



Sedimentary rocks are classified according to their chemistry and grain size. Both factors indicate their erosional and depositional environments.

Grain size indicates the power of the depositing agent (wind or water). The stronger the current, the greater is the ability to carry larger pieces further from source.

Conglomerate > sandstone > siltstone > shale



Beach pebbles

Conglomerates are laid down where fierce mountain streams meet flat country, and the water's force can no longer carry large pebbles. They also form where seasonal flash floods activate mountain streams for short periods. Conglomerates have formed at the edge of the Darling Scarp where the streams "drop their load". The Olgas in Central Australia are made of conglomerate.

Sandstones are laid by large rivers and coastal processes. The Swan Coastal Plain formed under these conditions. The rivers brought sand grains down from inland and deposited them in fans at the coast. The process is much the same as at present. The sea has repeatedly inundated and reworked these sediments and added marine carbonates. This is the source of the carbonate cement which forms the matrix (cement) of the limey sandstones (or sandy limestones known as the Tamala Limestones)

Siltstones and clays which form **shales**, are laid by very slow rivers meandering their way about a floodplain. Mudflats accumulating near Broome are fine examples of these.

| Rock Type | Grain Size | Subjective Description |
|---------------------|------------------|---------------------------|
| Conglomerate | Greater than 2mm | Pebbles |
| Sandstone | 2.0 to 1.0mm | Gritty |
| Siltstone | 1.0 to 0.01mm | Silky but slightly gritty |
| Shale | Less than 0.01mm | Silky |

Even geologists find these sizes difficult to estimate but can learn to estimate grain size by touch. Students cut out squares of varying grades of sandpaper and put these in a reference sheet. They use this standard to estimate the coarseness or fineness of sedimentary rocks. This reference sheet can be retained and used to categorise soils.



Equipment (per class):

- 4 sheets of very coarse sandpaper – cut into 8 pieces
- 4 sheets of coarse sandpaper – cut into 8 pieces
- 4 sheets of medium sandpaper – cut into 8 pieces
- 4 sheets of fine sandpaper – cut into 8 pieces
- Stapler or strong glue
- A variety of sedimentary rocks for testing

Method:

1. Ask students to draw a pebble in the space provided on their worksheet*.
2. They should then take their pieces of sandpaper and staple (or glue) them into the spaces provided for them in their table.
3. These sandpaper samples provide a size reference for students. They can now rub the sandpaper with one hand, while doing the same to their rock sample to work out the matching grain size.

Notes

- Mudstones and shales should be classified as fine
- Siltstones may fall under the medium or fine category (depending on your sample and how sensitive students are to the texture differences)
- Sandstones will fall under medium to very coarse, depending on your sample (and its variability)
- Students will recognise that conglomerates fall under the *pebble size category – which is technically a rounded gravel (4mm to 64mm). They may also be composed of smaller particles, called granules (2-4mm).