

Sedimentary Rocks

Rocks made of bits & pieces of other rocks.

Sedimentary Rocks

- Igneous rocks are the most common rocks on Earth, but because most of them exist below the surface you might not have seen too many of them.
- 75 percent of the rocks exposed at the surface are sedimentary rocks.



What is sediment?

- **Sediments** are loose materials such as rock fragments, mineral grains, and bits of shell that have been moved by wind, water, ice, or gravity.
- Sediments come from already-existing rocks that are weathered and eroded.
- **Sedimentary rock** forms when sediments are pressed and cemented together, or when minerals form from solutions.

Sedimentary Rock Notes

already-existing rocks that are weathered and eroded

Sedimentary Rocks are made from

Sedimentary Rocks form when

sediments are pressed and cemented together, or when minerals form from solutions

Sedimentary Rocks are classified in 3 ways

1

2

3

made from

formed from

If sediments have small pieces then this occurs

If sediments have large pieces then this occurs

These are created by

and then moved by

Example

Example

Example

Example

Strata

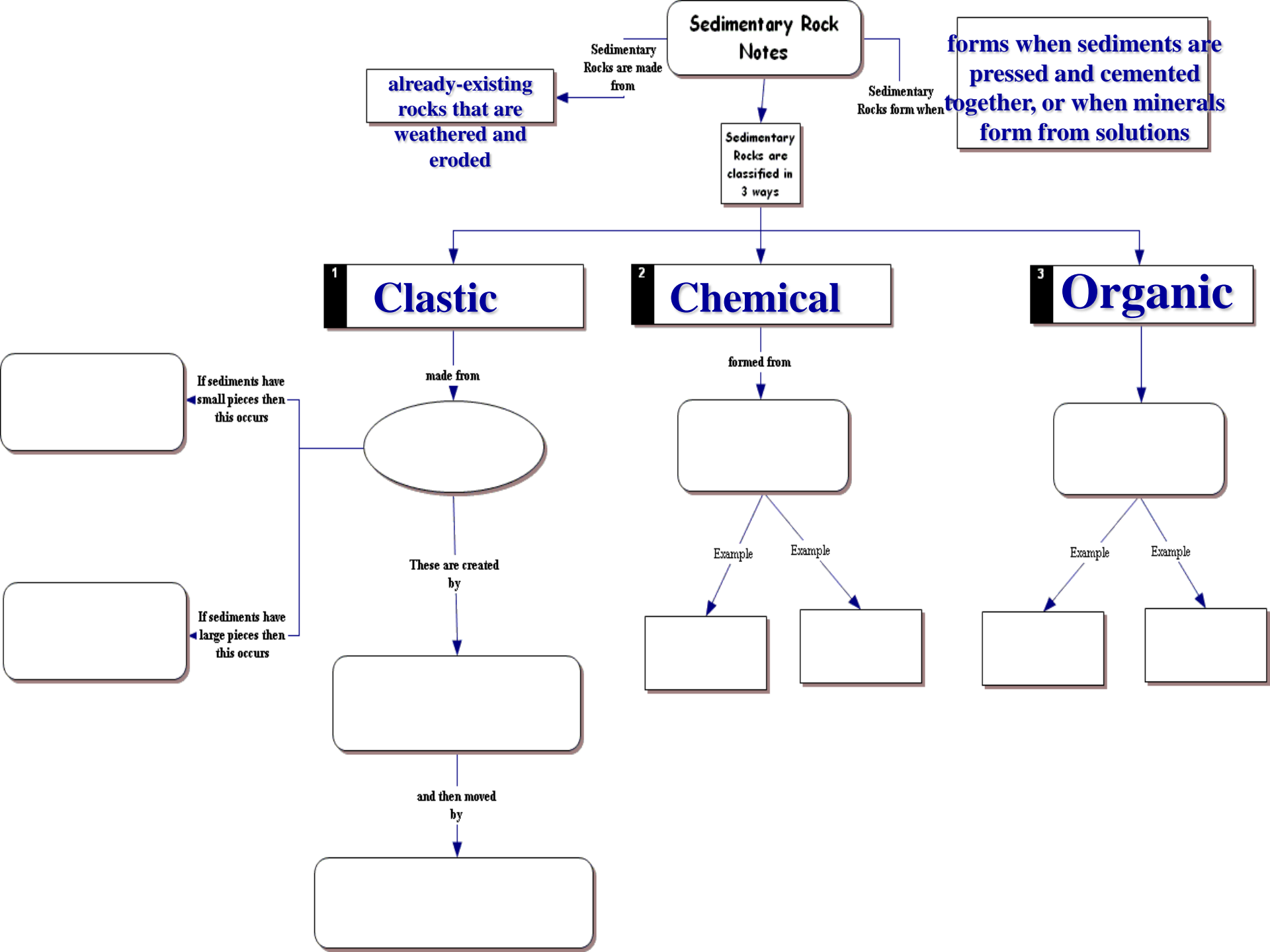
- Sedimentary rocks often form as layers.
- ▣ The older layers are on the bottom because they were deposited first.
- ▣ Sometimes, forces within Earth overturn layers of rock, and the oldest are no longer on the bottom.

