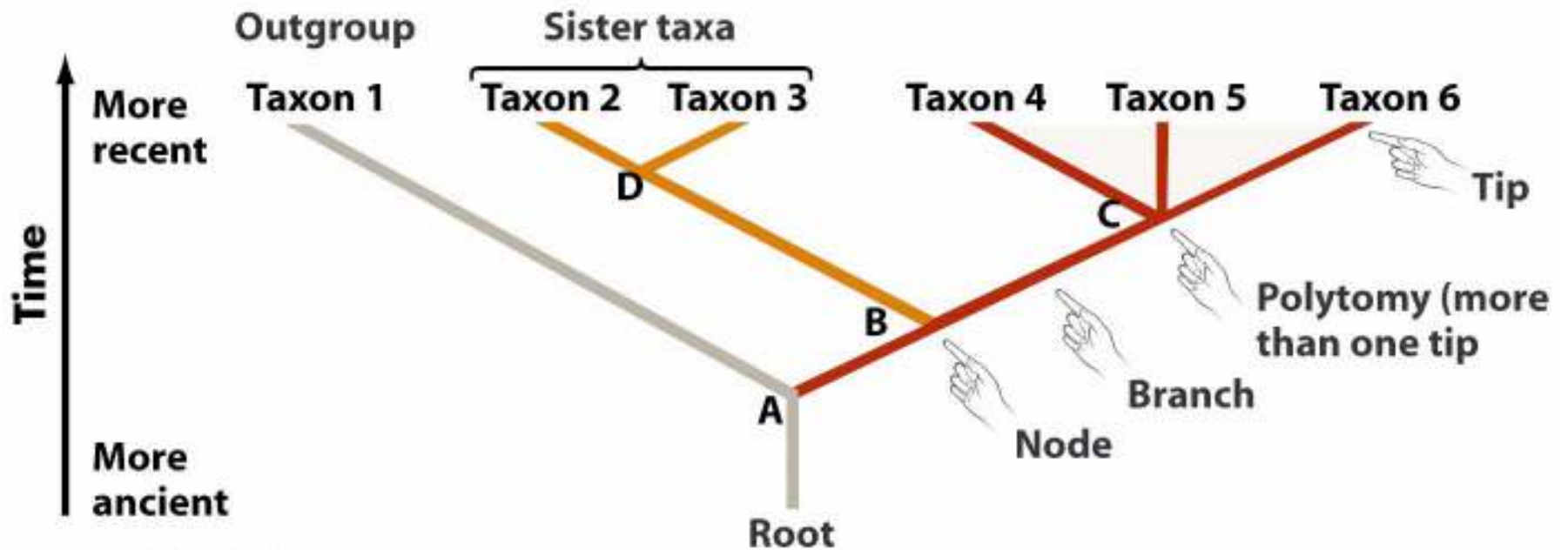


Figure 26-1 Biological Science, 2/e
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Adaptive radiations produce star phylogenies.

