



19. Bauxite



Formed by weathering, bauxite is a group of aluminum oxides and is the main ore that we get aluminum from. Aluminum is the most abundant metal element in the Earth's crust and the third most abundant element in the crust, trailing only oxygen and silicon. Because aluminum reacts with water and air to form various oxides and hydroxides, aluminum metal is never found in its pure form in nature.

Bauxite is formed when aluminum-bearing rocks (typically those with a high content of the mineral feldspar) lose their silica by the weathering process of leaching. Using aluminum instead of steel for some parts of cars and trucks makes them lighter, which saves fuel and reduces polluting emissions.

Activities:

K-1: Aluminum is very malleable, which means that it can bend without breaking. Take a piece of aluminum foil and try bending it. Did it crack and break when you tried to bend it? Circle your answer:
Yes No

K-4: Collect an aluminum drink can and a steel food can that are about the same size. Empty both cans. Which can is heavier? [circle one]



Aluminum pop-top can



Steel can

Aluminum has a lower density than steel, so it is lighter. However, steel is stronger than aluminum. You can easily dent or flatten an aluminum can compared with a steel one.

3-5: Aluminum metal is very soft and can be easily scratched with a steel nail. However, when aluminum is processed by calcining in high heat to reduce and oxidize it to Al_2O_3 , it makes a synthetic form of the second hardest mineral, corundum, which is also known as the gemstones ruby and sapphire. Examine some sandpaper at your house, a hardware store, or an online retailer. Is the sandpaper labeled "aluminum oxide": Yes No



19. Bauxite continued

What is the advantage of using sandpaper that is made from minerals that are rated 9 on Mohs compared with sandpaper made with quartz, which is 7 on hardness scale of 1–10, with 10 representing the hardest mineral, diamond? _____

_____.

6-8: Aluminum is one of the lightest metals. Which would weight more, a cubic centimeter of aluminum, which has an atomic number of 13 on the periodic table of the elements, or a cubic centimeter of iron with an atomic number of 26? _____.

8+: Research the density of aluminum and steel. Modern commercial aircraft are about 80% aluminum by weight. Approximately how much weight was saved by using aluminum instead of steel for an average-size airplane that weighs 41,000 kg: _____

_____.

8+: Some metals are permanently magnetic (ferromagnetic), which means they are attracted to a magnet. Check if an aluminum drink can is magnetic by applying a refrigerator magnet to it and circle your answer:

Magnetic Nonmagnetic

Find aluminum on the periodic table of the elements. What is its atomic number? _____.

What group is aluminum in and what does that tell you about its properties, including whether ferromagnetism is a property of the group: _____

_____.