Classifying Sedimentary Rocks

- Sedimentary rocks can be made of just about any material found in nature.
- ▣ Sediments come from weathered and eroded igneous, metamorphic, and sedimentary rocks.
- Sediments also come from the remains of some organisms.
- ▣ The composition of a sedimentary rock depends upon the composition of the sediments from which it formed.

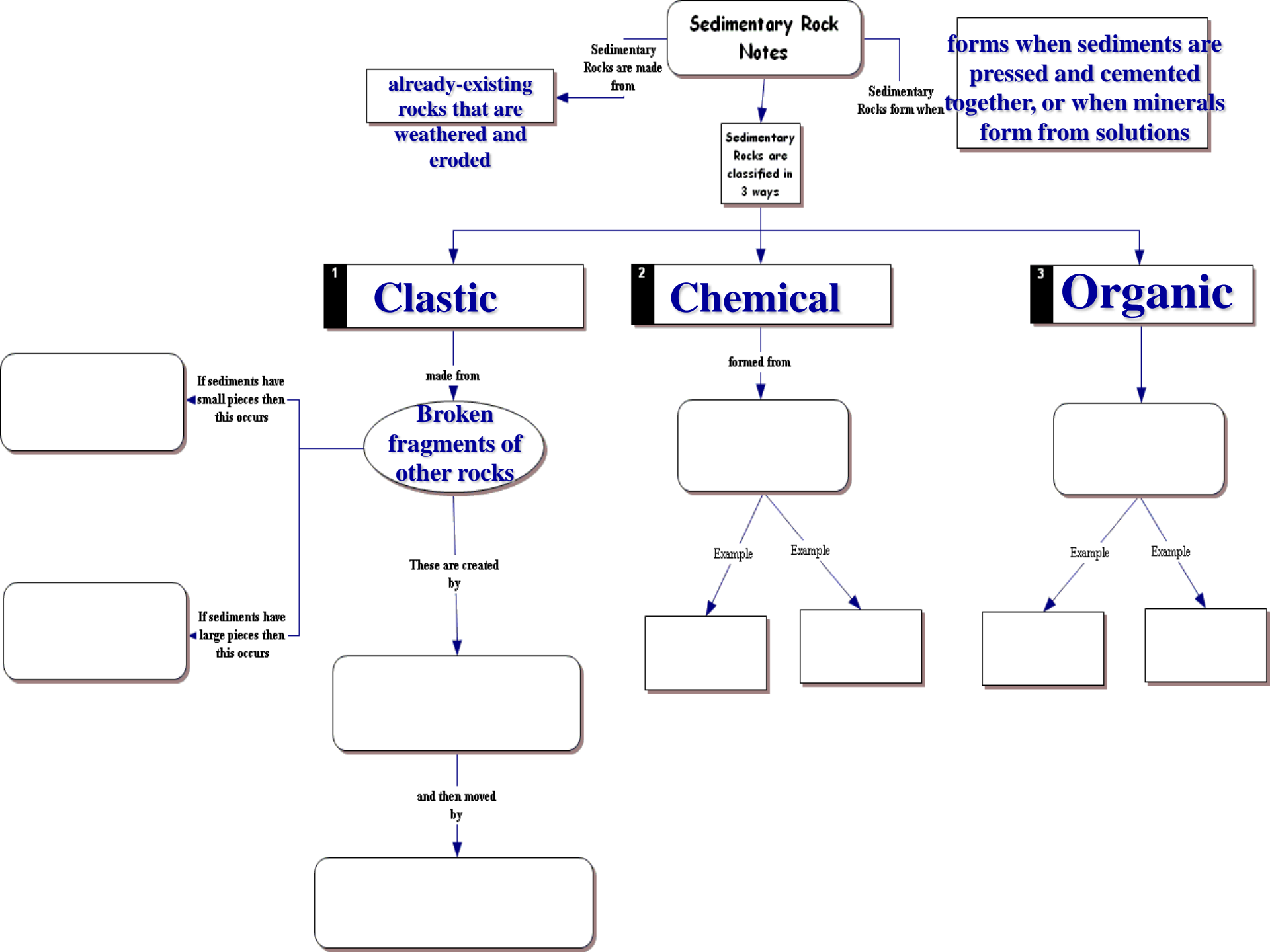
Classifying Sedimentary Rocks

- Sedimentary rocks are classified by their composition and by the manner in which they formed.
- The three types of sedimentary rocks are
 - Clastic
 - Chemical
 - Organic



