



# Echo Crater

**In this adventure, you'll get to yell as loud as you want into a pit crater!! But, first let's learn what causes echoes and then find out how pit craters are formed.**

**Echoes** are caused by sound waves hitting a barrier and then bouncing back. There are three basic ingredients that make an echo:

1. Distance - Sound travels very fast, but to make an echo, it must travel a distance at least 75 meters and back (that's roughly 250 feet each way!).
2. Loudness – the sound wave has to be a loud enough force to travel out and back.
3. A bounceable “wall” - The sound wave has to actually hit something in order to bounce back to you. A barrier with several adjacent “walls” will bounce back the best sound. That's why echoes work best if you are in a valley, canyon, or even a big empty building.

**Activity #1:** In your vehicle with the windows closed, yell out “echo” (**warn your family first!**), then listen carefully. Did you hear your voice echo back to you? \_\_\_\_\_ Why or why not? \_\_\_\_\_

**Activity #2:** Look on the park brochure map to find Chain of Craters Road and Puhimau Crater. Pull into the parking area and walk to the viewing area to see Puhimau Crater.

**The craters along Chain of Craters Road, including Puhimau, are perfect examples of pit craters. A large channel of magma flows just below this area. Occasionally the magma under some particular spot will suddenly drain away. This can cause the ground above the magma channel to instantly collapse. This creates a pit crater. Puhimau pit crater probably formed 400 or 500 years ago. It is about 500 feet deep with a width of 400 feet to 650 feet and is oval in shape. If you look carefully you can see that the crater is still steaming in spots.**

Describe what you could have seen and heard if you had been there when Puhimau was created: \_\_\_\_\_

Why do you think this area is steaming? \_\_\_\_\_

**Activity#3:** Draw a sketch of Puhimau Crater and label the features it has that make it a great echo site.

**Finally**, yell a few really LOUD words out across the crater (good words to try: your name, aloha, lava). Which words worked best? \_\_\_\_\_



**Pa‘ahana the pueo says.....**speaking of echoes, bats like the endangered ‘Ōpe‘a pe‘a (Hawaiian Hoary bat) use echoes to navigate their way through the night sky making high-pitched squeaks. This process, known as echolocation, helps bats locate food and avoid obstacles.

**Discover More.....Visit our book stores at the Visitor Center or Jaggar Museum for more information about craters and the native animals of Hawai‘i.**