

HAWAIIAN Hot Spots

What you were probably taught in school is that most of the volcanoes on Earth are formed at plate boundaries. Recall that the Earth is made up of large sections of crust called tectonic plates, which float over the mantle, and are constantly bumping into each other. Both volcanoes and earthquakes occur at these plate boundaries. There is another type of volcano, which sometimes forms in the middle of the plate. These volcanoes are called hot spot volcanoes, which are fed by the underlying mantle (underground molten rock).

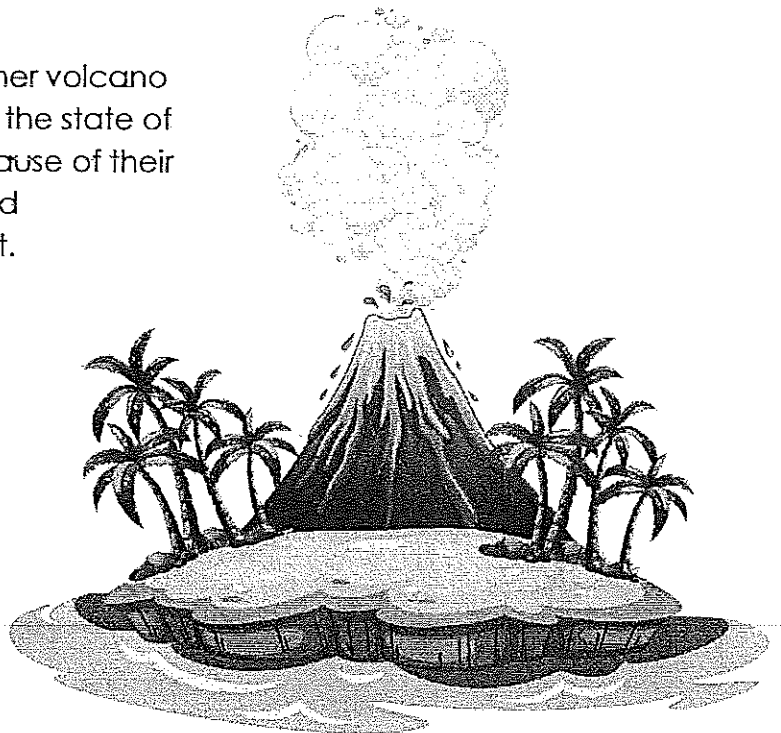
Magma plumes are areas in the mantle where the magma is hotter than the magma surrounding it. This hot magma rises and pushes its way up through the crust. This usually happens under oceanic crust. The Hawaiian Islands are a good example of hot spot volcanos.

Imagine millions of years ago when the first Hawaiian Island peaked above the water level. At that time, it was already a large underwater mountain, but no one above water level could see it. How did it form in the middle of a tectonic plate? Looking way down beneath the oceanic crust we find a magma plume. When the hot magma hits the cold ocean water, it turns into rock (solidifies). Over millions of years, the magma poured out of the oceanic crust and the rock continues to build up until eventually it becomes an island. The name of the oldest Hawaiian Island is Kauai.

If you want to see an active volcano, don't plan a trip to Kauai because it's been dormant for about 1.5 million years. What happened to the magma plume? Did it dry up? We must revisit plate tectonics for a moment. Remember that the plates move (2cm-5cm per year) over the mantle. After thousands of years, Kauai moved past the area of the magma plume or hot spot. This created a dormant volcano.

The magma plume keeps erupting and another volcano starts to build. There are eight major islands in the state of Hawaii and all of them have developed because of their time over the hot spot. Currently, the Big Island (youngest island) of Hawaii is over the hotspot. When you see pictures on TV of a volcano erupting in Hawaii, you are witnessing the eruption of Kilauea in Volcano National Park.

There is also a good reason why the Big Island is so much bigger than the others. Because they are older, erosion has had more time to work its effect smaller islands. Hawaii is a unique place where you can see the Earth's crust both being created and destroyed.



Answer the questions below based on the article about Hawaiian Hot Spots.

COMPREHENSION QUESTIONS:

1. What type of volcano is fed by underground molten rock?

2. Where in the United States do hot spot volcanoes exist? Underline your answer.

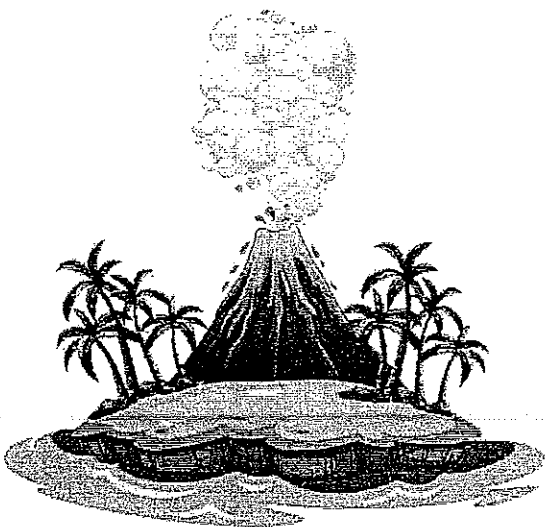
3. How did the first Hawaiian island appear, visually, millions of years ago?

4. What is the name of the oldest Hawaiian island? Highlight your answer.

5. How have the other Hawaiian islands formed?

6. What is the youngest Hawaiian island and what is the volcano that is found there?

Mini-PROJECT: DIY VOLCANO



Research three different ways to create a home-made-volcano. Create step-by-step directions for each. Then, choose which volcano would be the most effective and why. BONUS: actually create the volcano and bring it to class as an experiment.

- Create step-by-step directions for three home-made volcanos
- Based on your research, determine which of the three volcanos you think will be most effective
- Write a three or four paragraph synopsis of why you came to that conclusion