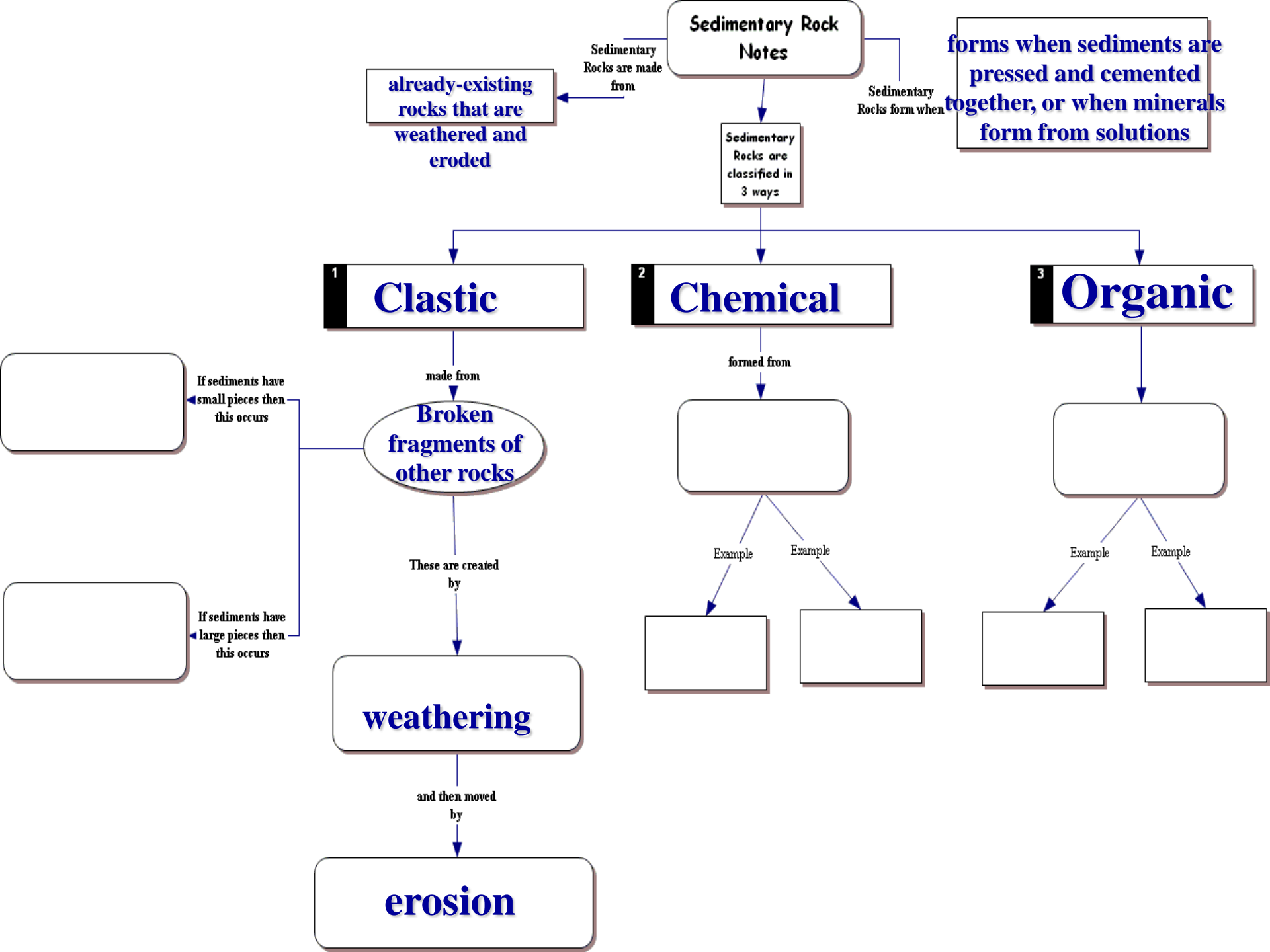
Clastic Sedimentary Rocks

- Clastic sedimentary rocks are made from the broken fragments of other rocks.



