Sandstone Chemical Properties:

The composition of sandstone is quite similar to that of sand, that essentially consists of quartz. The natural cementing material which binds the sand together as rock is usually composed of silica, calcium carbonate, or iron oxide. The percentage constitution of each constituent varies between certain limit, which is as follows:

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>SiO$_2$</td>
<td>93-94%</td>
</tr>
<tr>
<td>Alumina ($\text{Al}_2\text{O}_3$)</td>
<td>1.4 to 1.5%</td>
</tr>
<tr>
<td>Iron ($\text{Fe}_2\text{O}_3$)</td>
<td>1.5%-1.6%</td>
</tr>
<tr>
<td>Lime (CaO)</td>
<td>0.8% to 0.9%</td>
</tr>
<tr>
<td>Soda($\text{Na}_2\text{O}$) &amp; Potash (Kro)</td>
<td>1.0% to 1.2%</td>
</tr>
<tr>
<td>Loss On Ignition (LOI)</td>
<td>1.0% to 1.2%</td>
</tr>
<tr>
<td>Magnesia (MgO)</td>
<td>0.2 to 0.25%</td>
</tr>
</tbody>
</table>

They are highly resistant to acids, alkalis and thermal impact and their insolubility in acids and alkalies is about 97%
Sandstone Physical Properties

Sandstone is a classic sedimentary rock comprising an aggregate of sand-sized (0.06–2.0-mm) fragments of minerals, rocks or fossils held together by a mineral cement. Actually, sandstone forms when sand is buried under successive layers of sediment. During burial the sand is compacted and a binding agent such as quartz, calcite or iron oxide is precipitated from ground water which moves through passageways between grains to create Sandstone.

The physical properties of sandstone are:

Mineralogy
A wide variety of rock fragments with up to 75% quartz grains.

Occurrence
Associated with most other sedimentary rock types.

Water Absorption
The capacity of water absorption is not more than 1.0%

Texture
Medium-grained; may range widely in degrees of grain sorting and shape
**Structure**
Bedding is often apparent along with sedimentary structures and fossils

**Hardness**
Lies between 6 to 7 on Moh's Scale Density 2.32 to 2.42 Kg/m3

**Color**
Sandstone is available in many colors – red, green, yellow, pink, gray and white. The reason for the variation in colors being the change in the percentage of constituent and the binding material.

**Porosity**
The porosity of sandstone is almost negligible. Thus sandstone is almost impermeable.

**Compressive Strength**
Varies from 365 to 460 Kg/m2

**Sandstone Composition**

Sandstone, the sedimentary rock is composed of small grains that are cemented by siliceous, felspathic or calcareous cementing material. The cementing material determines the durability of the sandstone. This coarse-grained sedimentary rock is formed by the consolidation and aggregation of sand and held together by a natural cement, such as silica.

The name sandstone is, of course, based on the fact that this rock is made up largely of sand grains. Sandstones that contain less than 10% clay matrix are called arenites. These can be subdivided based on the percentages of Quartz, Feldspar and unstable lithic fragments (fragments of preexisting rock). Sandstones are composed of mostly quartz, feldspar, and lithic fragments. Other minerals also occur, depending on the mineralogical maturity of the sandstone.

- **Quartz grains**: Greater than 2/3 of the minerals found in sandstones is quartz because it is one of the most abundant minerals in crystalline rocks like granitoids, schists, and gneisses. Quartz is also mechanically durable due to its high hardness and lack of cleavage. Quartz is chemically stable under conditions present at the earth’s surface. It has a very low solubility in water as well.
• **Feldspar grains:** In fact, feldspars are the most common minerals in igneous and metamorphic rocks. Feldspars are less stable than quartz at conditions near the earth’s surface. As a result, feldspars make up only 10-15% of all sandstones. As, feldspars are unstable in the sedimentary environment, most feldspars in sandstones show the effects of alteration. This is usually evident as growths of microcrystalline clay minerals along cleavage planes and on the surfaces of the feldspars.

