

Name _____

Mount Fuji Assignment

Using the Virtual Field Trip, fill in the following blanks. In some places, room to elaborate is provided. Make sure to use scientific rationale for your responses.

The people of Japan revere Mount Fuji as _____. People of the _____ and _____ faiths revere it as a shrine. Each year, _____ of people climb

Mount Fuji during _____ through _____, the official climbing season.

Climbing Mount Fuji would be _____ because

_____.

Mount Fuji is a _____ volcano that is primarily generated by a _____ . Before the discovery of the rip in the _____, this volcano was believed to be a typical volcano created by _____ like that of Hakone. However, scientists knew that Mount Fuji was simply too _____, with an elevation of _____ meters, to fall into this category. In addition, the volcano also produces _____ km³ every 100,000 years which is like _____ football fields each filled with 30,000 _____ loaded with volcanic materials.

The dominant rock type of Mount Fuji is _____; however the initial rock type was _____, and this could be because _____

_____.

Name _____

Hakone Assignment

Using the Virtual Field Trip, fill in the following blanks. In some places, room to elaborate is provided. Make sure to use scientific rationale for your responses.

Hakone is a popular _____ destination due to the many _____
 _____; in Japan they are known as _____. However, Hakone is a volcanic
 _____ that consists of double _____, and the innermost one contains
 _____ peaks. These peaks form a line that trends from _____ to _____. The largest
 peak is _____ which is a _____ (volcano type).

The most common rock type associated with Hakone is _____, and this is
 typical of volcanoes located at _____ zones. The volcano has gone through
 several _____ of development that have separated _____ formation and
 erosion. The activity in this area began _____ Ma (_____
 _____), which is the same as _____ Ka (_____
 _____).

The first event ended when the larger, older _____ was formed, and the second
 stage ended with the formation of the second one. The final stage brought the formation of
 the _____

 _____.

_____.

The Volcanic Explosivity Index

The size of a volcanic eruption cannot be measured as readily as the magnitude of an earthquake. To measure how "big" an eruption is, geologists describe the volume of tephra, the eruptive column height, explosive energy, or the distance traveled by ballistic ejecta. However, these parameters can be difficult to determine if no one observes the eruption (McClelland and others, 1989). The volcanic explosivity index was devised by Newhall and Self (1982) to provide a relative measure of the explosiveness of eruptions. Volume of products, eruption cloud height, and qualitative observations are used to determine the explosivity value. The scale is open-ended and ranges from 0, for non-explosive eruptions, to 7, for history's largest explosive eruption. Strombolian and Vulcanian eruptions are the most common. Plinian and ultraplinian eruptions generate the greatest cloud column heights. The volume of Hawaiian and Strombolian eruptions is 10^4 cubic m or less. Very large eruptions produce one million cubic meters more tephra than non-explosive or small eruptions. The volume of plinian and ultraplinian eruptions is near 10^{10} cubic m. $10^{10} - 10^4$ cubic m = 10^6 cubic m = 1,000,000 cubic m. The May 18, 1980, eruption of Mount St. Helens is the only event rated 5 on the volcanic explosivity index for 1975-1985.

The Volcanic Explosivity Index

	0	1	2	3	4	5	6	7	8
General description	Non-Explosive	Small	Moderate	Moderate Large	Large	Very Large	----->		
Volume of tephra (m^3)		10^4	10^6	10^7	10^8	10^9	10^{10}	10^{11}	10^{12}
Cloud column height ¹ (km)	<0.1	0.1-1	1-5	3-15	10-25	25	----->		
Qualitative description	Gentle, effusive		Explosive		Cataclysmic, paroxysmal, colossal Severe, violent, terrific				
Classification	Hawaiian		Strombolian		Vulcanian		Plinian Ultra-Plinian		
Total historic eruptions	487	623	3176	733	119	19	5	2	0
1975-1985 eruptions	70	124	125	49	7	1	0	0	0

¹For VEIs 0-2, data are km above crater, for VEIs 3-8, data are in km above sea level.
Modified from McClelland and others (1989).