Weathering & Erosion

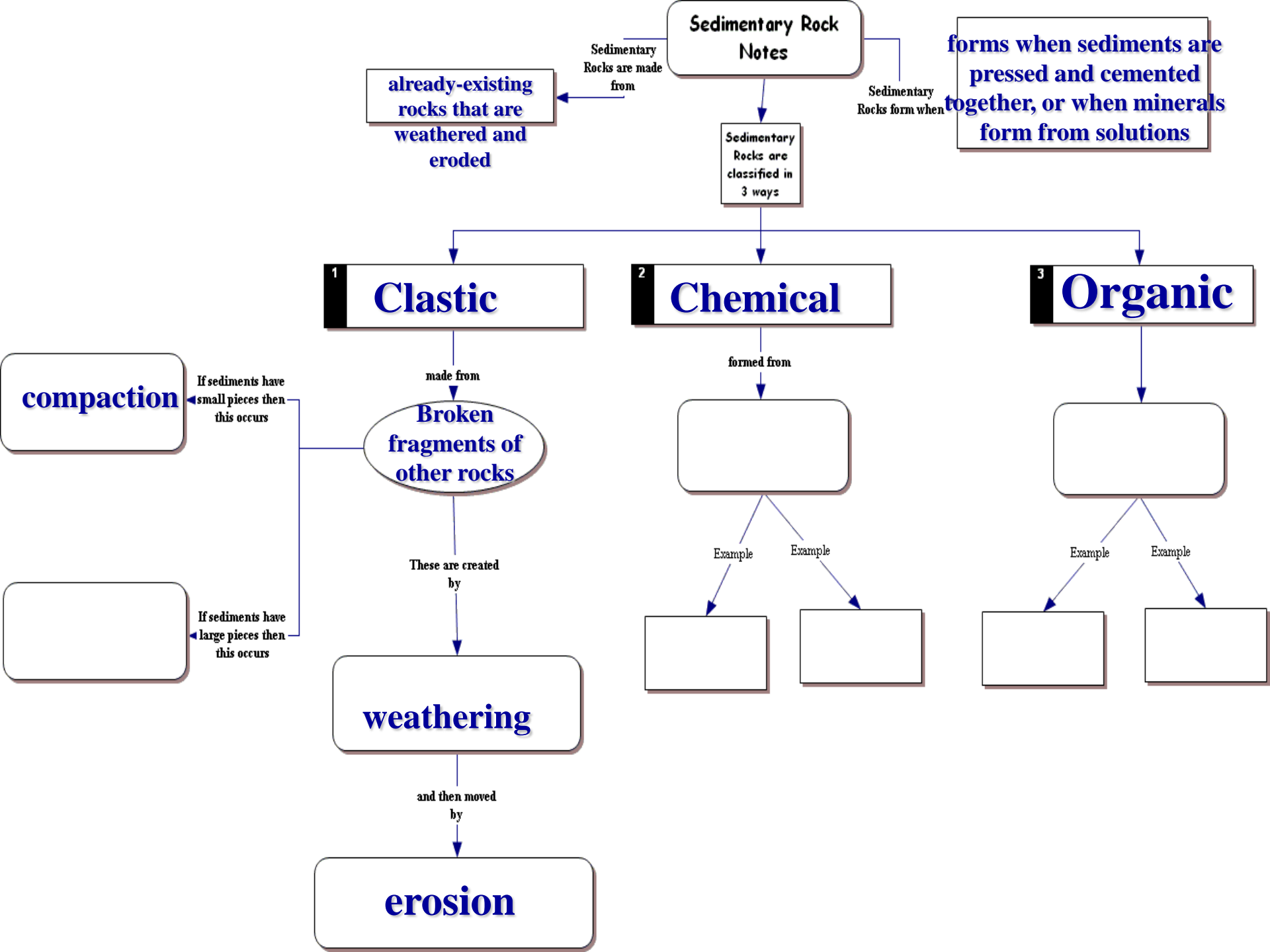
- ▣ When rock is exposed to air, water, or ice, it breaks down chemically and mechanically.
- This process, which breaks rocks into smaller pieces, is called weathering.
- The movement of weathered material is called erosion.



Compaction

- Where sediments are deposited, layer upon layer builds up.
- Pressure from the upper layers pushes down on the lower layers.
- ▣ If the sediments are small, they can stick together and form solid rock. This process is called **compaction**.