• **Rock fragment grains:** With the exception of fragments of quartz, lithic fragments are generally unstable in the sedimentary environment, yet, if present in a sandstone give the best clues to provenance. Any type of rock fragment can be found in a sandstone, but some kinds are more common because of areal extent in the source drainage basin, stability of the rock fragment in the sedimentary environment.

**Sandstone Applications:**

**Garden Sandstone**
Sandstone the natural soft stone plays an important role in decorating and beautifying garden. Sandstone is an ideal medium for making garden ornaments as it ages very slowly, while imparting an antique or rugged look to the artifacts. Sandstone had been found useful in making garden furnitures, fountains, planters, plinths, bird baths, statues, garden urns, pitchers, miniatures etc.

**Garden Obelisk**
An obelisk is a tall, four-sided shaft of stone, usually tapered with a pointed pyramidal top. Garden obelisks are ornamental in nature and monumental in size.

**Garden Statue**
The statues of sandstone are huge figures which include figurines of human, animals, birds, angels and fairies.

**Garden Urns**
These are vases of varying sizes and shapes with footed base or pedestal. The urns are heavily carved with magnificent designs.

**Garden Fountains**
The intricately carved garden fountains impart an altogether a different look and feel to the garden. This unique accessory is available in almost all sizes varying from large estate sized fountains to quaint cherub fountains.
**Plinths**
Plinths are the base upon which – the pedestal, statue or a column can be placed. Plinths are made of blocks and the slabs of the sandstone. These plinths are mostly designed artistically to serve as a classical garden ornament.

**Garden Lamps**
Lamps made of sandstone are used in gardens and impart amazing looks when the electric bulbs put inside them light up.

**Garden Planters**
A decorative container for a plant or small tree is generally referred to as a planter. Sandstone can withstand all kinds of variation in climate and is therefore preferred for making planters.

**Garden Tables**
Sandstone, the exquisite natural stone has been used to create innumerable pieces of garden furniture. Made in huge range of colors, designs, styles and finishes, the garden tables are available in any size to suit all gardens.

**Sandstone Wall**
Sandstone has been widely used for raising walls since ages. Sandstone has been used for over centuries for making castles, forts, temples etc. The decades and centuries old walls of the forts and great monuments of India like Fatehpur Sikri, and Red Fort that still stand unshaken were also made of sandstone.

One of the basic and important use of sandstone is to raising walls. Now a days it is widely used to make the sandstone walls which gives a classic as well as attract look. Sandstone is being used to cover the entire buildings, walls on homes, garden walls, foundations walls and entrances, it can be used internally or externally.

**Popularity of sandstone for making walls**
The essential inherent properties of sandstone make it ideal for the purpose of making walls. These are

- Sandstone is fine grained.
- Sandstone is rough & tough.
- Sandstone is compact and quite hard.
- It has good compressive strength and low absorption property as well.
- It is fireproof and non-slippery.
All these properties make sandstone just suitable to make walls. The sandstone bricks, blocks and slabs are used in making the walls of sandstone. Making the walls of sandstone lends a antique look.

As a matter of fact, the fireproof, non-slip sandstone, is mostly used for wall shield not only because of its strength but because of its decorative look as well. The sandstone wall is mostly made of blocks or the slabs of sandstone. Sometimes, the sandstone bricks are also used for making the wall of sandstone which gives a unique and antique look. Really, sandstone walls are expressions of artistic dexterity of the skilled craftsmen.

Sandstone Floorings

Sandstone Flooring is among the most durable flooring material that one can buy today. Sandstone is often used by homeowners to give the rooms in their homes a timeless, classic look. They are durable and long lasting. That's why, sandstone floors are quite rightly a favorite among homeowners. It costs a bit more to install, but once it's in, it will last virtually a lifetime. Additionally, it is very easy to keep clean and maintain. Once sealed, it is nearly impervious to accidents.

