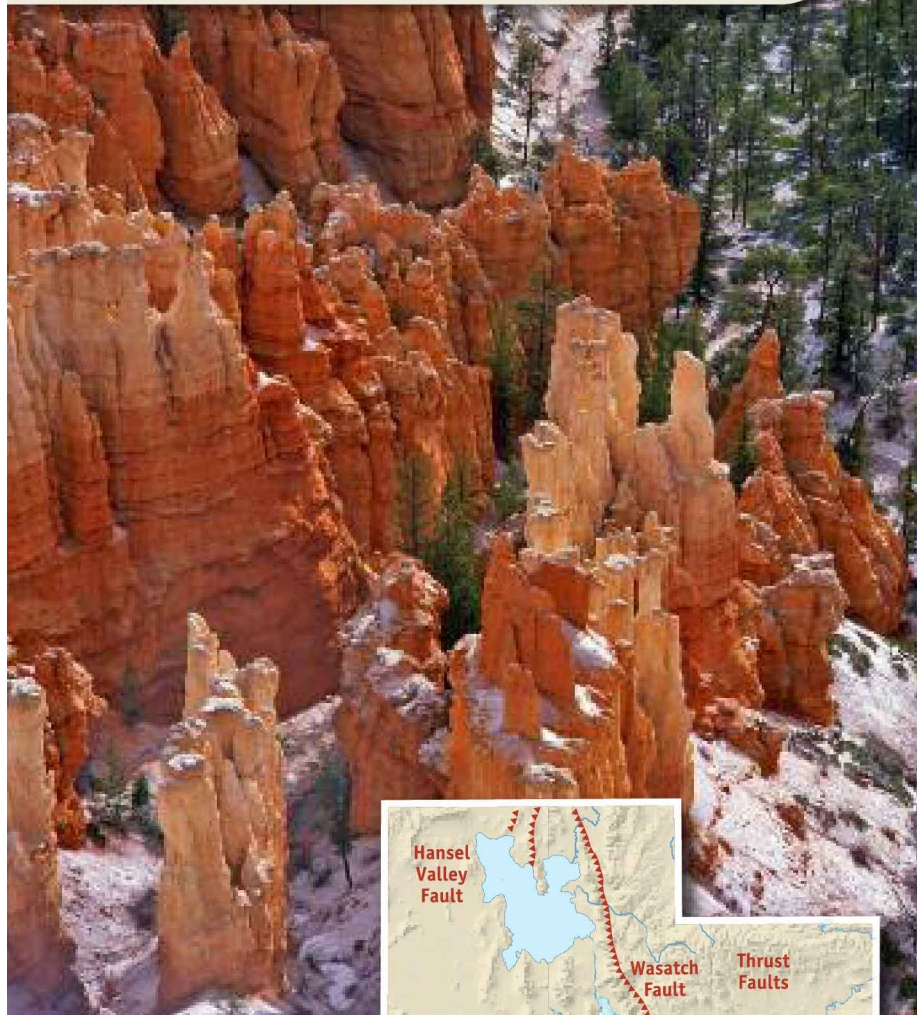
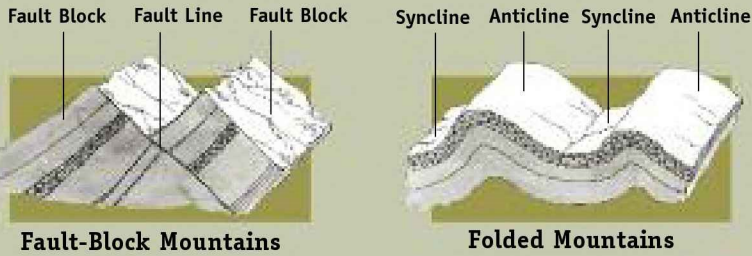
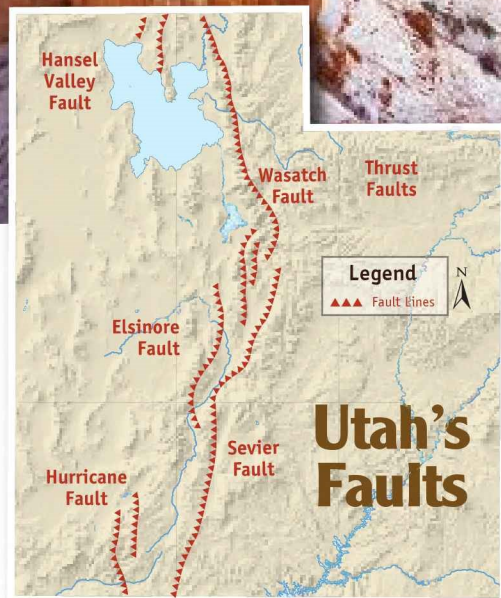


Natural Forces Shape Utah's Mountains and Plateaus

Forming Mountains



The colorful pillars, or hoodoos, of Bryce Canyon were formed by erosion from wind, water, and ice.