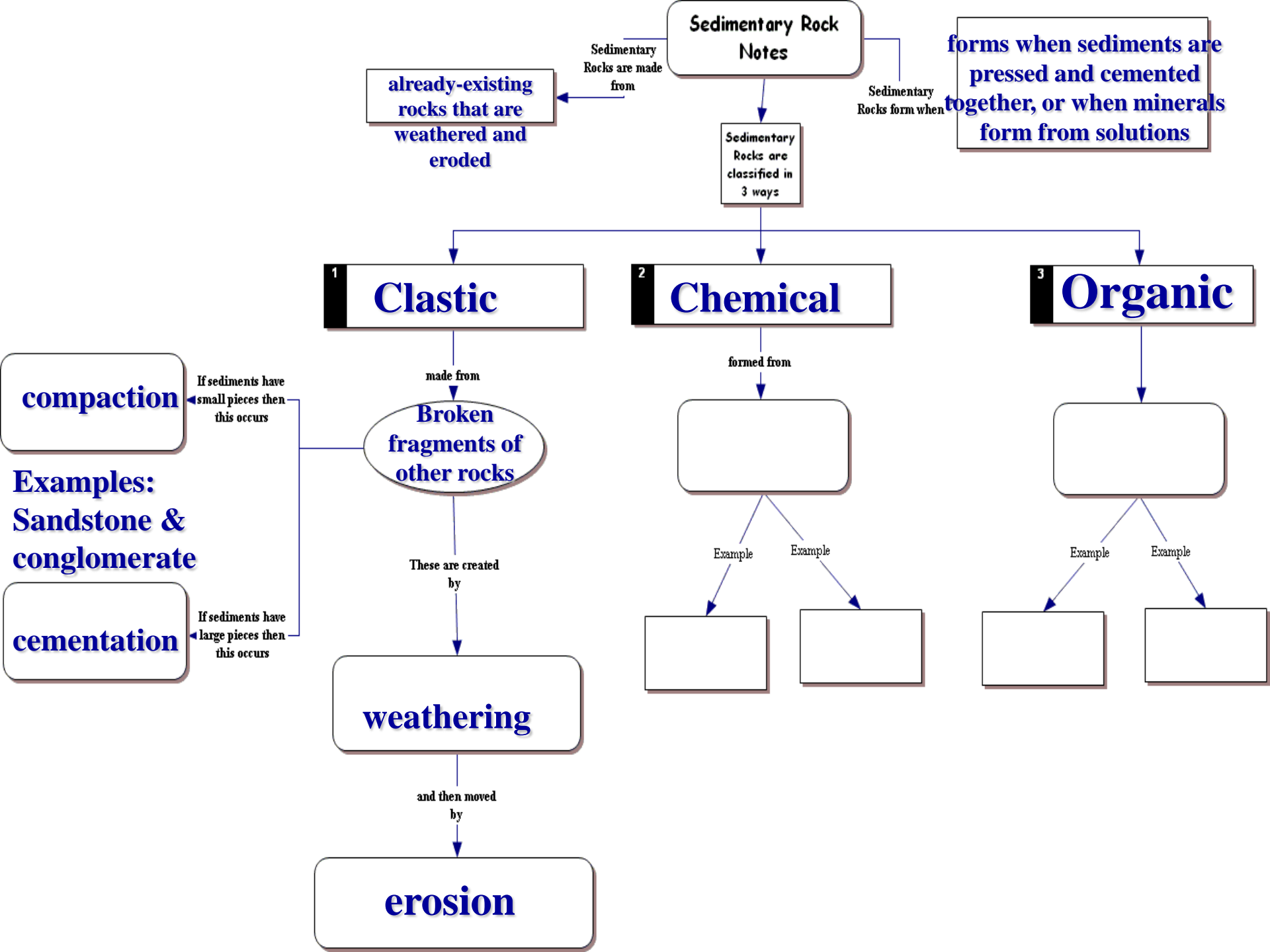
Cementation

- ▣ If sediments are large, like sand and pebbles, pressure alone can't make them stick together
- Large sediments have to be cemented together.
- As water moves through soil and rock, it picks up materials released from minerals during weathering.
- The resulting solution of water and dissolved materials moves through open spaces between sediments.