In fact, sandstone flooring is natural stone material. It is easy to take care of and comes in a variety of natural looking shades and colors as well. Sandstone is also used by many interior designers due to its versatility – it can enhance the beauty as well as look of any room. Sandstone has been widely used in enormous applications such as flooring, counter tops, table tops, handicrafts, furniture, roofing and so on. In all the aforesaid terms sandstone acts as a perfect item due to what it can be termed as stunning.

Being one of the non-slippery, fire-proof, exquisite and durable natural stone, it is widely used in floorings. Among all the available alternatives, sandstone come in an assortment of trendy and chic colors and designs that makes it one of the preferred items for their usage in floorings. Furthermore, sandstone floorings are economical in terms of cost effectiveness.
Sandstone Pavement

The use of sandstone in pavements is a long lasting, durable and beautiful establishment. The astonishing sandstone pavements are well known for their durability and elegance. With the passage of time sandstone has been widely used in different purposes.

In fact, sandstone is widely used as paving material the bricks, strips, tiles and chips have become a popular medium and are therefore an important part of both interior and exterior decoration, too. Available in a wide range of colors and designs the sandstone bricks and tiles are gaining rapid popularity when it comes to serve the pavement purpose. The sandstone pavements are not only used commercially but also for residential constructions as well.

It is true to say that the final appearance of the sandstone depends on many factors like finish, design, and thickness of the selected stone. Finding its application both commercially and for residential constructions, sandstone is used for further beautifying the pavement by using attractive tiles and chips of different colors and patterns. The tiles and bricks used for paving are available in different shapes from rectangular and square to irregular and custom shapes.

Sandstone Landscaping

The concept of landscaping offers substantial environmental benefits. Trees and vegetation control erosion, protect water supplies, provide food, create habitat for wildlife, and clean the air by absorbing carbon dioxide and releasing oxygen.

Stone makes a low-maintenance landscape, particularly suitable for areas with limited rainfall. The stone included sandstone for patios and walkways, thick blocky stone for retaining walls, decorative boulders and slabs for stair treads.

Why is sandstone popular for landscaping?
Sandstone has been extensively used as a medium for landscaping because of the following reasons:

- Its texture, aesthetic and rugged natural look, performance, availability in various colors.
- Another positive aspect of sandstone is that it is weather proof which makes it worth investing.
- The stone can be sawed, cut, polished and molded as per requirement and is far more durable than wood.
Sandstone Handicrafts

Sandstone is used to churn out a wide range of handcrafted products like sculptures, frames, furniture, jewelry boxes, stands, garden ornaments, flower vases and many other decorative items. Owing to its architectural properties and natural beauty, the handcrafted items of sandstone are used for interior as well as exterior decoration. The rustic and exotic appeal of sandstone has made sandstone useful for gracing the edifices of forts and palaces since ages. The availability of sandstone in various colors make it further suitable for both domestic and commercial use.

The various handcrafted items Sandstone, the highly beautiful medium in stone is used to create a large array of artifacts which are as follows:

**Photo Frames**
Sandstone is being increasingly used to make artistic photo frames. The intricately crafted photo frames are the results of work of skilled artisans. Sandstone photo frames can be custom made as per buyers’ specifications.

**Sandstone Candle Stands**
Sandstone candle stands are available in a multitude of designs and shapes. It is not only used to hold candles but also as a decorative piece. The sandstone candle holders are intricately designed by skilled artisans.

**Stone finial**
Is a small ornamental, terminal feature at the top of a gable, lamp, lamppost, stone wall etc. Finials made of sandstone are actually sculptured ornaments, often in the shape of leaves or flowers, at the top of a gable, pinnacle or similar structure.

**Flower Vases**
Is an open container, used for keeping flowers. These vases are artistically crafted out of sandstone that imparts an ethnic touch.

**Garden Ornaments**
Sandstone has been commensurate in making various garden ornaments and decorative items like fountains, garden furnitures, planters, statues, garden lamps, plinths, obelisk, and various other unique garden accessories.

**Bird Bath**
Made of pure sandstone, a bird bath is an ornamental basin often placed in garden for birds to bathe.