

## Gemstones

Gemstones are minerals or other materials that, because of certain outstanding physical properties such as color, clarity, and hardness, have aesthetic value for use in jewelry and other adornments. Of the over 5,000 different mineral varieties known, about 50 are commonly used as gemstones. In general, for a mineral to be used as a gemstone it must be beautiful when polished, cut, or faceted, and it must be hard and durable. Rarity is another characteristic that lends value to a gemstone.

Most gemstones are minerals, but gemstones are given a name based on their appearance, as opposed to the more scientifically strict names of minerals. As a result, a mineral may have a different name for its gem version. For example, sapphire and ruby, two well-known gemstones of distinctly different color, are actually the same mineral: corundum. Emerald and aquamarine are gem forms of beryl. Quartz is called amethyst if it is purple, citrine if yellow. Other gemstones are known by their mineral name such as diamond, garnet, and topaz.

Although a gemstone may have many properties that make it appealing, the beauty of a gemstone is generally a factor of its color, clarity, and luster. The color of a gem is largely due to its chemical composition. If the color is the result of elements that are an essential part of the mineral structure, it is termed idiochromatic. These minerals usually produce gems of a consistent color, such as peridot (mineral name: olivine), which is always green. An allochromatic gem derives its color from elemental impurities that are not integral to mineral. In this case, a mineral can vary in color, based on the varying trace impurities. Corundum, for example, is white in the pure mineral state, but slight amounts of chromium and iron will produce the red color of rubies while a combination of iron and titanium will result in sapphire blue. The color variation in diamond and quartz are also due to chemical impurities.

The clarity is the degree to which a gemstone is free of visible impurities, or inclusions. Inclusions may be tiny gas bubbles trapped in the crystal, internal fractures, or microscopic specks of a differing mineral. Inclusions are a very common result of the natural formation processes of minerals. It is rare to find a mineral free of them. This is why the most valued gems are free of inclusions. Some minerals have a greater tendency to contain inclusions, such as emerald.

The luster of a gemstone is the overall appearance as light strikes it. Gemstones are valued for a luster that is very shiny and glasslike and for one that yields a high degree of internal reflections. The latter, termed adamantine, is enhanced greatly by faceting, or the grinding of regular, angled surfaces. There are numerous patterns of faceting that are designed to maximize the natural luster of a gemstone. Diamond is a prime example of how faceting brings out its natural brilliance. Chatoyancy in gemstones, commonly known as "cat's eyes" or "stars," occurs when light reflects perpendicularly from mineral channels or mineral fibers inside the gemstone. Parallel fibers will result in a cat's eye effect; when the reflecting fibers extend in different directions, a star effect will result.

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Answer the following questions by using the information you just read in the article.

1. In general, what characteristics does a mineral have in order to be a gemstone? \_\_\_\_\_  
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2. What two gems are made from corundum? \_\_\_\_\_
3. Amethyst and citrine are two gems made of what mineral? \_\_\_\_\_
4. What are the terms "idichromatic" and "allochromatic" used to describe? \_\_\_\_\_
5. How are idichromatic and allochromatic different? \_\_\_\_\_  
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\_\_\_\_\_
6. A red ruby is that color because of trace amounts of what two elements? \_\_\_\_\_  
\_\_\_\_\_
7. What is clarity? \_\_\_\_\_
8. What are two examples of an inclusion? \_\_\_\_\_
9. Why are minerals free of inclusions more valuable? \_\_\_\_\_  
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