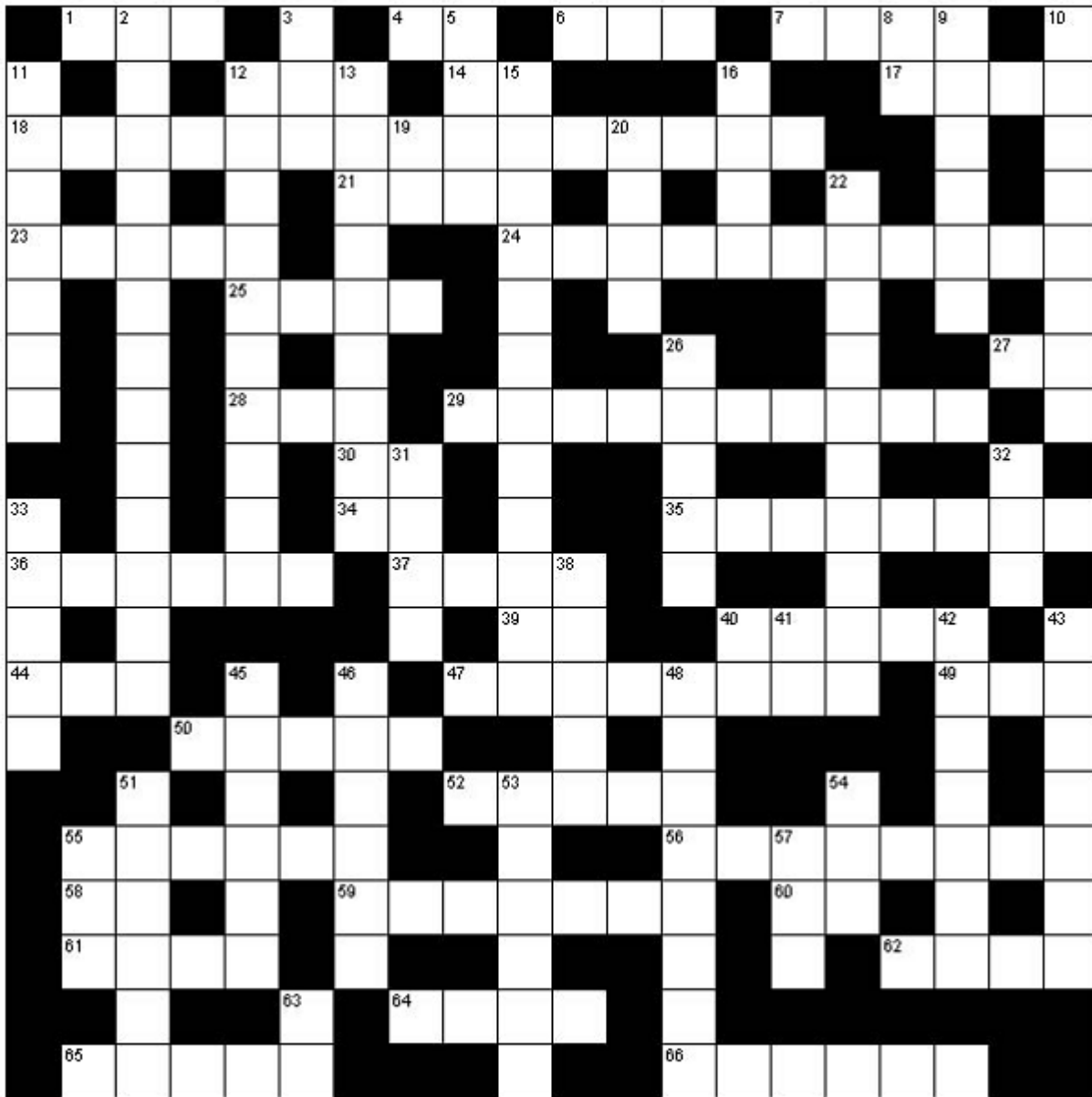
Directions:

Use the volcanic explosivity index to answer the following questions.

1. Which type (classification) of eruption was most common from 1975-1985?
2. Which type (classification) of eruption produces the highest cloud columns and greatest volumes of tephra?
3. How many large eruptions occurred from 1975 to 1985? Can you guess which eruption was the largest? Hint: It was in 1980.