Clastic Sedimentary Rock Classification



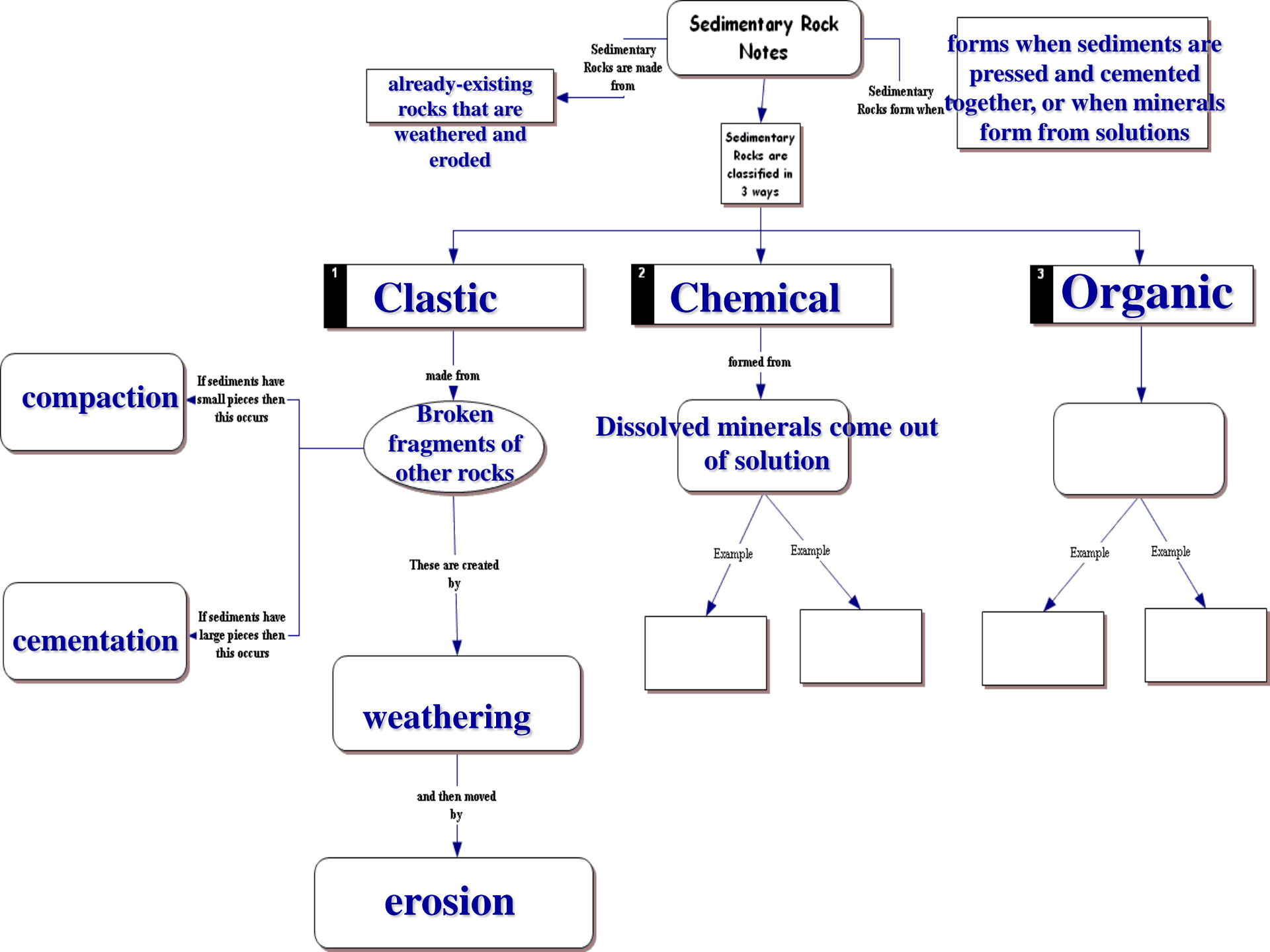
- Clastic Sedimentary Rocks are named according to the shapes and sizes of the sediments that form them.
- Conglomerate and breccia both form from large sediments.



Chemical Sedimentary Rocks



- Chemical sedimentary rocks form when dissolved minerals come out of solution.
- Minerals collect when seas or lakes evaporate. The deposits of minerals that come out of solution form sediments and rocks.
- Chemical sedimentary rocks are not made from pieces of preexisting rocks.



Chemical

- When calcium carbonate (CaCO_3) comes out of solution as calcite and its many crystals grow together, limestone forms.
- Limestone usually is deposited on the bottom of lakes or shallow seas.

