GG104 F 2013 potential midterm-style questions, based on lectures and readings: these will be updated after each class meeting, and posted at:


1. Why do we know more about continents than oceans?
2. Why do we know more about the crust?
3. How do you divide up the Earth with respect to chemical composition?
4. How do you divide up the Earth with respect to physical properties?
5. Why was the original continental drift idea not accepted?
6. Why is it that sometimes descriptions of how things were done in olden-day Hawaii are considered “inaccurate”?
7. In general, what was the migration route of the people who colonized Hawaii in pre-western-contact times?
8. Why might they have made these migrations?
9. Where might stories of menehune have originated?
10. What is a shield volcano?
11. What are key aspects of “Hawaiian-style” volcanic eruptions?
12. If temperature increases downward inside the Earth, why is almost all of the mantle solid?
13. How are temperature, gas content, and silica content related to the explosiveness of an eruption?
14. What things got people thinking about continental drift in the first place?
15. What are the processes involved in making new lithosphere vs. getting rid of it?
16. What is a Wadati-Benioff zone?
17. What is a mid-ocean ridge?
18. What is a transform fault?
19. What are three ways that melting (to form magma) occurs within the Earth?
20. What is melting, by the way?
21. What is the shape and structure of a hotspot?
22. What is a possible connection between flood basalts and hotspot traces?
23. What is the difference between absolute plate motion and relative plate motion?
24. How can you get different compositions of magma from the same starting composition of rock that is being melted?
25. How does this relate to the magmas that feed eruptions of Hawaiian volcanoes?
26. What happens to eruption frequency as a volcano moves off the hotspot?
27. What are the connections between magma chamber, eruption, lava flow, rock type, and potential use of that rock as an implement?
28. What are phenocrysts? Vesicles?
29. What is a dike? Why is dike rock so good for certain stone implements?
30. What is the molecular structure of glass?
31. How are cooling rate and gas content related to the texture (crystal size and vesicle content) of an igneous rock?
32. What are pāhaku ‘elekū and pāhaku ‘ālā?
33. How is the texture (crystal size, presence/absence of vesicles, etc.) of an igneous rock related to the type of stone implement that it can be made into?
34. What is pyroclastic material?
35. What are the general characteristics (surface, interior, behavior, velocity, etc.) of 'a‘ā and pāhoehoe lava flows?
36. What determines whether a flow will be ‘a‘ā or pāhoehoe?
37. What is a lava tree?
38. What are lava channels and lava tubes, and why are they important with respect to the cooling that occurs as lava is flowing?
39. What factors control the explosivity of magmas, and how might that be related to the melting process that forms the magma in the first place?
40. Why are Hawaiian eruptions typically not explosive?
41. What factors control the viscosity (opposite of fluidity) of magma?
42. What is a shield volcano, and how is it related to the type of lava that erupts?
43. What is the general shape of a volcanic dike? Why does it have that shape?
44. What are inflation and deflation of a magma chamber, and why is it useful to monitor them?
45. If it is so hot within the Earth, why is the mantle almost entirely solid?
46. What is a volcanic bomb? Lapilli? Volcanic ash?
47. What are cinder cones, spatter cones, and tuff cones? How do they relate to the eruptions that formed them?
48. What might be the cause of giant Hawaiian landslides?
49. How do residual stones and boulders form?
50. How do the physical characteristics of different stones control how they can be shaped by flaking or pecking?
51. What effect do vesicles have on propagating fractures?
52. How does the rate of cooling affect the size of crystals in igneous rocks?
53. How is the texture (crystal size, presence/absence of vesicles, etc.) of an igneous rock related to the type of stone implement that it can be made into?
