

What is Coal?

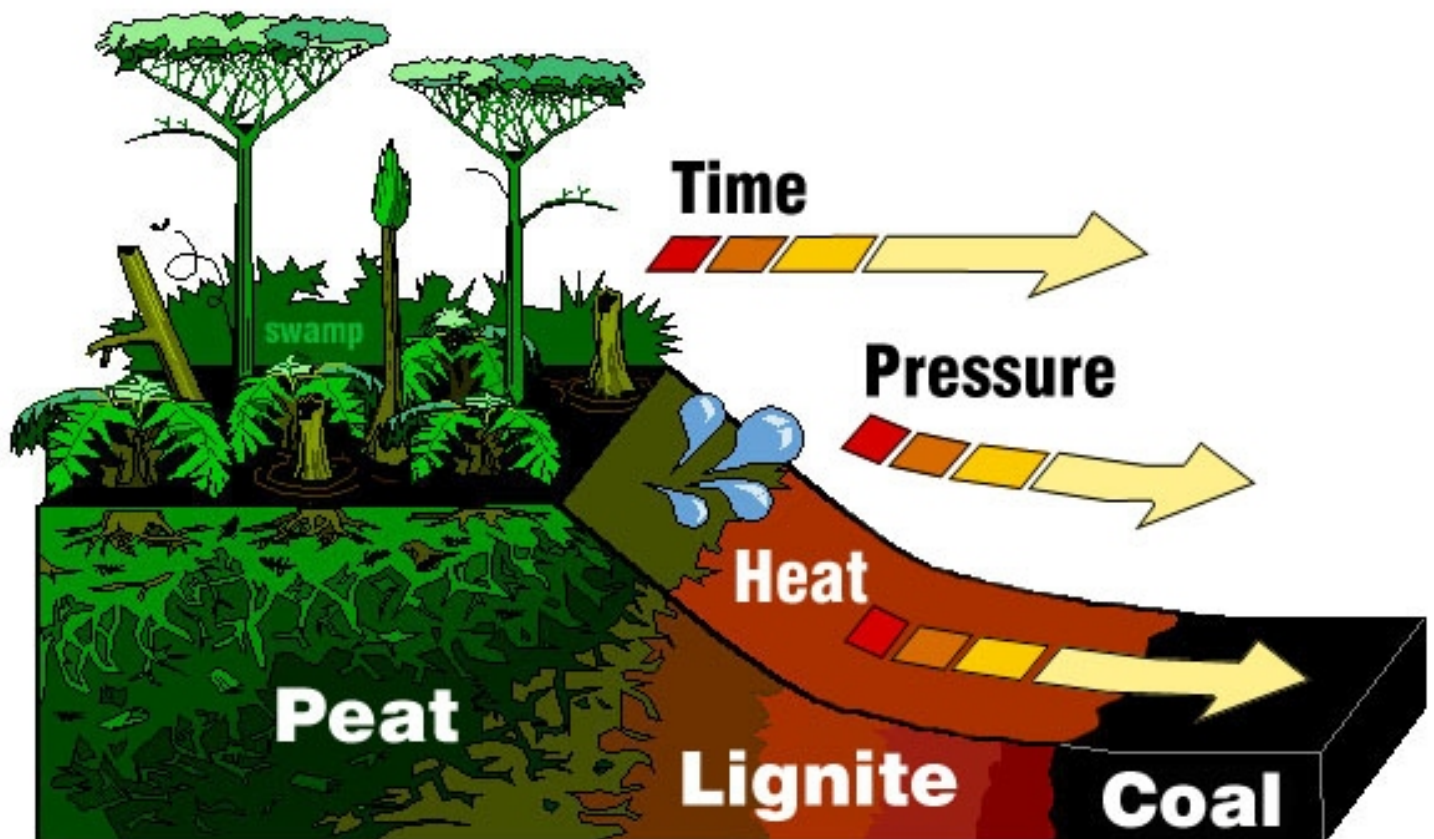
Coal... The "Fossil Fuel"

Coal was formed from the plants that grew on the earth millions of years ago. The imprints of these plants often appear on lumps of coal and adjacent rocks and are called fossils. The eastern and midwestern coals were formed 200 to 250 million years ago. The western coals were formed 50 to 70 million years ago.

Thousands of years were required to accumulate plant materials needed to form even a thin layer of coal. Current estimates range from 9,000 to 12,000 year per foot of bituminous coal formed in place.

Each coal seam or bed represents a period of plant growth followed by gradual sinking of the land. Where the land subsided below the water level, the plants decayed slowly to form peat. This is believe to be the first step in the process of converting plant material into coal. This was followed in turn by the production of lignite some thousands of years later as the pear was compressed by layers of soil. Still later, with additional compaction and deeper burial, the lignite was converted to bituminous coal and on occasion to anthracite coal as a result of increased temperatures and pressures. As much as 5 to 10 feet of plant matter was needed to produce each foot of coal.

This process of coal formation was repeated sporadically for thousands of years, resulting in the formation of multiple horizontal or near-horizontal seams separated by varying thicknesses of dirt and rock.



Characteristics of Coal

Unlike most rocks, coal is an extremely complex material. It contains both organic and inorganic materials. The organic materials (macerals) are the combustible portion. The inorganic materials (minerals) are the non-combustible portion, and form the residue *ash(when coal is burned. Virtually every mineral substance that exists on earth today found in the ash formed when coal is burned. Most are found in trace quantities; other such as aluminum, iron, silicon, calcium and magnesium, are found in appreciable quantities and, together with their oxides, make up the main components of the ash. Even relatively clean coal contains more then 2% ash. Coal used for steam generation (steam coal) contains 5 to 10 times more ash than these clean coals.

Coal is classified into four broad categories or ranks: (1) lignite; (2) sub-bituminous; (3) bituminous; and (4) anthracite. For technical purposes, the carbon content is used to designate the rank. On this basis, lignite has a lower rank than sub-bituminous and bituminous which have a lower rank than anthracite coal.

Commercially, coal is designated in terms of its end use. Any coal used in the production of steam is known as "steam" coal. Any coal used in the production of coke is "coking" or "met" (metallurgical) coal. Coal is a heterogeneous rock whose properties depend in large measure on its composition. Unlike most other rocks, many coals tend to weather or slake (break apart) as they dry out. These coals combine slowly with the oxygen in the air and tend to self-heat. This reaction creates oxygen-deficient atmospheres in enclosed areas and may lead to spontaneous combustion in coal and gob (waste) piles containing large amounts of fine coal. Coal is composed primarily of carbon, hydrogen, oxygen, nitrogen and sulphur. However, it also contains traces of virtually every element found in nature. These elements can be determined routinely by the use of standard test procedures. Because the bulk of all coal mined in the United States today is burned to produce heat, many laboratories conduct proximate analyses and tests to determine the heating value. These tests involve a determination of the moisture content, ash, volatile matter, and fixed carbon in the coal, as well as the heat content in British thermal units (Btu's) per pound of coal.