

GOL 106 – Sedimentary Rock Identification & Interpretation Worksheet

Classify the set of sedimentary rocks by describing the composition, texture and any other notable properties. Next, based on your observations interpret possible depositional environments.

COMPOSITION

Detrital/Clastic

- Contains gravel
- Primarily sand (visible grains)
- Silt (barely visible)
- Clay (too fine to see)

Biochemical

- Carbon/charcoal
- Calcareous (fizzes with dilute HCl)
- Shells/shell fragments
- Corals/coral fragments
- Calcareous fossils/microfossils

Chemical

- Oolitic
- Crystalline/microcrystalline

TEXTURES & OTHER PROPERTIES

- Angular grains (often of similar composition)
- Rounded grains (often of different composition)
- Poorly sorted
- Moderately sorted
- Well sorted
- Mostly quartz
- Mostly feldspar
- Mix of sand grains w/ silt & mud
- Gritty
- Smooth
- Blocky
- Fissile (breaks into thin sheets)
- Black (dark) color
- Red (rust) color

- Visible shells or other fossils (whole and/or fragments)
- Loosely cemented shell fragments
- Chalky (gets all over your hands)
- Fizzes with dilute HCl
- Black and sooty
- Black and shiny (bright)
- Brittle

- Ooids/Oolites (spherical calcite grains)
- Banded appearance/layering
- Pores or cavities
- Fizzes with dilute HCl
- Fizzes with dilute HCl only if powdered
- Conchoidal fracture
- Dark yellow to dark rusty-red chemical residue (streak)
- Salty taste
- Hard ($H > 5.5$)
- Soft ($H \leq 5.5$)

ROCK CLASSIFICATION

- Conglomerate
- Breccia
- Quartz sandstone
- Arkose
- Greywacke
- Siltstone
- Claystone
- Silt shale
- Clay shale

- Bituminous coal
- Calcareous (Fossiliferous limestone)
- Chalk
- Coquina
- Micrite (Chemical limestone)

- Oolitic limestone
- Travertine
- Micrite (Chemical limestone)
- Chert (white):
 - Jasper (red)
 - Flint (black)
 - Agate (banded)
 - Petrified wood (multicolored)
- Ironstone (hematite or limonite)
- Rock salt (halite)
- Rock gypsum

SEDIMENTARY STRUCTURES

- Raindrop impressions
- Horizontal strata
- Graded bedding

- Ripple marks (current/oscillation)
- Cross-bedding
- Mudcracks

- Flutes/flute casts
- Plant root/animal burrows
- Animal tracks/trails

SEDIMENTARY ENVIRONMENTS

Terrestrial

- Rift Valley/Alluvial fan (tectonically active regions)
- Rivers/Streams (fluvial)
- Lakes (lacustrine)
- Swamps/Marshes (paludal)
- Desert/Dunes (aeolian)

Transitional

- Delta
- Beach/Barrier Island
- Lagoon
- Tidal Flat

Marine

- Reefs
- Carbonate Bank/Platform
- Nearshore/Continental Shelf
- Deep Sea

1.) These three samples look slightly different based on color and composition, but they are all classified as the same type of sedimentary rock.	
Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:
Were these rocks deposited in a turbulent, high-energy environment or a quiet, low-energy environment?	
Were the clasts in these rocks deposited close to their source area or were they transported away from their source area?	
Are these rocks texturally mature or immature?	

2.)	
Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:
Were these rocks deposited in a turbulent, high-energy environment or a quiet, low-energy environment?	
Was this rock deposited in an oxygen-rich (oxic) or oxygen-poor (anoxic) environment?	
What are the two, soft sedimentary rocks that are precursors to the formation of this sedimentary rock?	

3.) Sample A

Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:

Sample B

Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:

Sample C

Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:

Were the clasts in these rocks deposited close to their source area or were they transported away from their source area?

Are these rocks texturally mature or immature?

Which sample(s) most likely formed in an arid desert environment?

