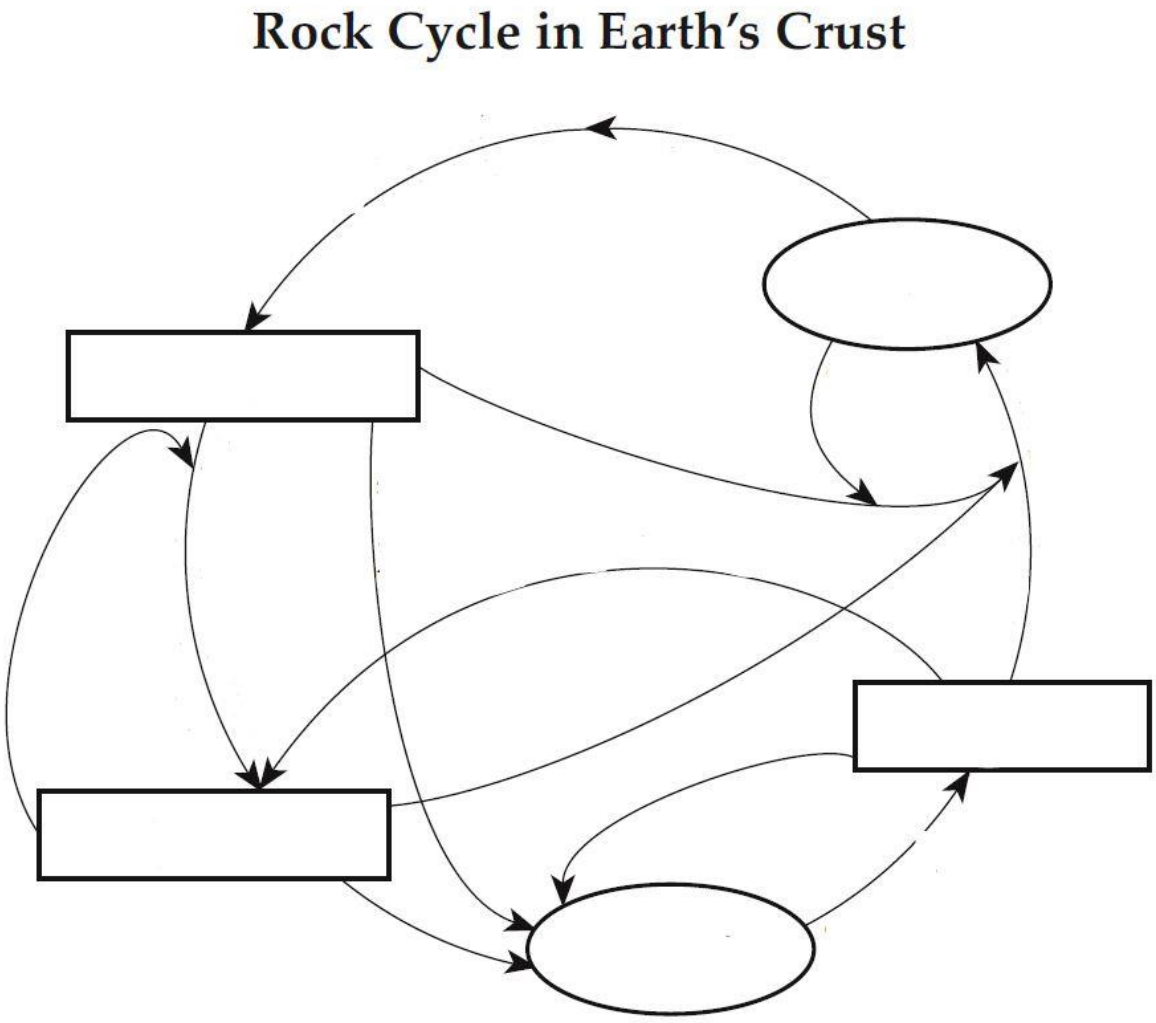
Section 3: Sedimentary Rocks



Section 3 Question: How does sediment turn into a sedimentary rock and how can we distinguish them?

What Do You See?

What Do You Think?