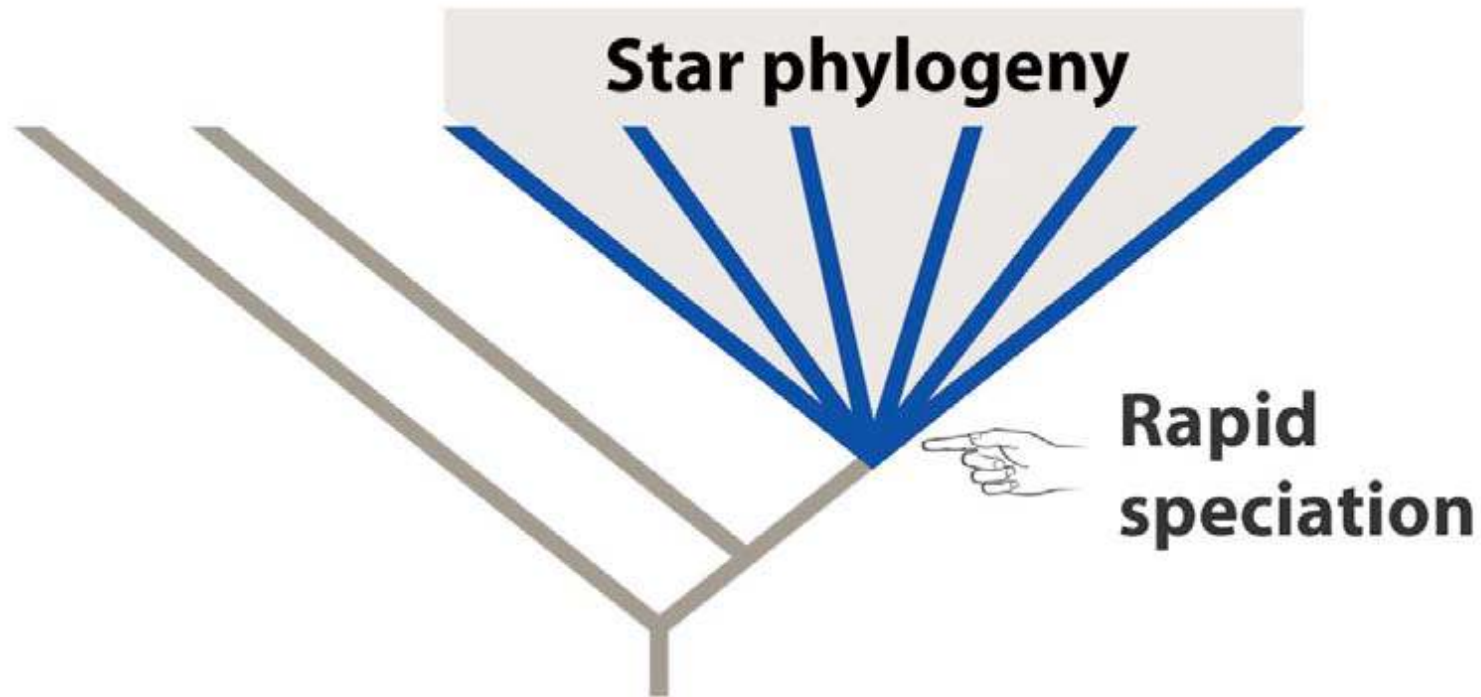
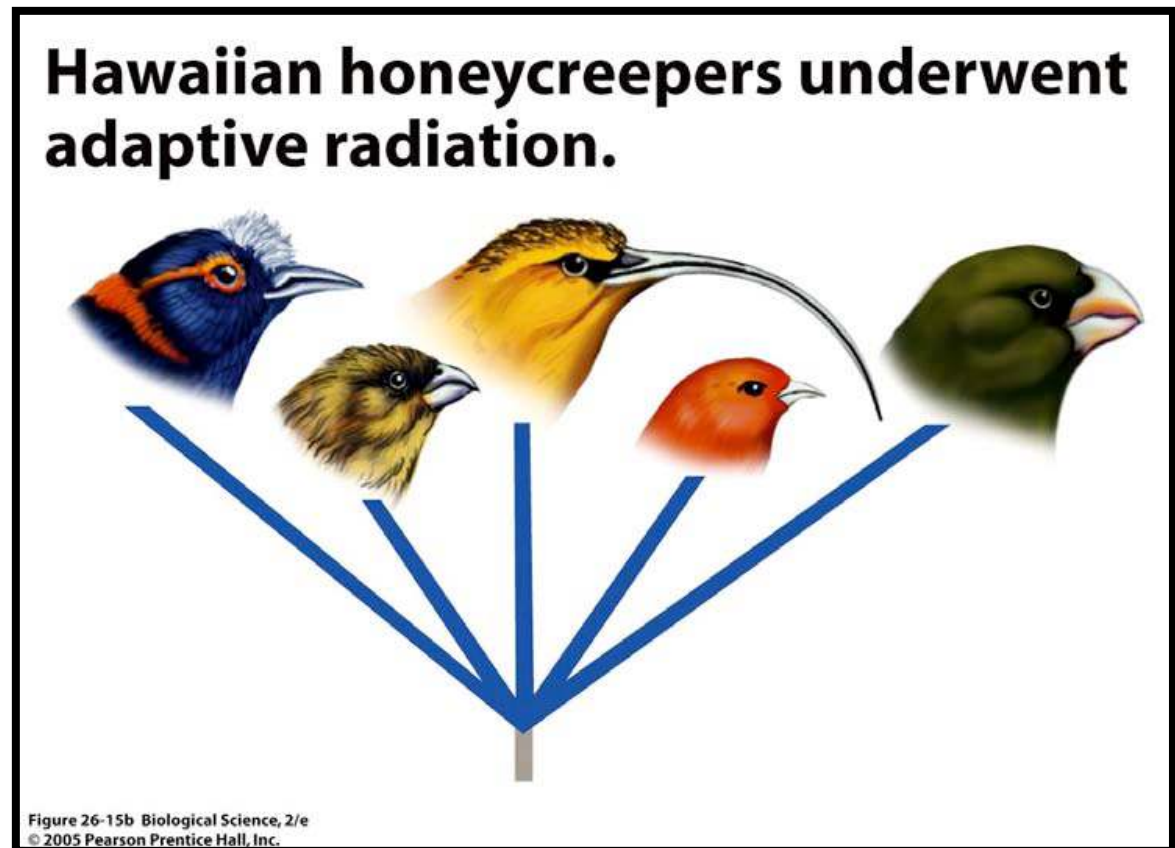


