

Teachers' Answer Sheet to Broken Top Brain Teasers

- 1. The cone is older. You can't fill in the eruptive fissure from which the cone was built with a lava flow until the hole or vent exists.** For Earth Science teachers & students this is the "*Law of Superposition*". The eruptive vent/fissure and also the cone that was built from it erupting has to be older than the lava flow which was starting to fill the vent/fissure in. The lava flow is the Blue Dragon Flow that issued from the Spatter Cones & Big Craters Area about 2,100 years ago. Therefore, we know that Broken Top cinder cone is more than 2,100 years old at the minimum.
- 2. Winds were blowing during the eruptions and more material was deposited in the down wind direction from the vent or eruptive fissure.** Idaho has been a windy place for a long time. 6,500 years ago it was windy when Silent Cone formed, 2,400 years ago it was windy when Big Craters initially formed, and today Idaho is also often a windy place.
- 3. Advantages:** (A) **Shade** or shelter from the sun. (B) **Cooler**--because of the shade, cracks get much less solar heating than the surface does. (C) **Shelter from the wind**. Cracks help preserve moisture in the plant by blocking or reducing moisture loss or drying caused by the wind. (D) **More moisture** or water--water runs down hill, so low spots tend to end up with more moisture. Also, cracks fill with snow in winter, so deeper cracks may contain more water following the spring melt than the surface environment does. Some cracks and voids in the lava retain ice all summer long and form perched water tables above the ice, such as "Registration Waterhole", "Yellow Jacket Waterhole", "Bears Den Waterhole", etc. (E) Cracks are a natural **trap for soil**. Sediment and soil bouncing (saltation) or being carried by the wind gets deposited where the wind speed is less, i.e., in the crack.
- 4. Collapse A is Hot and Collapse B is Cold.** Collapse **A** had to be hot enough to drape in a plastic fashion, much like a cake, soufflé, or batch of brownies taken out of the oven too soon. Collapse **B** had to have been cool enough to behave in a brittle fashion like breaking up a sheet of chilled peanut brittle.
- 5. A is younger. A has flowed on top of B, so B had to be present first before A could cover it.** Just like in Brain Teaser #1 the "*Law of Superposition*" is being used to determine relative age. An analogy would be dirty clothes hamper in a child's room in which the "oldest" clothes are at the bottom and the "youngest" are on the top.