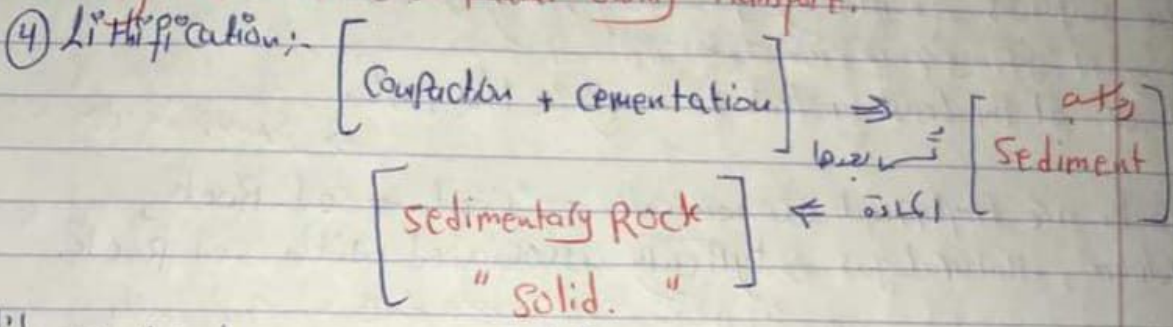


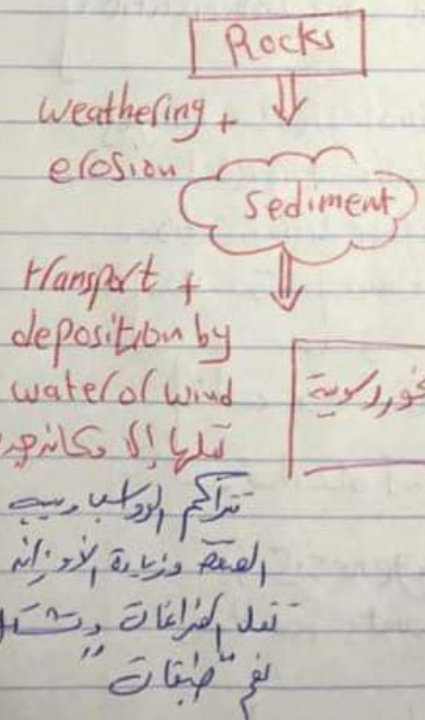
CH6: Sedimentary Rocks.

o The process of Forming Sedimentary Rocks:

- 1) Weathering :- تفتت + تكبير الصخور بالقرب من سطح الأرض
- 2) Transport of weathered materials (Fragments) by mass movement (gravity) و erosional agents " running water, wind " نقل المواد المترسبة لبعدها
- 3) Deposition :- "ترسيب" (sedimentation) and they are broken even further during transport. لفصل عن ترسيبها، لفئات الكسكاه بعد رسيه هذه لفصل " Lakes, river, valleys, seas " مثل



بالفصل عن ترسيبها " Layers " لفئات " Lithification " هي صفة + مادة ربط من اجل تقطيع لفئات بين المواد لربطها



What is sedimentary Rock??  
 Sedimentary Rock is Product of [mechanical and chemical weathering]  
 ليه بتشكل الصخور الرسوبية??  
 Because weathering + transport + deposition are taking place on a constant basis و sediments are Found almost every where and as they lithify they as continuously forming sedimentary rocks.



# Importance of Sedimentary Rocks

كم تشكل الصخور الرسوبية من حجم كوكبنا؟  
 الأرض حسب حجمها 16 كم  
 من حجم الأرض راجت الصخور الرسوبية تشكل 1.5%  
 هذا الحجم ولكنه تشكل الصخور الرسوبية نسبة 75%  
 الصخور المتكونة من الصخور الرسوبية على سطح الأرض

دبيته هو "لأنه" "لأنه" "لأنه" "لأنه" "لأنه"  
 بالتقريب أو على سطح الأرض

Importance: III evidences on past events and environments at the surfaces, (containing fossils), they give us a historical record or at the least a tool to analyze the past.  
 البقايا وقد تكونت في حين الأحياء عن "أماض"  
 عبارة عن كربون متركز

Rocks are Important economically: Coal ⇒ Sed. Rock, Petroleum, natural gas ⇒ typically associated with sed Rock.  
 الصخور الرسوبية كانت مصدر الطاقة والوقود

## ⇒ From sediment to Sedimentary Rock [Diagenesis and Lithification]

Diagenesis: - all the physical, chemical and biological changes that occur during the conversion of Sediment to Sedimentary Rock.  
 all processes after deposition and during and after lithification.  
 ⇒ diagenesis generally occurs at temp less than [150-200]°C

[metamorphic Rocks] ← لأنه لو كانت درجة الحرارة أعلى من 200°  
 ← تكونت من صخور أخرى بالتقريب أو على سطح الأرض

⇒ Lithification ⇒ is not the only form of Diagenesis, for instance [the process of Recrystallization accounts for the development of more stable minerals from less stable ones]

Ex ⇒ Aragonite [Aragonite ⇒ Calcite]



## → Compaction + Cementation.

(3)

∴ Lithification → The process by which unconsolidated sediments are transformed into solid sedimentary rocks.