The Rocky Mountains, stretching from Alaska, through Canada, and south all the way to northern New Mexico, were slowly lifted by natural forces over thousands of years. How did this happen? The earth's surface was crunched together from faraway pressure of both the Pacific and Atlantic Ocean floors. The stress caused flat areas to buckle and rise in huge folds or cracks. Utah's land, like other parts of North America, were slowly lifted upward to make great peaks and cliffs.

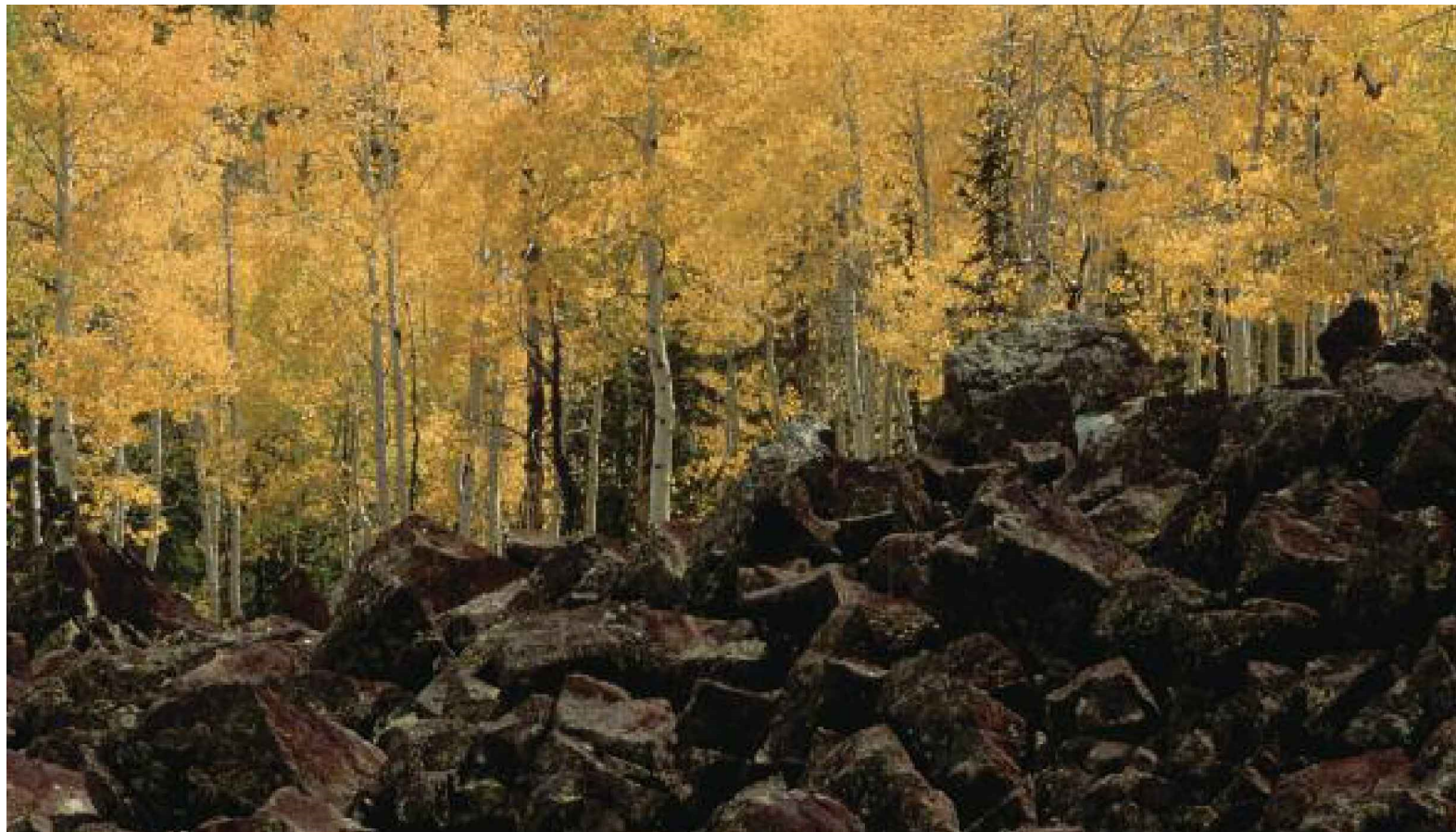
Other parts of Utah's land were squeezed up into high plateaus as the mountains surrounding the area all pushed in on the region. Over time, water and wind caused *erosion* (wearing away) of the land and cut beautiful cliffs and canyons through the rock. As the canyons deepened, colored rock was exposed. This is how the great canyons of southern Utah were formed.

Faults

As a part of the uplift, *faults*, or cracks, began to form at weak spots in the earth's crust. One part of the earth was raised while the part next to it slipped downward. In time, mountain sediment washed down into the valleys.

All three of the large universities along the Wasatch Front—Weber State University, the University of Utah, and Brigham Young University—are on fault lines. Utah State University in Logan is close to another fault line. Many of our large hospitals are also on fault lines.

Ninety percent of Utah's population live near the Wasatch Fault.



Volcanoes Formed Mountains

In some areas, underground volcanic activity lifted large pieces of the earth's crust without breaking through the surface, causing isolated regions of scattered mountains. Examples of these are the La Sal, Abajo, and Henry Mountains of southeastern Utah.

