

SI Geology - Full Discipline Demo

Sedimentary Rocks

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

Match the term to the correct definition.

⚡ Cementation	Process in which sediment grains are squished together, reducing the space between particles	1
⚡ Compaction	Hardening of sediments into a rock	2
⚡ Deposition	Process in which mineral crystals form in solution and collect as aggregates	3
⚡ Lithification	Settling of sediment as the velocity of transportation decreases	4
⚡ Precipitation	Process in which chemical films or microscopic crystals precipitate between sedimentary grains, gluing them together	5

Correct answers:

- 1 Compaction 2 Lithification 3 Precipitation 4 Deposition
5 Cementation

Classify the following statements as true or false.

⚡ Biogenic sedimentary rocks are classified as having well-sorted, moderately sorted, or poorly sorted grains.	
⚡ Chemical sedimentary rocks can have either a crystalline or microcrystalline texture.	
⚡ Clastic sedimentary rocks with poor sorting are associated with environments where rapid deposition occurred.	
⚡ Poorly-sorted sediments are associated with slow deposition.	
⚡ The grain size of clastic sedimentary rocks can be categorized using the Wentworth scale.	
True	False
1	2

Correct answers:

1

Chemical sedimentary rocks can have either a crystalline or microcrystalline texture.

Clastic sedimentary rocks with poor sorting are associated with environments where rapid deposition occurred.

The grain size of clastic sedimentary rocks can be categorized using the Wentworth scale.

2

Biogenic sedimentary rocks are classified as having well-sorted, moderately sorted, or poorly sorted grains.

Poorly-sorted sediments are associated with slow deposition.

Exploration

Lithification involves two processes: ____ and ____.

- ☐ cementation, deposition
- ☐ erosion, deposition
- ☒ compaction, cementation
- ☐ mechanical weathering, chemical weathering

✓

Rocks composed of weathered rock and mineral fragments are called clastic sedimentary rocks.

- ☒ True
- ☐ False

✓

A sedimentary rock sample containing grains with sharp edges are classified as ____.

- ☐ Well-rounded
- ☐ Rounded
- ☒ Angular
- ☐ Microcrystalline

✓

The texture of chemical sedimentary rocks can be described as coarse, medium, or fine.

- ☐ True
- ☒ False

✓

A sedimentary rock composed of well-sorted gravel would be associated with a low-energy environment.

- ☐ True
- ☒ False

✓

Exercise 1

What does grain size indicate about a specimen's depositional environment and energy of transport?

Based on what you learned about grain size and transport, which sedimentary rock sample examined here likely had its grains transported the farthest before being deposited?

Which sedimentary rock sample examined here likely had its components transported the least before being deposited?

Which sedimentary rock sample examined here would be most susceptible to weathering? Explain your answer.

Data Table 1: Sedimentary Rock Identification
(SAMPLE ANSWER BELOW)

Sample	Rock Type	Grain Size	Composition	Rock Name
9	Clastic	Gravel	Rock and mineral fragments	Conglomerate
10	Biogenic	Fine (not visible)	Charcoal (plant matter)	Coal
11	Clastic	Clay	Rock and mineral fragments	Shale
12	Biogenic	Coarse or medium	Shells and calcite mud	Fossiliferous Limestone

13	Chemical	Microcrystalline	Silica	Chert
14	Clastic	Sand	Quartz grains	Quartz Sandstone
15	Chemical	Crystalline	Halite	Rock Salt
16	Clastic	Silt	Rock and mineral fragments	Siltstone

Photo 1: Sedimentary Rock Set
(SAMPLE ANSWER BELOW)



Exercise 2

Based on the depositional environment that you determined for Sample 15, how did this rock form?

For each of the clastic rock samples, describe why you choose the depositional environment you assigned to it in one or two sentences.

Why is it important for geologists to research and understand the depositional environment of sedimentary rocks?

Data Table 2: Depositional Environments
(SAMPLE ANSWER BELOW)

Sample	Rock Name	Rock Type	Additional Characteristics	Depositional Environment
9	Conglomerate	Clastic	Rounded to well-rounded grains. Poor to moderate sorting.	River or glacier
10	Coal	Biogenic	Variable depending on the sample	Swamp
11	Shale	Clastic	Well-sorted. Smooth with laminations.	Deep sea, lake, river, delta, or beach
12	Fossiliferous Limestone	Biogenic	Shell fossils surrounded by mud that effervesces in acid.	Shallow sea
13	Chert	Chemical	Extremely hard with no visible crystals.	Deep sea or lake

14	Quartz Sandstone	Clastic	Well-sorted, well-rounded. May or may not contain structures.	River, delta, beach, desert, or shallow sea
15	Rock Salt	Chemical	Crystals visible. Tastes salty.	Lake
16	Siltstone	Clastic	Well-sorted. Grains too small to see but feels gritty.	Lake, river, delta, or beach

Competency Review

Biogenic sedimentary rock formation is associated with all of the following environments except ____.

- ☐ lakes
- ☒ deserts ✓
- ☐ swamps
- ☐ reefs

In what order do the steps of sedimentary rock formation occur?

- ☐ Weathering - Erosion - Deposition - Transportation - Lithification
- ☐ Erosion - Weathering - Deposition - Transportation - Lithification
- ☐ Erosion - Weathering - transportation - Deposition - Lithification
- ☒ Weathering - Erosion - Transportation - Deposition - Lithification ✓

Which of the following grain sizes would not be associated with a clastic sedimentary rock?

- ☒ Coarse ✓
- ☐ Sand
- ☐ Gravel
- ☐ Clay

Chemical sedimentary rocks form through ____ and aggregation of minerals from a solution.

- ☐ Lithification
- ☐ Cementation
- ☐ Compaction
- ☒ Precipitation

A clastic sedimentary rock sample is composed of gravel-sized rock and mineral fragments with rounded grains. What type of sedimentary rock is being observed?

- ☐ Siltstone
- ☐ Shale
- ☒ Conglomerate
- ☐ Chert

A biogenic sedimentary rock composed of shell, shell fragments, and corals may have originated in a ____.

- ☒ Reef
- ☐ Desert
- ☐ Lake
- ☐ Glacier

Sedimentary rocks have characteristics that reflect the environment in which they formed.

- ☒ True
- ☐ False

Which of the following minerals does not commonly occur in a sedimentary rock?

- ☐ Hematite
- ☒ Olivine
- ☐ Calcite
- ☐ Quartz



A chemical sedimentary rock sample is composed of microcrystalline silica. What type of sedimentary rock is being observed?

- ☐ Coal
- ☒ Chert
- ☐ Rock Salt
- ☐ Siltstone



Extension Questions

Fossils found in sedimentary rocks can help geologists understand the history of an area. Why might sedimentary rocks be ideal for fossil formation versus other types of rocks? Discuss three other ways sedimentary rocks might help geologists understand the history of a location. (SAMPLE ANSWER BELOW)

Sedimentary rocks are an ideal location for fossil formation versus metamorphic or igneous rock, due to the high heat and pressure required for these other rocks' formation. This heat/pressure would destroy organic matter, preventing fossil formation (or in the case of metamorphic rocks, destroying any fossils already found in the rock).

Listed below are additional examples of how sedimentary rocks can help geologists understand an areas history.

1. Chert can indicate the former presence of an ocean or deep lake.
2. Limestone can indicate an area was once a warm, shallow ocean.
3. Coal can indicate the presence of swamp.
4. Sandstone can indicate an area where large amounts of sand accumulated, such as a beach or a desert.
5. Cross bedding in different directions can indicate a wind deposit of stands, similar to sand dunes.