Figure 26-15a Biological Science, 2/e
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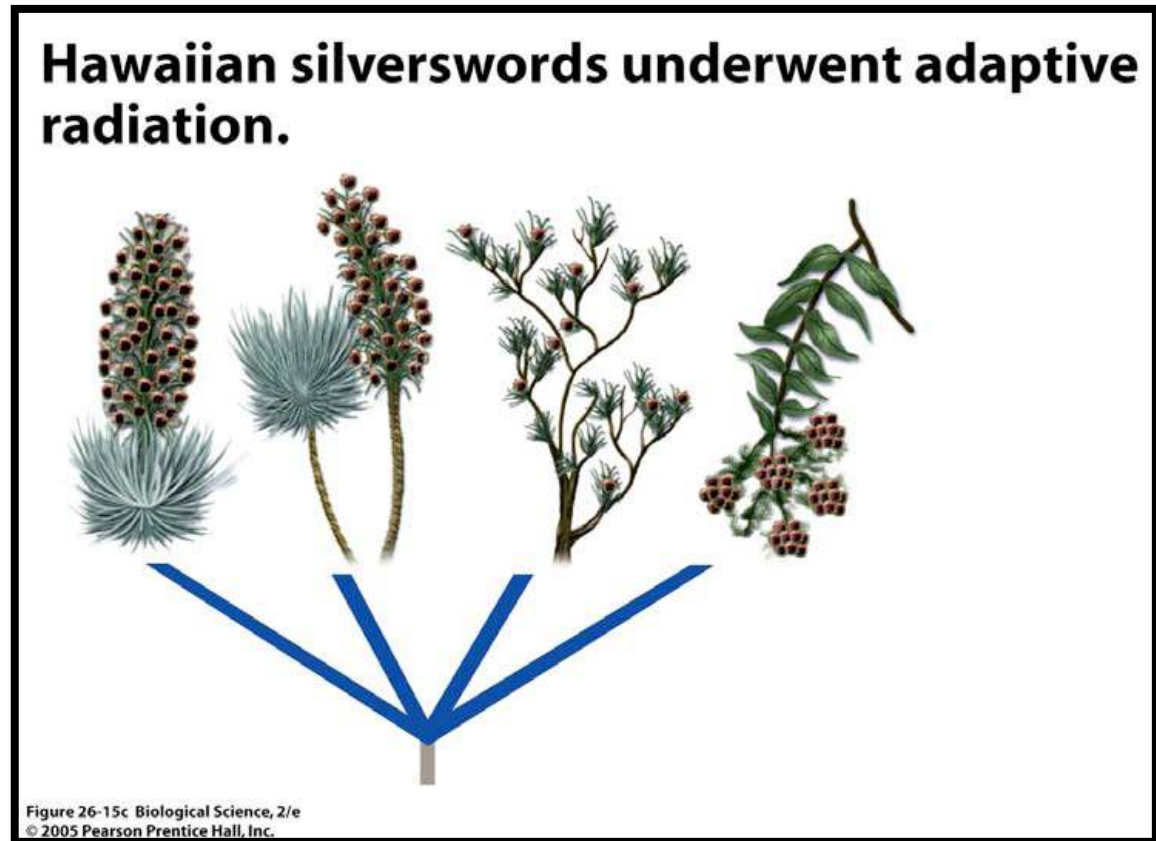
Hawaiian examples

- Honeycreepers– Single, finch-like, seed-eating ancestor
 - Produced huge diversity in foraging types
- Insects
- Fruits
- Nectar
- Seed-crackers



Silverswords

- Ancestor = California tarweed
 - Produced huge diversity in growth forms and habitat type
- Rainforest to lava flows
 - Vines, trees, bushes, mats



Mammals



E. fulvus
 Photo by
<http://www.monkeyland.co.za/images/speciesblacklemur.jpg>

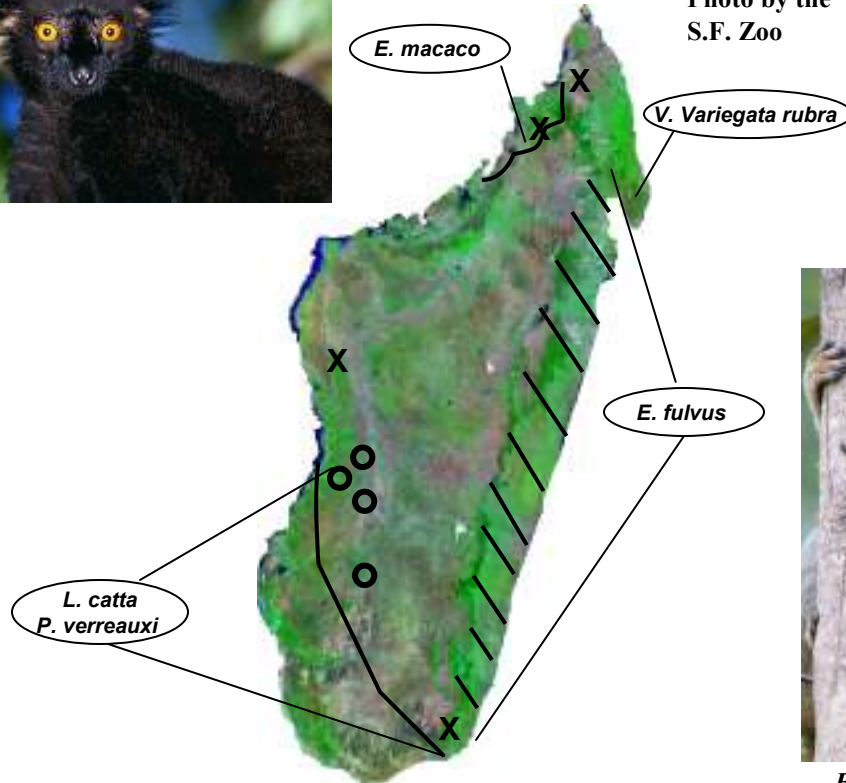


V. variegata
 Photo by the
 S.F. Zoo

V. Variegata rubra



L. catta
 Photo by C. Dirks.



E. fulvus
 Photo by C. Dirks.

The relative distribution of lemurs selected for our study. *D. madagascariensis* (X) and *M. murinus* (open circle) are found in several locations.