Volcanoes Made Rock and Brought up Minerals

Igneous rock comes from deep inside the earth. Molten, or melted, rock is constantly being formed. Sometimes this rock pushes up through the earth's crust as lava. For hundreds of years, Utah was

covered by active volcanoes that spread layers of ash and lava in many directions. Today all of Utah's volcanoes are extinct, or dead. But their craters and hardened lava flows can be seen in many parts of central and southern Utah.

Utah also has a rich store of metals and minerals. Some of them were deposited by volcanic action. That is how the copper, gold, silver, and molybdenum came to be in the Kennecott Utah Copper mine and in other places in Utah.

How did it happen? The oldest rock found at Kennecott's mine is sandstone. It was originally deposited as sediment in shallow seas. Extensive folding and faulting of the layered rock created the Oquirrh Mountains where the mine is located. Millions of years later, molten rock deep within the earth's crust pushed toward the surface and cooled. It was accompanied by hot mineral solutions that were forced into *fractured* sedimentary rock.

Lava once flowed over land we now call the Dixie National Forest near St. George.

“Utah will yet become the treasure house of the nation.”

—Abraham Lincoln,
in a speech about
mining wealth, 1800s



A squirrel perches on a volcanic rock. How can you tell the rock is volcanic?

Utah State Symbols



Rock: coal



Gem: topaz



Mineral: copper

Utah's Rock and Mineral Resources

Utah is rich in fossil fuels such as oil, natural gas, and coal. They were formed by the bodies of many, many plants and animals and much heat and pressure over millions of years. Today, these minerals heat our homes and run our cars.

Utah has enough salt to satisfy the world's needs for a thousand years. Most of it is used for water softeners and icy roads. Other mineral salts are used as fertilizers and in explosives. Salt for food comes from other states. Large evaporation ponds allow many kinds of minerals to be taken from the shores of the Great Salt Lake.

Utah's geologic history has given us a tremendous supply of building stones. Large beds of sandstone, limestone, and quartz have been used for buildings.

A type of pure marble is found near Fillmore. The Utah State Capitol Building is made from this granite.

Great amounts of sand and gravel were left by Lake Bonneville. They are used today in concrete, landscaping, and in highways.

What do you think

- What are some environmental issues associated with mining and refining of minerals? What are some ways these problems can be solved?
- Think about the mineral resources that provide fuel for your daily activities. Which ones would be the hardest to give up?

Salt from the Great Salt Lake ends up melting ice on winter sidewalks and roads and in family water softeners. Most of our table salt comes from Kansas salt mines. What do you think the salt in this picture, taken at Morton Salt Company near the Great Salt Lake, will be used for?



From Coal to Electricity

Large coal fields were discovered in Carbon County in the early 1880s. The coal fields are still important. Most of Rocky Mountain Power's electricity is generated by steam plants. How do they heat the water to make the steam? By burning coal!

The electricity is sold to Utahns, other western states, and even to foreign countries such as Canada and Japan.

Using one form of natural energy to produce another, the Huntington power plant south of Price is one of five Utah power plants that burns coal to produce electricity.



Activity | Utah's Minerals

This graph shows the dollar value of the minerals that were mined in Utah in 2005. Remember, this is the dollar value, not the quantity. A small amount of gold or silver, for instance, might be worth much more than a larger quantity of coal.

1. Which category had the most value?
2. Which category had the least value?
3. What Utah mineral resources that produce energy are not shown on the graph?

Choose one of the following activities:

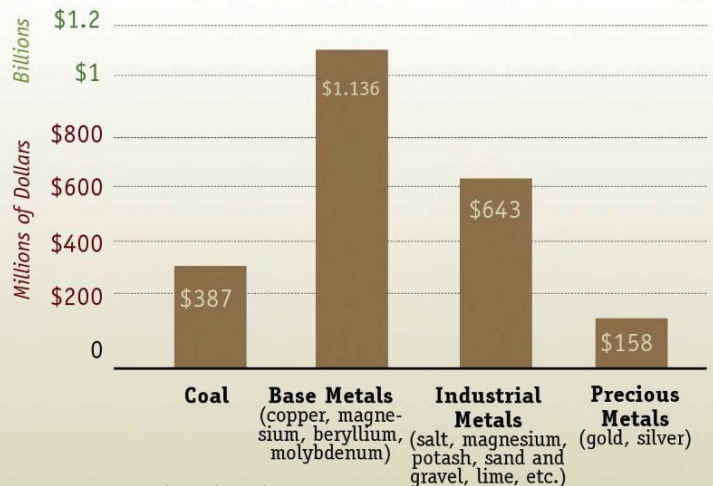
A. Uses of Minerals

Choose a mineral from one of the mineral categories on the graph and do some research to learn how and where the mineral is used. Present your information in a written report, a poem, a poster, or a model.

B. Minerals in Your Life

Compose a story, poem, or song about how minerals are used in your life. You could include what your life would be like if Utah's minerals were not available.

Utah's Mineral Valuation, 2005



SOURCE: Utah Geological Survey