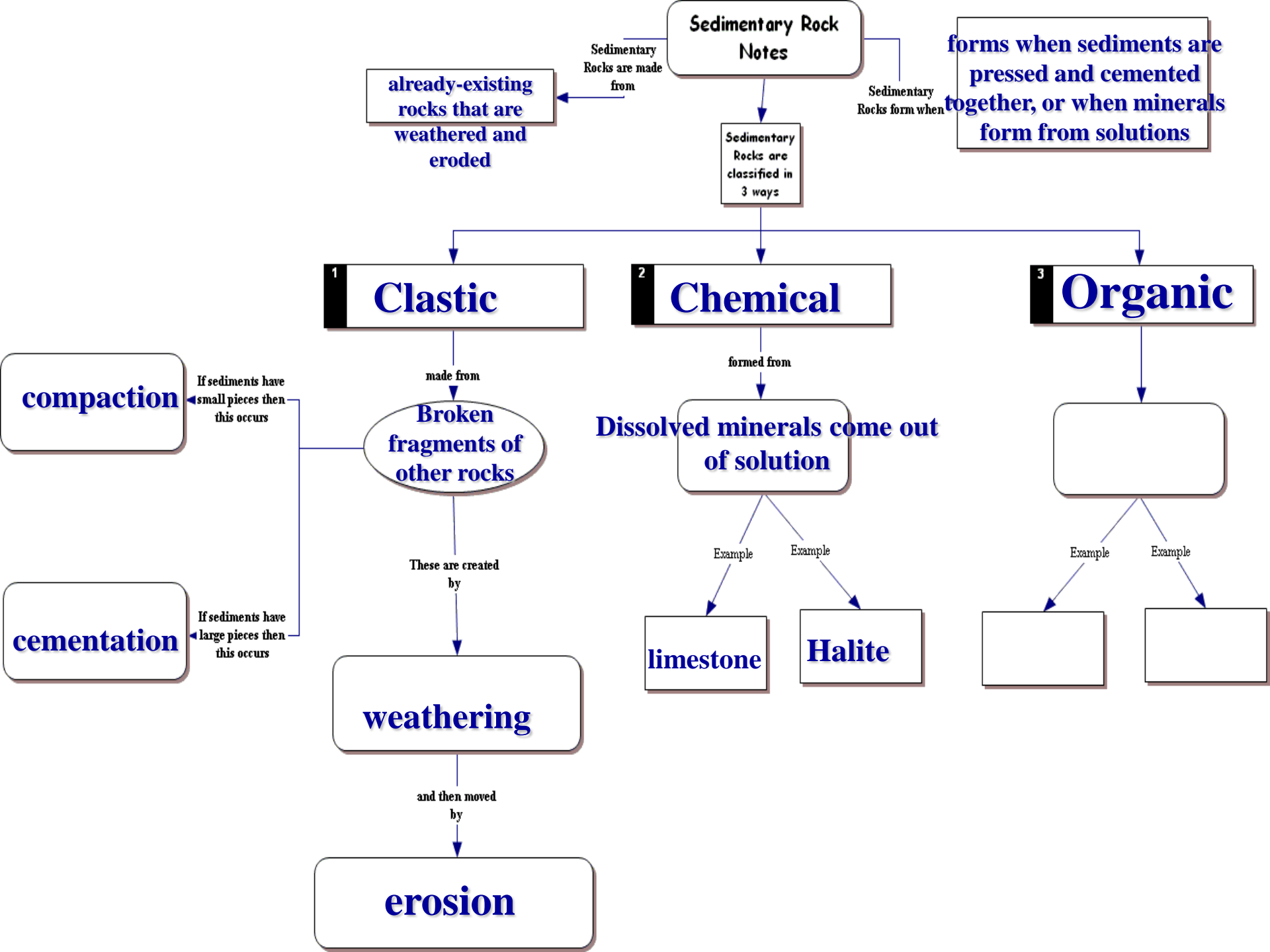
For your information...

- Large areas of the central United States have limestone bedrock because seas covered much of the country for millions of years.
- It is hard to imagine South Dakota being covered by ocean water, but it has happened several times throughout geological history.