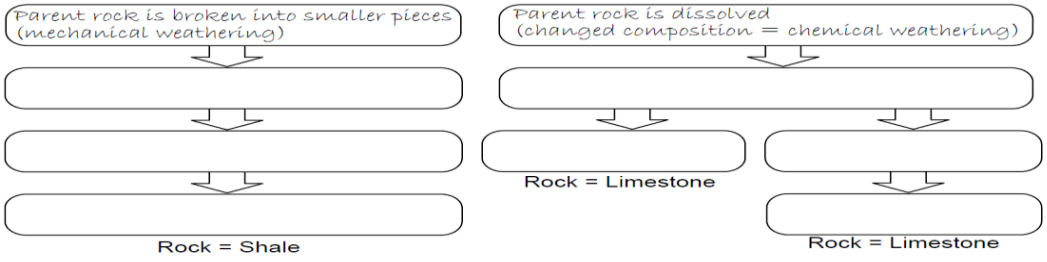
1) From the choices, list the steps necessary for a parent rock to become a detrital or chemical sedimentary rock. Each step will be used once.

DETRITAL (e.g. shale/mudstone)

- transportation (water, wind, ice)
- ~~parent rock is broken into smaller pieces~~
- deposition of detrital sediments
- compaction and cementation into rock

CHEMICAL (e.g. limestone)

- transportation (dissolved in water)
- ~~parent rock is dissolved~~
- precipitation as rock
- precipitation as shells
- shells are deposited, compacted and cemented



What Do You Think Now?

1) From the choices, list the steps necessary for a parent rock to become a detrital or chemical sedimentary rock. Each step will be used once.

DETRITAL (e.g. shale/mudstone)

- transportation (water, wind, ice)
- ~~parent rock is broken into smaller pieces~~
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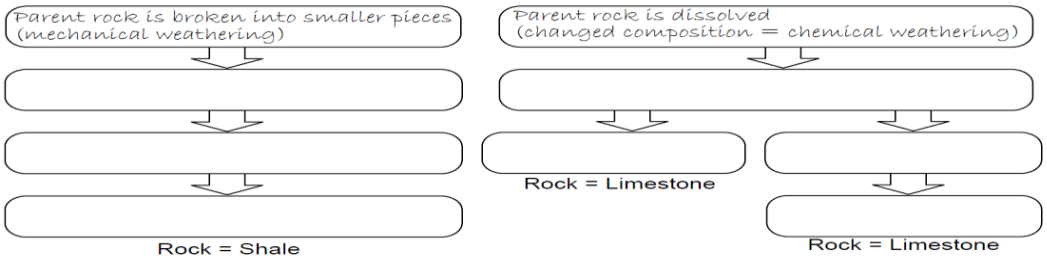


Focus Question A: How do different types of sedimentary rocks form?

Create your own rock:

Rock 1:
Describe the process used to create your rock

What characteristics do your rocks have that distinguish it from the others?

Rock 2:
Describe the process used to create your rock

What characteristics do your rocks have that distinguish it from the others?

Rock 3:
Describe the process used to create your rock

What characteristics do your rocks have that distinguish it from the others?

Focus Question B: How do depositional environments affect sedimentary rock formation?

EXPLORE:

Pour your mixture of sediment into the container of water and record your observations after;

30 seconds:

1 minute:

5 minutes:

30 minutes:

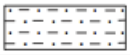
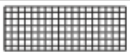
24 hours:

Extend:

Refer to page 7 of ESRT *Scheme for Sedimentary Rock Identification*

Use the table to identify your samples by name

Scheme for Sedimentary Rock Identification

INORGANIC LAND-DERIVED SEDIMENTARY ROCKS					
TEXTURE	**GRAIN SIZE**	**COMPOSITION**	**COMMENTS**	**ROCK NAME**	**MAP SYMBOL**
Clastic (fragmental)	Pebbles, cobbles, and/or boulders embedded in sand, silt, and/or clay	Mostly quartz, feldspar, and clay minerals; may contain fragments of other rocks and minerals	Rounded fragments	**Conglomerate**	
			Angular fragments	**Breccia**	
	Sand (0.006 to 0.2 cm)		Fine to coarse	**Sandstone**	
	Silt (0.0004 to 0.006 cm)		Very fine grain	**Siltstone**	
	Clay (less than 0.0004 cm)		Compact; may split easily	**Shale**	
CHEMICALLY AND/OR ORGANICALLY FORMED SEDIMENTARY ROCKS					
TEXTURE	**GRAIN SIZE**	**COMPOSITION**	**COMMENTS**	**ROCK NAME**	**MAP SYMBOL**
Crystalline	Fine to coarse crystals	Halite	Crystals from chemical precipitates and evaporites	**Rock salt**	
		Gypsum		**Rock gypsum**	
		Dolomite		**Dolostone**	
Crystalline or bioclastic	Microscopic to very coarse	Calcite	Precipitates of biologic origin or cemented shell fragments	**Limestone**	
Bioclastic		Carbon	Compacted plant remains	**Bituminous coal**	