<p>ACROSS</p> <ol style="list-style-type: none"> 1. Finest pyroclast 4. Ratio of circumference to diameter 6. Toxic component of LAZE 7. Lethal lake 12. Typical methodology 14. Isle ___ Wight 17. Earth's satellite to Pliny 18. Most deadly volcanic phenomena 21. Eruption ruckus? 23. Help for poor student of volcanology 24. Middle tier of joints in a lava flow 25. 2.54 cm, or Highland loch 27. "___ and behold!" 28. Unkindest ___ of all 29. Occurs at an oceanic trench 30. Part of Freud's psyche 34. "Negatory" 35. Volcanic glass 36. Opening at volcano summit 37. Hydrovolcanic vent 39. LXXVII before Pliny's Vesuvius 40. Fate of an object in a highly viscous medium 44. River, in Sonora 47. Volcanic rock of an intermediate composition 49. "___ pig's eye!" 50. Volcanic mudflow 52. Ore analysis 55. SiO₂ 56. Molten rock is transported through this shallow conduit 58. Direction of an eruptive column 59. Intermediate-sized tephra fragments 60. Mg₂(Si₂O₆) (abbr.) 61. _____ ardente 62. Molten rock on the Earth's surface 64. Hawaiian Goddess of Fire 65. Molten rock beneath the Earth's surface 66. Airborne pyroclastic material 	<p>DOWN</p> <ol style="list-style-type: none"> 2. Mt. St. Helens is one 3. 55 down, in Sonora 5. "Not one _____." 8. (Mg,Fe)₂SiO₄ (abbr.) 9. Component of volcanic gas 10. Basaltic lava flow with smooth upper surface 11. Pyroclastic fragments that accumulate as liquid droplets 12. Vent composed mostly of basaltic tephra 13. Mexican volcano born in a cornfield 15. Typical feature of a Hawaiian eruption 16. Pyroclastic fragment larger 59 across -- <i>link</i> 19. "Say it ain't ___ , Joe!" 20. An ill one awaited the villagers of Pompeii 22. Mt. Pelee is located here 26. Site of the on-going Hawaiian eruption that began in 1983 31. Generated in the aftermath of a Plinian eruption 32. Relative distance traveled by a low-viscosity lava flow 33. A pyroclastic flow up close 38. The lithosphere _____ above a convecting asthenosphere 40. Silicon (abbr.) 41. 1-800-CAL-LA___ 42. 26 down is located on this shield volcano 43. Created when a volcano collapses into its own magma chamber 45. "_____ of the Earth"? 46. A low-viscosity, mafic magma 48. Surface collapse structure above 56 across 51. Subdued hill surrounded by recent lava 53. Mauna Loa is one 54. "As the lahar approached, we _____ for cover" 55. Radiating ball of energy at the center of our solar system 57. Scale of Explosivity (abbr.) 63. Rugged basaltic lava flow
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<SHAPE>



WORD BANK

aa	fate	lava	paricutin	skylight
andesite	fire fountain	lava tube	pele	sol
ash	halite	lo	pi	SOP
assay	HCl	Luna	puuoo	spatter
basalt	id	maar	pyroclastic flow	stratovolcano
bomb	ll	magma	ran	stuck
caldera	ina	Martinique	rides	subduction
crater	inch	no	Rio	sulfur
cut	iota	nuee	roar	sun
dome	Kilauea	Nyos	scary	tephra
en	kipuka	obsidian	scoriacone	tutor
entablature	lahar	ol	shield	up
far	lapilli	pahoehoe	silica	vei

Name _____

Volcano Contour Map

Using information from the Virtual Field Trip or any other source, construct a topographic map of Mount Fuji and Hakone volcanoes in relation to each other. Make sure to leave room on the right side for the legend and compass, the top for the title, and the bottom for the scale bar.

1. Label all relevant tectonic plates and the plate type (ocean or continental).
2. Indicate what is subducting where.
3. Indicate each type of volcano and their related rock types.
4. Color code (or pattern code) your map for clarity.
5. Give the map a title at the top center of the map.
6. Create a legend at the right hand side of the map .
7. Include contour lines with estimated elevations.
8. Write a paragraph describing the map, and how it would be useful.
9. Turn in this sheet with your completed map.

RUBRIC

Component	Point value	Point value	Point Value	Score
	0	1	2	
Appropriate Scale with scale bar	Unrealistic, no scale bar	Fair distance,; scale bar present	Fair distance, scale bar present	
Consistent Units - Metric	No units	Units mixed up	Appropriate units	
Title	Absent	Not at Top	At the top	
Legend	Absent	Not at right hand side or missing components	At right hand side, all components present	
Color or pattern coded	Absent or unclear	Does not match legend	Clearly patterned & matches legend	
Compass	Absent	Present, but incorrect	Present and correct	
Contour lines	Absent	Present, but unrealistic	Present and fairly accurate	
Paragraph	Missing several steps and/or poor grammar/structure	Some grammar/structure errors, most steps described	Few grammar/structure errors; detailed description	
Overall Appearance	Severely smudged, disorganized, several eraser marks	Some eraser marks, slightly smudged, organized	Few eraser marks, not noticeable smudged, well organized	

Score _____/18