⇒ Compaction: - sediment grains are pressed closer and closer, reducing pore space between them.

⇒ Cementation: - chemical diagenetic change that involves the (precipitation of minerals) from water percolating through the pores between particles which fill pores ⇒ joints the particles together.

ماء غير لاصق يملأ مسام الحبيبات المترابطة.

⇒ Compaction "reduce the pore space" ⇒ تقليل المسامات ⇒ physical.

⇒ Cementation "reduces the porosity" ⇒ تقليل المسامات ⇒ chemical.

⇒ Ex of cement materials ⇒ calcite, silica [strongest cement]  
iron oxide [orange/dark red color]

# type of cement ⇒ Rock strength.  
المتراصة



# Types of Sedimentary Rocks:-

1] Detrital Sedimentary Rocks " ~~clastic~~ clastic "

عباره عن فتات من الصخور الرسوبية وصخره صلبة ناتجة عن weathering (فتات)

→ Sedimentary rocks that are formed from the deposition and accumulation of solid particles [detrital] fragments produced by mechanical and chemical weathering

24] chemical inorganic Sedimentary Rocks:- Sedimentary rocks  
كيميائية لا علاقة بالكائن الحي

Forming from the precipitation of materials dissolved in water

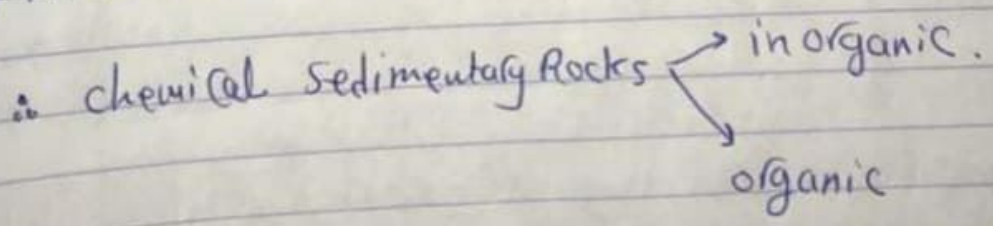
[chemical sediment] Ex:- الصخور الجيرية, Limestone.

توضع بعض الصخور الجيرية على شكل حبات هونديج calcite وبها ترتفع الحرارة  
يؤثر الارتفاع والترسيب ويكون Limestone وبها يكون تكون [chemical inorganic] عذرية

أيضا بالمياه العذبة ← تركيز الملح فيها عالي وترسيب مثل NaCl والصخور (FABs)

26] chemical organic or Bio chemical Sedimentary Rock:-  
كيميائية علاقة بالكائن الحي

Sedimentary rocks forming from the accumulation of plant or animal debris, Example coal → الفحم الحجري this black combustible rock consists of organic carbon from the remains of plants that died and accumulated on the floor of a swamp.





Detrital Sed. Rock :- are made of a variety of minerals (5) and rock fragments [ clay minerals, quartz ] are the most common.

\* clay minerals  $\Rightarrow$  the most abundant product of chemical weathering of silicate minerals and stable at the surface.  
Feldspar  $\xrightarrow{1-3}$

Feldspar  $\xrightarrow{\text{Weathering}}$  clay minerals

\* "quartz" :- abundant because it's extremely durable and resistant to chemical weathering

[7] كيميائي على وجه عام في [SiO<sub>2</sub>] وبها في مقادير مختلفة

\* other common minerals [ Feldspar, mica ]  $\rightarrow$  [ physical weathering ]

When chemical weathering doesn't have time to break them [ rapid erosion and deposition ]

$\Rightarrow$  Classification of Detrital Sedimentary Rocks

Particle size is the primary basis for distinguishing among various detrital sedimentary rocks not only because it is easy way but because grain size provides evidence on the depositional environment

القياس الرئيسي هو حسب حجم الجزيئات وهذا له دور كبير في تحديد بيئة الجزيئات من حيث سرعة الترسيب وكمية الترسيب.

the more energy the erosional force has  $\Rightarrow$  the larger the particles it will transport.

Ex:- ① Gravel "Large" : moved by swiftly flowing rivers as well as by landslides and glaciers [ high energy ]  
~~like~~ like running water

- ② sand "medium" → Wind blown dunes and some river deposits and beaches [medium energy] → Like Wind.
- ③ clay "small/ Fine" → associated with the quiet waters of a Lake, Lagoon, Swamp, certain marine environments [Low energy]

→ Common detrital sedimentary rocks in order of increasing particle size are 1 shale, 2 sandstone, 3 conglomerate, breccia

→ increasing particle size.

مقدمة

size mm	particle name	الرداء Common name	Detrital Rock
> 256 64 - 256 4 - 64 2 - 4	Boulder Cobble Pebble Granule	Gravel	Conglomerate (Round) حبيبات صغيرة Breccia (angular pebbles) حبيبات كسرة
1/16 - 2	Sand	Sand	Sandstone
1/256 - 1/16	silt	mud الطين	shale mud stone silt stone
< 1/256	clay		