Sample Name	Distinguishing Feature
1	
2	
3	
4	
5	
6	
7	
8	
9	

Explain:
How do geologists classify sedimentary rocks

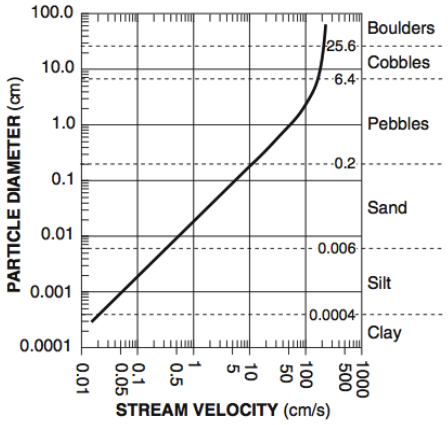
RETURN TO WDYTN

DIGGING DEEPER

Distribution of Sedimentary Rocks	

• Sedimentary Rocks are by far the most abundant type in the upper crust.
• Sedimentary rocks can form in several ways;
  ○ Compaction/cementation of sediments
  ○ Chemical processes
  ○ Organic processes
	What types of sedimentary rocks exist in our region of NYS?
	
	What do they tell us about the past environment?

Clastic Sedimentary Rocks	

• Clastic sedimentary rocks are made mostly of fragments of preexisting rocks that have been compacted or cemented together.
• The clasts of a sedimentary rock are often held together by quartz or calcite that has precipitated between the clasts.
• Clastic sedimentary rocks are classified by the size and shape of the clasts within the rock.
• Clast size usually reflects the energy of the medium that carried it there.
• There are 5 main types of clastic sedimentary rocks;
  ○ Shale
  ○ Siltstone
  ○ Sandstone
  ○ Breccia
  ○ Conglomerate
	Page 6 in the ESRT
	
	Relationship of Transported Particle Size to Water Velocity
	 
	
	This generalized graph shows the water velocity needed to maintain, but not start, movement. Variations occur due to differences in particle density and shape.

Chemical Sedimentary Rocks	
• Chemical sedimentary rocks form from direct precipitation of minerals from a solution. • Solutions can exist in ocean, lake, or stream environments. • A solvent is the material that dissolves another substance. • A solute is the material that is dissolved.	What types of areas do chemical sedimentary rocks typically occur?
Organic Sedimentary Rocks	
• Organic sedimentary rocks are made up of organic materials such as plant material and animal shells • The organic material is compacted or cemented together to create a sedimentary rock	Describe the formation of coal.
Sedimentary Environments	

• Sediments are deposited in various environments all over Earth's surface
• Sedimentary rocks can tell a story about the past environments on Earth
  ○ Sandstones can suggest desert or shallow ocean environments
  ○ Limestone forms in warm ocean environments
  ○ Coal forms in tropical to subtropical environments
	What do the types of rocks in our region of New York suggest our past environment was like?
	
	What other information would you look for to support your hypothesis?

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Chapter 3, Section 3 E.B.C.
Sedimentary Rocks

Name:_____
Period:_____

Question (2)		
Claim 1 (2)		
A. Supporting Evidence (3)	B. Supporting Evidence (3)	
Claim 2 (2)		
A. Supporting Evidence (3)	B. Supporting Evidence (3)	
Analysis (6)		

	Claim *A statement or conclusion that answers the original question/problem.*	**Evidence** *Scientific data that supports the claim. The data needs to be appropriate and sufficient to support the claim.*	**Analysis** *A justification that connects the evidence to the claims. It shows why the data counts as evidence by using appropriate and sufficient scientific principles and vocabulary*.
0	Does not make a claim, or makes an inaccurate claim.	Does not provide evidence, or only provides inaccurate or vague evidence.	Does not provide an analysis, or only provides an irrelevant analysis.
1	Makes an accurate but vague or incomplete claim.	Provides vague evidence and does not include specific data.	Repeats evidence and links it to claim, but does not include specific scientific principles.
2	Makes accurate and complete claim.	Provides correct evidence but does not include specific data.	Connects all evidence to the claims using scientific principles or vocabulary but not both.
3		Provides correct evidence and includes specific data.	Connects all evidence to both claims using scientific principles and vocabulary.

CHECKING UP: Page 302, 1 through 4 (2 points each)

____
13

1.

2.

3.

4.

In your own words, explain how the three main types of sedimentary rocks form. (5 points)