P. verreauxi
 Photo by C. Dirks.



M. Murinus
 Photo by J. Visser.



D. madagascariensis
 Photo by M. Beal

Anolis lizards

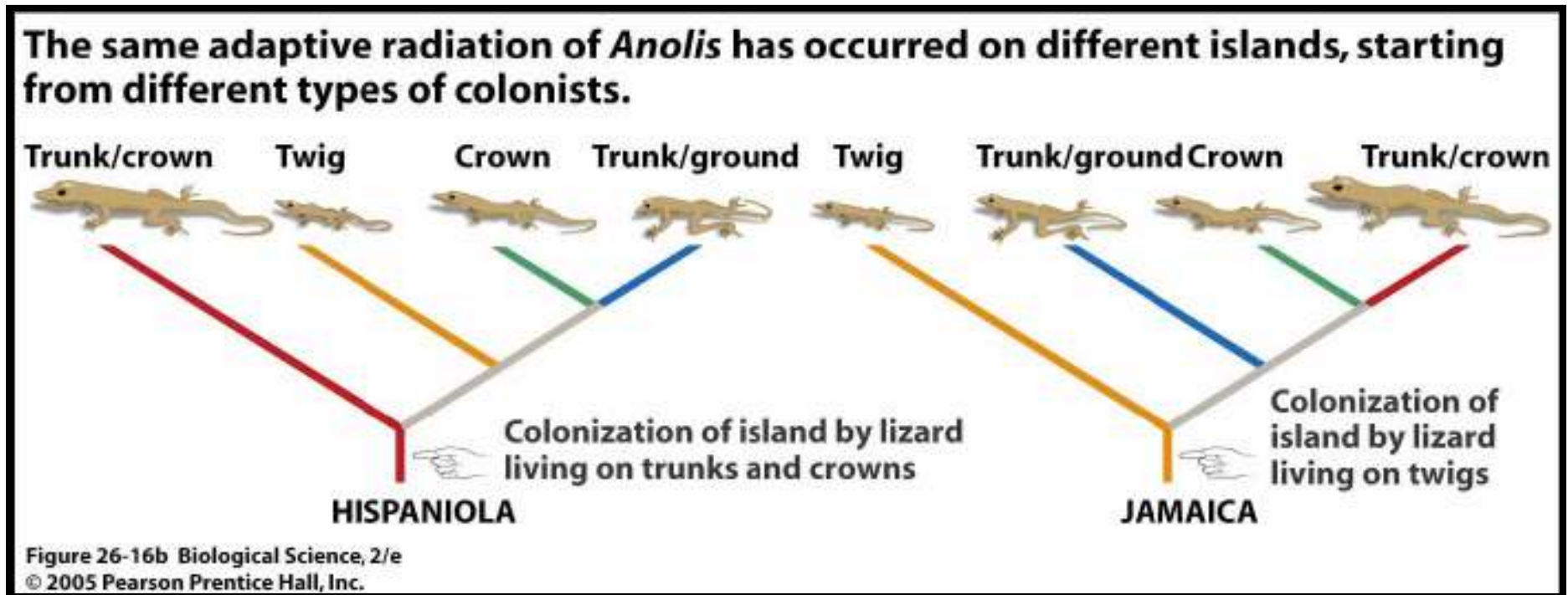
Species of *Anolis* vary in leg length and tail length. Some species are ground dwelling; others live in distinct regions of shrubs or trees.



Figure 26-16a Biological Science, 2/e
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**Multiple Ecotypes Diverged After A
Colonization Event**

Oh, and it occurred TWICE!



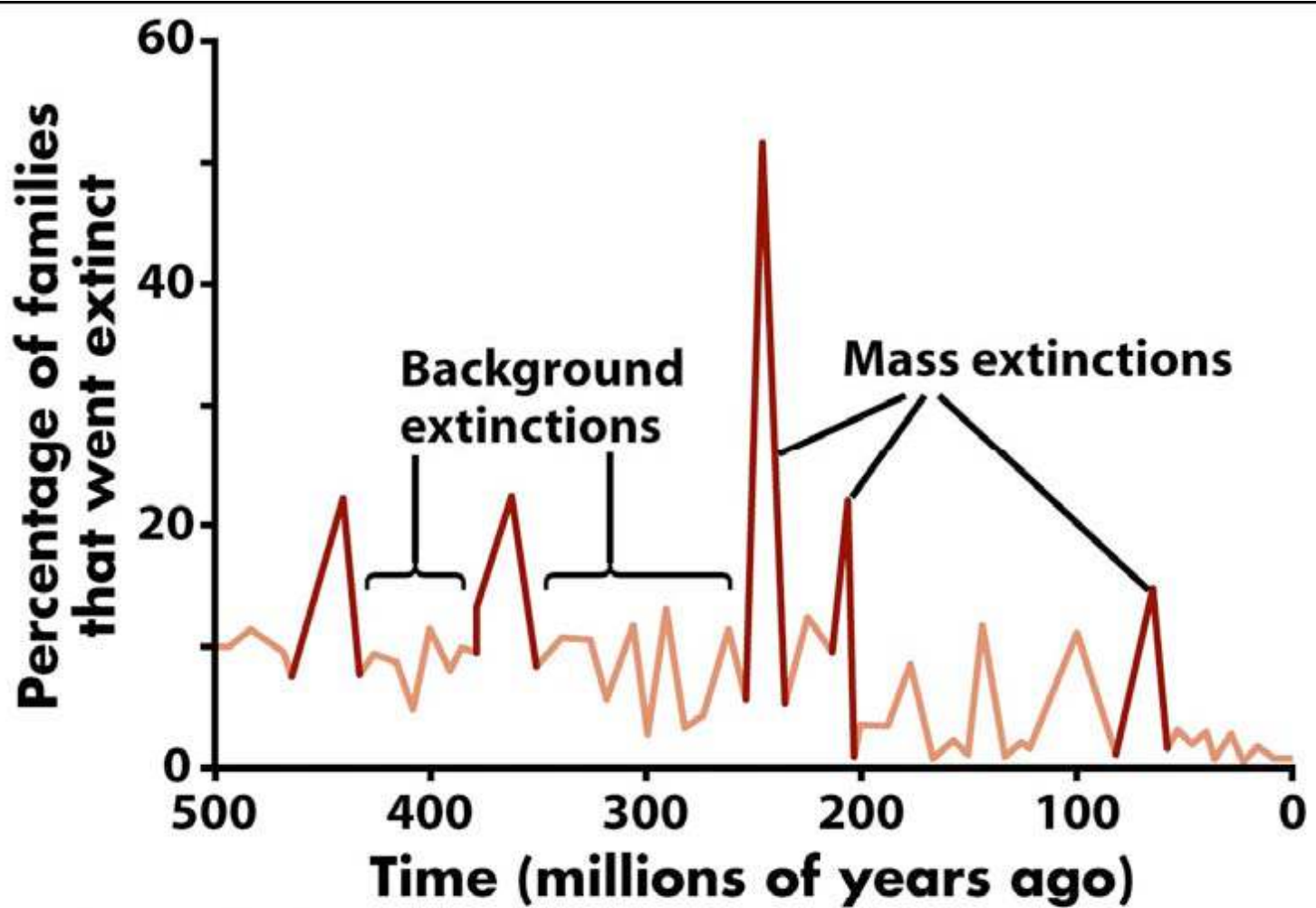


Figure 26-18 Biological Science, 2/e
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Iridium is present at high concentration in rocks formed 65 mya.

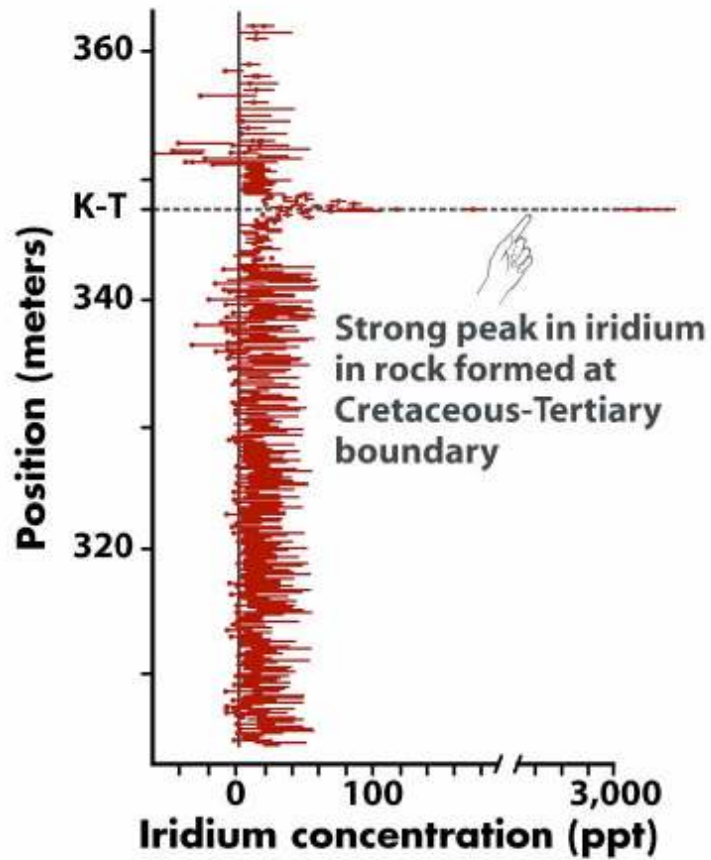


Figure 26-19a Biological Science, 2/e
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Minerals that form during asteroid impacts