4.)	
Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:
Was this rock deposited in a turbulent, high-energy environment or a quiet, low-energy environment?	
Were the clasts in this rock deposited within their source area or were they transported away from their source area?	
Is this rock texturally mature or immature?	

5.)	
Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:
Was this rock deposited in a turbulent, high-energy environment or a quiet, low-energy environment?	
Was this rock deposited in an oxygen-rich (oxic) or oxygen-poor (anoxic) environment?	

6.) Both of these samples have some subtle differences but are classified as the same type of sedimentary rock.
Sample A

Composition:		
Texture & Other Properties:		
Rock Classification:		
Sedimentary Structures (if any):		Sedimentary Environments:

Sample B

Composition:		
Texture & Other Properties:		
Rock Classification:		
Sedimentary Structures (if any):		Sedimentary Environments:

Which is the more poorly sorted sample (A or B)?

Which rock is more texturally mature (A or B)?

What mineral is responsible for giving this rock its pink, salmon color?

7.) Both of these samples have different compositions and textures, but are broadly classified as the same type of sedimentary rock.

Composition:		
Texture & Other Properties:		
Rock Classification:		
Sedimentary Structures (if any):	Sedimentary Environments:	
Which sample was most likely deposited in a quiet, low-energy environment?		
What common rock forming mineral is present in these rocks that also functions as a cementing agent?		
Classify both of these samples using Folks Classification system (may be required in some sections of GOL 106).	A:	
	B:	

8.)

Composition:		
Texture & Other Properties:		
Rock Classification:		
Sedimentary Structures (if any):	Sedimentary Environments:	
Was this rock deposited in a turbulent, high-energy environment or a quiet, low-energy environment?		
Was this rock deposited in an oxygen-rich (oxic) or oxygen-poor (anoxic) environment?		

9.)	
Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:
Were the clasts in this rock deposited close to their source area or were they transported away from their source area?	
Is this rock texturally mature or immature?	

10.)	
Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:
Was this rock deposited in a turbulent, high-energy environment or a quiet, low-energy environment?	
What is the primary component that composes this soft, porous rock?	

11.) Both of these samples have some subtle differences but are classified as the same type of sedimentary rock.

Composition:			
Texture & Other Properties:			
Rock Classification:			
Sedimentary Structures (if any):	Sedimentary Environments:		
Are these rocks texturally mature or immature?			
What dense, sediment-choked torrents are frequently associated with the deposition of this type of rock?			
If these samples were collected from a single graded bed deposit, which samples would represent the upper and lower sedimentary deposits of the sequence?	Graded Bed	Upper Deposit:	Lower Deposit:

12.) Sample A

Composition:			
Texture & Other Properties:			
Rock Classification:			
Sedimentary Structures (if any):	Sedimentary Environments:		

12.) Sample B

Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:

Sample C

Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:

What common rock forming mineral is present in these rocks that also functions as a cementing agent?

Which sample would most likely be found in a sedimentary deposit which contained oscillatory ripple marks?

Which sample was most likely a freshwater deposit?

13.)	
Composition:	
Texture & Other Properties:	
Rock Classification:	Sample A: Sample B: Sample C:
Sedimentary Structures (if any):	Sedimentary Environments:
What specific marine dwelling organisms may be responsible for the origin of this rock?	
These samples are a microcrystalline variety of what mineral?	
Which sample most likely owes its color to organic materials and low-oxygen (anoxic) conditions? Which sample most likely owes its color to the presence of iron oxides?	Anoxic: Iron Oxide:

14.)	
Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:
Name this sedimentary mineral (You may find it helpful to reference <i>Laboratory Manual in Physical Geology 9th edition</i> by Richard Busch & Dennis Tasa, pg 127-139).	
Did this sedimentary deposit form in an oxygen-rich (oxic) or oxygen-poor (anoxic) environment?	

15.) Sample A

Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:

Sample B

Composition:	
Texture & Other Properties:	
Rock Classification:	
Sedimentary Structures (if any):	Sedimentary Environments:

Classify both of these samples using Folks Classification system (may be required in some sections of GOL 106).

A:

B: