**Lithology**

Lithology is a term that describes the physical properties of a visible outcrop, core, or hand samples of rock units, including with the aid of a low magnification microscope. These physical characteristics include composition, color, texture, grain size, etc.

Therefore, it is correct to say that lithology of any rock unit describes the megascopic physical characteristics of a visible outcrop, hand, or core sample.

Lithologies of rocks can have a detailed description of the physical properties or a gross summary of a physical character. Considering the gross summary of physical characteristics, examples of lithologies include limestone, slate, [basalt](https://sciencedrill.com/basalt/), chert, coal, claystone, shale, etc.

Lastly, in the petroleum or oil industry, lithology, more precisely known as mud logging (lithology logs), is a graphic depiction of the various geological formations as drilling is ongoing, drawn on mud logs (logs used for this reason). Experts sample and examine cuttings from boreholes under a 10X magnifying microscope or do chemical tests when necessary

**Petrology vs lithology**: Petrology is a branch of geology that studies rock origin, composition, structure, and distribution. In contrast, lithology describes the rock’s macroscopic physical properties of the visible or outcrop, core, or hand samples. It doesn’t focus on microscopic details.

However, both divide rocks into three main categories, igneous, metamorphic, and sedimentary.

**What does lithology description entail:**it describes rock’s physical properties visible to the unaided eye or using a microscope with low magnification. Some of the considerations are:

**1. Rock type**

Lithology names are essentially rock types, and they all fall into the three categories we know in petrology. You will have igneous (form from magma), sedimentary (lithified clasts or particles including minerals), or metamorphic (initially solid rock transformed under heat and or pressure).

Igneous rocks may be intrusive (have visible grains, i.e., phaneritic), extrusive (fine-grained/aphanitic or glassy), or pyroclastic (made of volcanic fragments). You can have further classification based on chemical composition.

Sedimentary rocks are categorized as carbonate and are further classified using Folk, Dunham, or siliciclastic. Siliciclastic can further fall into various categories according to the relative amount of quartz, lithic fragments, feldspar, and grain size distribution).

Lastly, metamorphic rock naming depends on mineral composition, texture, protolith (original un-metamorphosized rock), or metamorphic facies. Also, there are other special classifications, including when dominated by a single mineral.

**2. Mineralogy**

Lithologies need a record of minerals if the rock has minerals large enough to see with your naked eye or a hand lens. Also, you can conduct a hydrochloric acid to check for fizziness if you suspect calcite, especially in carbonates or those cemented by calcite.

Rock minerals are important in identifying and classifying rocks in ultramafic, carbonatites. Also, mineral phases can help tell the degree of metamorphism (heat and temperature).

**3. Grain sizes**

In igneous rocks, grain size is the measure of mineral crystal size present, indicating where or the cooling rate. Larger grains indicate cooling occurred deep in the Earth’s crust and is in intrusive igneous rocks. Smaller grains show faster cooling on or near the Earth’s surface, while very rapid cooling will result in [volcanic glass](https://sciencedrill.com/volcanic-glass/) (an amorphous structure with no grains).

Like igneous, grain size in metamorphic rocks indicate the size of crystals. In most cases, crystal size increases with the increase in metamorphic grade and vice versa.

Lastly, sedimentary rocks indicate the diameter of clasts that formed the rock and formed the basis for naming, e.g., conglomerate, siltstone, mudstone, etc.

**4. Color**

Rock color, or the color of its various components, is an important attribute in the lithology description of some rocks, making its recording necessary. It tells you more about the minerals, including those in small quantities or inclusions.

Sometimes, you can record the color against standard color charts like the one by the Rock-Color Chart Committee.

**5. Texture**

Texture describes grains (in sedimentary rocks) and crystals (in metamorphic and igneous rock size, shape, and arrangement).

Igneous rock texture depends on the cooling rates, affecting grain size, with some having huge or mixed sizes. Common igneous rock textures include [pegmatitic](https://sciencedrill.com/granite-pegmatites/), pyroclastic, [glassy](https://sciencedrill.com/vitreous-or-glassy-rock-texture/), [aphanitic](https://sciencedrill.com/aphanitic-texture/), [phaneritic](https://sciencedrill.com/phaneritic-texture/), and [porphyritic](https://sciencedrill.com/porphyritic-texture/). However, they include [poikilitic](https://sciencedrill.com/poikilitic-texture/), graphic, vesicular, spinifex, sub-ophitic [trachytic](https://sciencedrill.com/trachyte/), perthitic, etc.

Sedimentary texture may be clastic (fine to coarse-grained), made from pre-existing rock fragments, or non-clastic, which occurs in rocks that chemically precipitate from water or organic materials. Other important characteristics of sedimentary rock texture are its grading, roundness, and surface texture. These rocks can be subangular, subrounded, or well-rounded and sorting, i.e., well and poorly sorted.

Lastly, the metamorphic texture may be foliated or non-foliated, with grain size microcrystalline, fine, or coarse. Also, you can have textures with varying grain sizes, such as porphyroblast and porphyroblast.

**6. Fabric**

Fabric describes the spatial and geometrical arrangement of all elements that make up rocks or the rock pattern. It is another important description of lithology.

The primary fabric in sedimentary rock is bedding, which may sometimes tell you depositional direction. It would be best if you recorded the extent of its development.

The fabrics are well-developed linear and planar for metamorphic rock, except for those that form from contact metamorphism.

Lastly, in igneous rocks, fabrics are mainly flow characterized by banding and cumulate formation, where some minerals set out during crystallization.

**7. Small-scale structures**

Another important description in lithology is small-scale structures, as they can help a geologist make a clever guess on the origin and possible large-scale structures. We call them small-scale since they are smaller than the outcrop we study.

Sedimentary rocks will have ripple marks, sole markings, crossbedding, and mud cracks. All these features may help tell you depositional environment and paleocurrent direction information.

Asymmetric boudins and micro-folds in metamorphic rocks deeper in fault zones may help tell the sense of displacement that happened in the zone.

Lastly, igneous rocks will have small-scale structures in lavas like [pahoehoe](https://sciencedrill.com/pahoehoe/) and ʻAʻā basaltic flows or in [pillow lava](https://sciencedrill.com/pillow-lavas/), indicating that eruption occurred under ice or water.

**8. Surficial and soil lithology**

Unconsolidated surficial materials or soil can have a lithology. A description of the unconsolidated surficial materials includes their grain size, texture, thickness, composition, internal structure, and deposition environment, coupled with an interpretation of formation.

Lacustrine, fluvial, aeolian, glacial, lacustrine, coastal, and recent volcanic deposits can all have surficial lithologies.

Some lithological soil types include alluvial, basaltic, boulder clay, chalk, [diorite](https://sciencedrill.com/diorite/), calcareous, and glacial till. Others are [granite](https://sciencedrill.com/granite/), loess, sandy, schist, shale, serpentine, fluvial, [gabbro](https://sciencedrill.com/gabbro/), and volcanic.