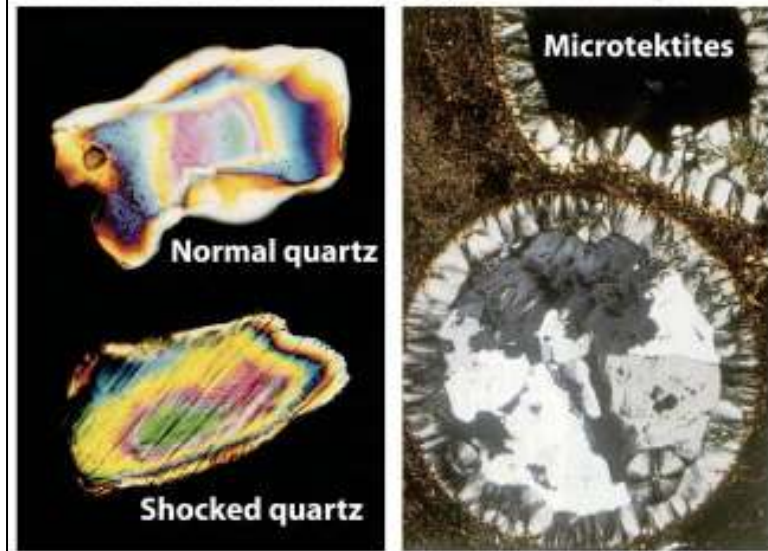


Figure 26-19b Biological Science, 2/e
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The asteroid left a crater [180 km (112 miles) wide]

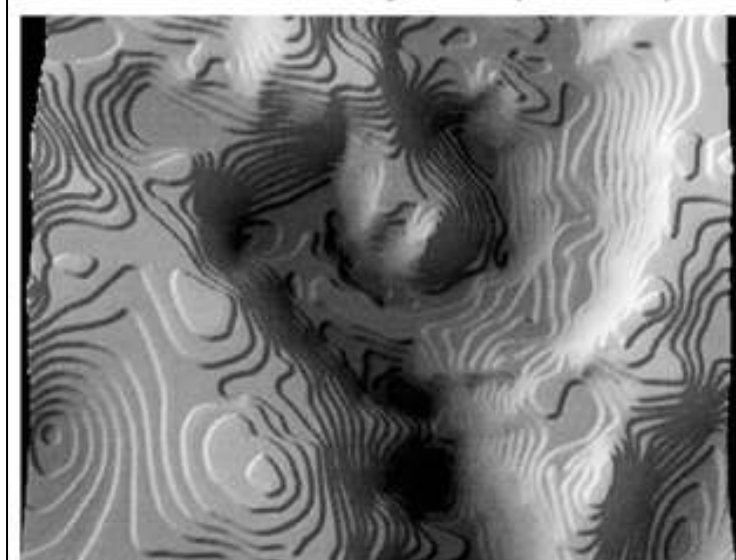


Figure 26-19c Biological Science, 2/e
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WORKSHOP TIME!

Uh, what are we working on?

ANSWER:

You are going to work on being a scientist!

**Discuss with your neighbors what interests
you about science.**

Then, together define “scientist”.

ACTIVITY:

One ONE piece of paper, write your name and the name of your neighbor with whom you will work on this exercise.

Now, working with your neighbor, write down what you think are attributes of a good scientist. Write your list of attributes on the left hand side of a piece of paper.

FOLD THE PAPER IN HALF DOWN THE MIDDLE AND TURN IT OVER.

NEXT TASK:

Working with your neighbor, write down what you think are attributes of a good student of science.

Write your list of attributes on the right hand side of a piece of paper (the one that is facing up).

NEXT TASK:

**Open the sheet of paper and compare the lists.
Identify common attributes by circling them.**