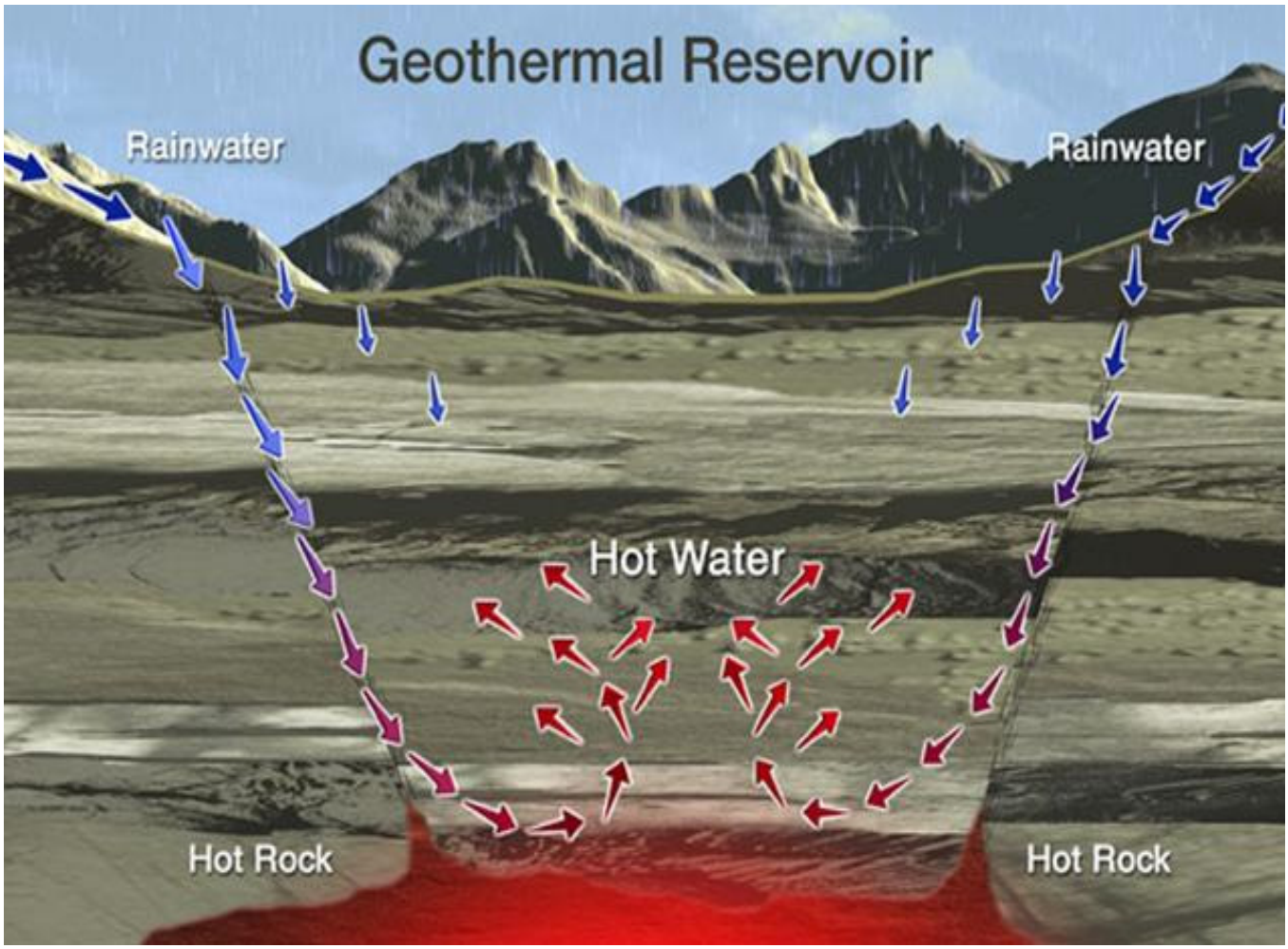
1. What is Geothermal Energy?

Geothermal energy is the natural heat of the earth. The earth's core consists of molten rock, called magma, which can be as hot as 7,000 degrees F. The immense heat of the earth cools as it approaches the surface.

The top mile or so of the earth's crust has a fairly constant temperature gradient of about 1 degree F for every 100 feet of depth. This means that the temperature 1,000 feet below the surface of Montana is usually around 10 degrees hotter than the ground just beneath our feet. Temperatures at a depth of 10,000 feet are normally around 100 degrees warmer than the surface.

This natural heat gradient is present throughout the world. However, in many spots on the earth (including Montana), we have much hotter areas of rock, sometimes caused by shallower deposits of magma that rise to within a few miles of the earth's surface. Yellowstone National Park's thousands of hot springs and geysers are thought to occur because of the presence of a shallow magmatic "hot spot."

To transfer this geothermal heat of the earth to the surface, a second element is needed — water. Deep aquifers of water may pass through rock layers heated by shallow magma. Water may also percolate down through vertical cracks in the rock, known as "faults," where the water is then heated. This hot water may then find other faults leading back to the surface, where it can emerge as a hot springs.



Geothermal reservoirs or hot springs develop when rainwater or deep aquifers are warmed by hot rocks heated below by magma.