

Date: 2007 Workshop

Title of Project: Yellowstone Volcanism

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School: Woodland Middle School, Cd' A

Target Grade Level: Middle Level Audience

Objective: 1) Students understand how magma forms and factors affecting development of granites and basalt (SiO_2 ; FeO_3) (temp./depth)
2) Formation and development of Yellowstone hotspot and Snake River Plain (calderas eruption; plate motion/rate)

Materials: Student samples- rhyolite, andesite, basalts
Student copies- "Origin of Magma; Melting Temps. of Rocks"
"Hotspot Volcanism on the Snake River Plain"
One liter club soda/per group
Box/container to hold sand/litter; small balloons; plastic tube
Air compressor
Overhead transparency w/Idaho Snake River Plain outline

Summary:

Students explore factors that create volcanic eruptions.
Shake liter of club soda; use small nail/pin to puncture cap
What happens? Why? Discuss role of gases and pressure changes in making club soda "erupt" (CO_2 , decreasing pressure)
Different types of magmas- "blends" of elements- rhyolite, andesite, basalts
Why different? How are they different?
plate boundaries; SiO_2 content
divergent, convergent, hotspot
How chemistry affects eruption...more silicates, more gases, more explosion, water content
Illustrate differences b/w basaltic flows (Hawaii) and rhyolitic (Yellowstone hotspot)
Use samples again (chemistry determines behavior)
Demo- caldera- forming explosion
Fill $\frac{3}{4}$ full of silica sand or cat litter
Attach balloon to plastic tubing w/clamp
Attach plastic tubing to compressor
Slowly inflate balloon; watch ground swell; ask students "why?"
Analogy of magma chamber swelling
Explode balloon in box; sand/material flies out, creating caldera
Show Snake River Plain diagram. Ask students what features are/aren't

visible and apparent.
Overlay calderas to Snake River Plain w/ ages of eruption events
Have students calculate plate rate and motion.
Calculate frequency of eruptions.

Volcanism Unit

Background on volcanoes (types- Strato, shield, cinder and super volcanoes)

Chemistry, plate boundary

Pressure, temperature, water-“Melting Point Activity” “Club Soda Demo”
 SiO_2 , FeO^3 , MgAl^3 , (rhyolite, andesite, basalt)

“Hotspot” volcanism- mantle plume demo

Hawaii, Iceland, Yellowstone

Track plate motion/rate

“Caldera” demo- sand, balloons, box

Snake River Plain

Toba GOOGLE

Yellowstone