The Fossil Record

CELLS and HEREDITY, CHAPTER 5, SECTION 3, PAGES 155 to 163

Objectives
1. Describe how most fossils form.
2. Explain how scientists can determine a fossil’s age.
3. Identify some unanswered questions above evolution.
4. Relate geologic time to the fossil record and extinctions.

Homework due Friday
Finish Index Fossils worksheet
**KEY TERMS**

<table>
<thead>
<tr>
<th>Petrified fossil</th>
<th>Half-life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mold</td>
<td>Fossil record</td>
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<tr>
<td>Cast</td>
<td>Extinct</td>
</tr>
<tr>
<td>Relative dating</td>
<td>Gradualism</td>
</tr>
<tr>
<td>Radioactive dating</td>
<td>Punctuated equilibria</td>
</tr>
<tr>
<td>Radioactive element</td>
<td></td>
</tr>
</tbody>
</table>

**Available on page 155**

**Vocabulary overview**

- Fossil Brainpop
- Whales in Transition
- Index Fossils worksheet
Fossils BrainPOP
Geologic Time

- Key:
  - Precambrian Time
  - Paleozoic Era
  - Mesozoic Era
  - Cenozoic Era

- First one-celled organisms with nuclei
- First many-celled organisms
- First plants on land
- Dinosaurs extinct
- Present time
- First bacteria
I. How Do Fossils Form?

Most fossils form when

* Petrified Fossils - A fossil formed when minerals replace all or part of an organism (page 156).

* Molds and Casts
  - Mold: hollow space in shape of an organism
  - Cast: a copy of the shape of the organism that made the mold

* Preserved Remains
  - Fossils preserved in substances other than sediment, such as ice, tar, or amber.
II. Determining a Fossil's Age

Scientists can determine a fossil's age in two ways: relative dating and radioactive dating.

- **Relative Dating**
  - Fossils found in top layers are younger than fossils found in bottom layers.
  - Does not tell actual age.

- **Radioactive Dating**
  - Determines actual age.
  - Amount of a radioactive element gives the age of the rock.

Ways to determine a fossil's age.
III. Unanswered Questions

Two unanswered questions about evolution involve the causes of mass extinctions and the rate at which evolution occurs.

* Mass Extinctions

- Causes of many large extinctions are not known. Thought to be due to climate change.

* Rate at Which Evolution occurs:

- **Gradualism**
  - Evolution occurs slowly but steadily
  - Tiny changes in a species gradually add up to major changes over very long periods of time

- **Punctuated Equilibria**
  - Theories to explain how rapidly species change.
  - Accounts for gaps in fossil record.
  - Species evolve quickly during relatively short periods, separated by periods of little or no change.
Cambran Period

541–485.4 million years ago
Ordivician Period

485.4–443.4 million years ago
Silurian Period
443.4–419.2 million years ago
Carboniferous Period
358.9–298.9 million years ago
Fossil Record

May 06, 2014

Triassic Period
252.2–201.3 million years ago

dinosaurs appear
Jurassic Period
201.3–145 million years ago

Pangea breaks up
The Cretaceous Period, which lasted from 145 to 66 million years ago, is marked on this map by the text 'Cretaceous Period 145–66 million years ago'. The diagram also highlights the disappearance of dinosaurs with the text 'dinosaurs disappear'.
ANSWERS to “The Fossil Record” Review and Reinforce

1. The Geologic Time Scale
2. They use evidence from the fossil record as well as evidence from the absolute dating of rocks.
3. Most fossils form when organisms that die become buried in sediments. Over millions of years, the sediments harden into sedimentary rock. The hard parts of the dead organisms become fossils, including molds, casts, and petrified fossils.
4. The fossil in the sedimentary rock at the bottom of a canyon is older because the lower down the canyon wall, the older the layers are.
5. Scientists can compare the amount of a radioactive element in a rock sample to the amount of the element into which it breaks down. With this information, they can calculate the actual age of the rock.
6. The millions of fossils that scientists have collected are called the fossil record. The fossil record is incomplete because many organisms die without leaving fossils behind.
7. h
8. f
9. g
10. d
11. a
12. e
13. b
14. c
Whales in Transition

Click on whale picture for video
then click on quicktime link
Dorudon