

SI Geology - Full Discipline Demo

Fossils

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI Geology - Full Discipline Demo
Course	SI Geology - Full Discipline Demo
Instructor	Sales SI Demo

Test Your Knowledge

Classify the following statements into two categories as Fossilization Processes or Common Fossilization Environments.

Fossilization Processes	Common Fossilization Environments
1	2
⌘ Sedimentary rock layers can preserve fossils over time. ⌘ Petrification involves the replacement of organic material with minerals. ⌘ Fossilization can occur in marine and terrestrial settings. ⌘ Fossils may form through the accumulation of minerals in bone cavities. ⌘ Permineralization is a form of mineral preservation. ⌘ Swamps and bogs create conditions that promote the preservation of organisms. ⌘ Volcanic eruptions create favorable conditions for fossilization, such as rapid burial, heat, pressure, and a lack of oxygen.	

Correct answers:

1 Petrification involves the replacement of organic material with minerals.

Fossils may form through the accumulation of minerals in bone cavities.

Permineralization is a form of mineral preservation.

2 Sedimentary rock layers can preserve fossils over time.

Fossilization can occur in marine and terrestrial settings.

Swamps and bogs create conditions that promote the preservation of organisms.

Volcanic eruptions create favorable conditions for fossilization, such as rapid burial, heat, pressure, and a lack of oxygen.

Match each type of fossil with its corresponding description.

Trace Fossils	Fossils formed when minerals gradually replace the organic material of an organism, leaving a stony replica.	1
Cast Fossils	These fossils are created when an organism leaves behind a track, trail, or other evidence of its existence.	2
Imprint Fossils	Impressions of leaves, feathers, or other soft body parts are often found in these fossils.	3
Petrified Fossils	These fossils are formed when a mold fills with minerals, creating a replica of the original organism.	4

Correct answers:

1 Petrified Fossils 2 Trace Fossils 3 Imprint Fossils 4 Cast Fossils

Exploration

Environments with high levels of deposition are less likely to preserve fossils.

☐ True

☒ False



The petrification process of ____ occurs when the hard parts of an organism are reinforced by precipitated minerals.

- ☐ carbonization
- ☐ replacement
- ☒ permineralization ✓
- ☐ oxidation

An external mold of a thin organism is called an imprint.

- ☒ True ✓
- ☐ False

Which phyla includes starfish and sea urchins?

- ☐ Brachiopoda
- ☐ Cnidaria
- ☒ Echinodermata ✓
- ☐ Porifera

Exercise 1

Identify which objects are the molds and which are the casts in your exercise.

Which cast provides the most information about the shell? Why?

How was the formation of your mold and cast different from how molds and casts form in nature?

What type of environment would you expect to best preserve body fossils? Use evidence from this exercise to support your answer.

Data Table 1: Shell Measurements
(SAMPLE ANSWER BELOW)

Measurement	Original Shell (cm)	Plaster of Paris Shell Sand (cm)	Plaster of Paris Shell Soil (cm)	Play-Doh®
Length	5.5	6.0	3.5	5.0
Width	4.5	5.0	2.0	4.0
Depth	1.5	1.0	0.5	1.0

Data Table 2: Plaster Shell Observations
(SAMPLE ANSWER BELOW)

	Sand	Potting Soil	Play-Doh®
Observations	Somewhat retains shape, but hard to obtain precise dimensions. No external features preserved.	Retains shape and somewhat retains dimensions. No external features are preserved.	Retains shape, dimensions, and external features (ridges very clear).

Photo 1: Dried Fossils
(SAMPLE ANSWER BELOW)



Exercise 2

In what type of environment, in general, did each of these organisms live? How do you know?

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Which fossil is most likely the oldest fossil? Explain your reasoning.

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An index fossil is a fossil organism found within rock strata that is characteristic of a particular span of geologic time. Index fossils are used to date and correlate rock strata. All index fossils must have a wide geographic distribution, a short temporal range (i.e., amount of time they lived), and be abundant. Which (if any) of the unknown fossils could be an index fossil? Why?

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Photo 2: Fossil Sketches
(SAMPLE ANSWER BELOW)

No sample answer provided

Data Table 3: Fossil Identification
(SAMPLE ANSWER BELOW)

Fossil	Identity
Fossil A	Ammonite
Fossil B	Crinoid
Fossil C	Brachiopoda

Competency Review

Fossils formed through ____ reveal information about the soft parts of an organism.

- ☒ carbonization ✓
- ☐ permineralization
- ☐ replacement
- ☐ precipitation

Environments that have exceptional fossil preservation due to deposition are called Lagerstätten.

- ☐ True ✓
- ☐ False

Fossils that are created when sediment is packed around organic matter are called ____.

- ☐ casts
- ☐ molds ✓
- ☐ imprints

The phyla Porifera includes snails, clams, and squid.

- ☐ True
- ☐ False ✓

Trilobites are a commonly fossilized member of the phyla ____.

- ☐ Cnidaria
- ☐ Brachiopoda
- ☐ Bryozoa
- ☐ Arthropoda ✓

In Exercise 1, the Play-Doh was used to create a cast.

- ☐ True
- ☐ False ✓
-

Which fossil is characterized by two symmetric valves with a hinge?

- ☐ Rugose Coral
- ☐ Ammonite
- ☒ Brachiopod
- ☐ Crinoid



Extension Questions

Why are marine fossils common? Explain this using your knowledge of the location of early life, its evolution, and the process of fossilization.

(SAMPLE ANSWER BELOW)

Most fossils are from marine environments because because most of the evidence of early life is from shallow seas. When diversification and increased fossilization occurred during the Cambrian Explosions, most organisms still lived in the sea. In addition, marine environments have high deposition rates that contribute to the likelihood of preservation, and some organisms in marine environments have shells that help enable their preservation.