Example

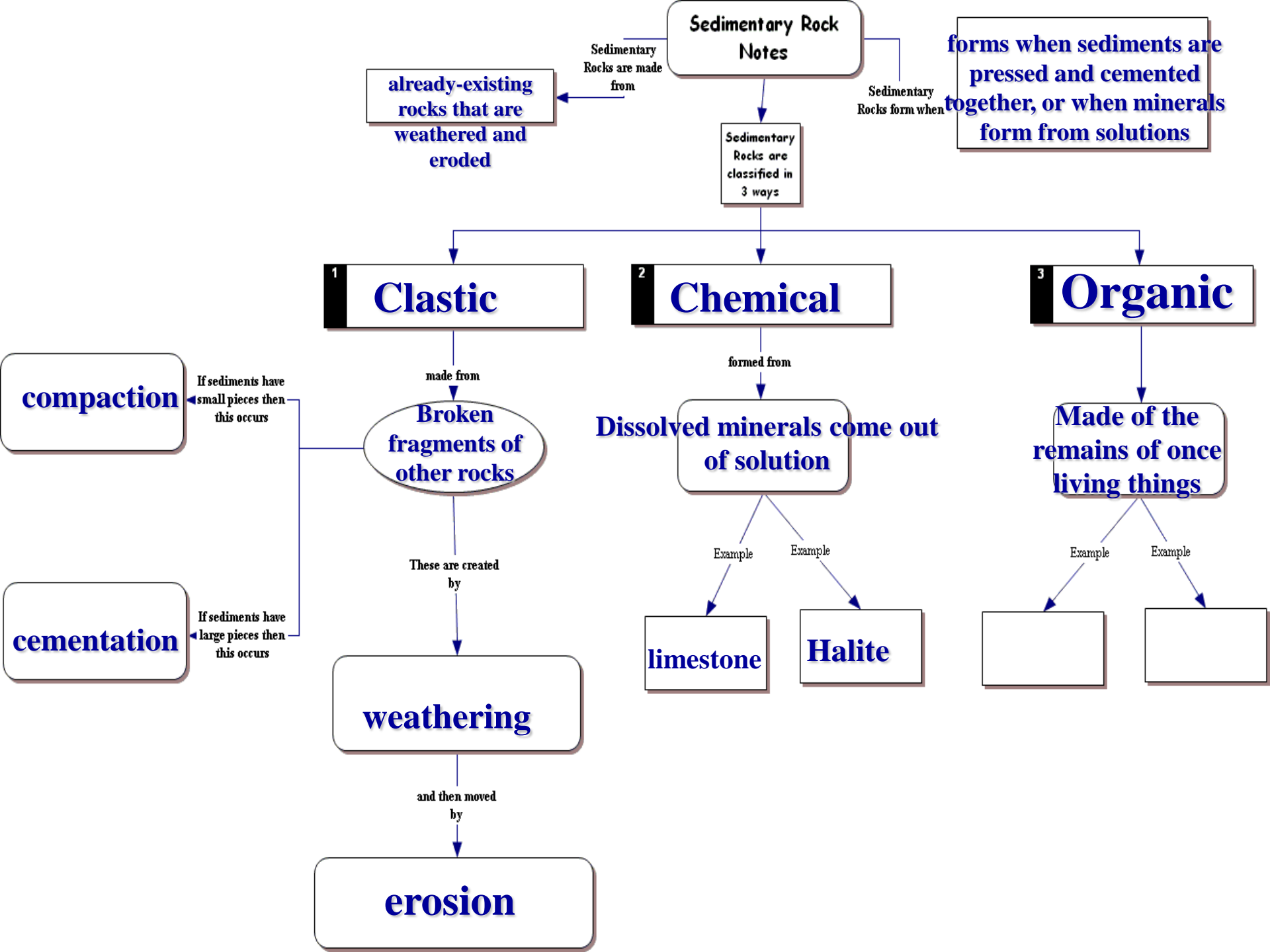
- When water that is rich in dissolved salt evaporates, it often deposits the mineral halite.
- Halite forms rock salt.
- Rock salt deposits can range in thickness from a few meters to more than 400 m.
- Companies mine these deposits because rock salt is an important resource.





Organic Sedimentary Rock

- Rocks made of the remains of once-living things are called organic sedimentary rocks.
- One of the most common organic sedimentary rocks is fossil-rich limestone.
- Like chemical limestone, fossil-rich limestone is made of the mineral calcite.
- Fossil-rich limestone mostly contains remains of once-living ocean organisms.



Example of Organic Sedimentary Rock

- Chalk is another organic sedimentary rock that is made of microscopic shells.
- When you write with naturally occurring chalk, you're crushing and smearing the calcite-shell remains of once-living ocean organisms.



Example of Organic Sedimentary Rock

- Another useful organic sedimentary rock is coal.
- Coal forms when pieces of dead plants are buried under other sediments in swamps.
- These plant materials are chemically changed by microorganisms.
- The resulting sediments are compacted over millions of years to form coal, an important source of energy.