54. What is super-cooling and how is it related to stone implements in Hawai‘i?
55. What are the 3 common minerals that you can find in Hawaiian basalt?
56. Why was it important for the 4 Tahitian healers to come to Hawai‘i?
57. Why is it important to provide for a variety of worship techniques and/or beliefs regarding Nā pōhaku Ola?
58. Why was a fence put up around Nā pōhaku Ola?
59. What would you look for to decide if the surface on a basalt stone was fresh or weathered?
60. What are reasons why fresh rock might be exposed here and there on Nā pōhaku Ola?
61. Why might there be weathered surfaces on Nā pōhaku Ola?
62. What are some of the uses of geologic materials from olden-day Hawai‘i, and what kinds of stone would you look for to build/make them?
63. What are some of the things you might say if you want something from a stranger?
64. Why are you saying these things?
65. How could you use a mo'olelo about building a large structure on Moloka'i to determine the population of an island?
66. How did the kahuna of olden times break stones?
67. How does one cook with an ‘imu? How does it work, thermally?
68. What is dry-stacking?
69. What is one probable reason why some heiau had walls whereas others didn’t?
70. Who were the menehune, (perhaps)?
71. What is the significance of finding a few rare, unusual stone carvings or cut-stone walls?
72. What was the traditional method of moving large numbers of stones from one place to another?
73. What determined where old Hawaiian loko i’a (fishponds) were built?
74. How does a loko i’a work?
74. What are some uses of geologic materials in modern-day Hawai’i?
75. Why is basalt not such a great material for modern high-rise construction?
76. What are some modern uses for basalt besides actually building things?
77. What is BTB, and how does it work?
78. What is the difference between “flaking” and “pecking” (as it relates to stone implements)?
79. If you are marooned on an island, what are some ways you can turn “mere” stones into something useful?
80. What does it mean when someone says “islands shape people”?
81. What is the history (geologic and otherwise) of a stone that eventually becomes an implement?
82. What are observation and empiricism, and how were/are they useful to Hawaiian society?
83. What is the usefulness of having hundreds of different cloud names?
84. What are some examples of experimentation in pre-contact Hawai’i?
85. Is western science completely devoid of gut feelings and hunches?
86. Are hunches better or worse if you have background knowledge?
87. Why are pueo (owls) important to the restoration of Kaho'olawe despite not being key parts of the natural ecosystem?
88. Why is the expression: He lohe pepeiao, he ‘ike maka nō (did you hear it or did you actually see it?) relevant to science?
89. Why is the expression: O ka mea kū pono, pa’a; o ka mea hewa, kāpae a’e (that which is good, keep; that which isn’t set aside) relevant to science?
90. What does the mapping of adze quarries on West Moloka’i tell us about the practical applications of Hawaiian science?
91. Do traditional accounts ever offer something of value to modern researchers?
92. Why is Arctic amplification a key component of climate change?
93. How do greenhouse gases work?
94. What is the role of satellites in studying climate change?
95. Identify some dangerous aspects of climate change that are occurring now.
96. Describe how sea level rise will affect our communities.
97. What is a positive feedback as applied to climate science?
98. What are the typical types of eruptions that occur in Hawai‘i?
99. What happens when you add water to a basaltic eruption?
100. What is the relationship between Pele, her sisters, and some prominent volcanic features?
101. How do you identify rejuvenation-stage volcanism?
102. Why is rejuvenation-stage volcanism so puzzling?
103. In what order did the islands form according to the Kumulipo? (Beckwith 1970; lecture)
104. How has the Pele, Hi‘iaka, Lohi‘au story maybe helped solve the controversy of how long the Keanakāko‘i eruption took?
105. How have we answered the how-long question most recently?
106. What might the story of Hi‘iaka viewing the eruption in Puna from a vantage point at Pōhakea (Wai‘anae Mtns., O‘ahu) be really describing?
107. Is it possible that someone on O‘ahu could have known that there was an eruption at Kīlauea? If so, how?
108. What might prevent someone on O‘ahu from knowing there was an eruption at Kīlauea?
109. What probably killed Keō‘ūa’s warriors?
110. Has rejuvenation volcanism of Ko‘olau taken place all over the volcano? (Ozawa et al. 2005; Fig. 1).
111. Has rejuvenation volcanism of Ko‘olau taken place at a constant rate? (Ozawa et al. 2005; Fig. 2).
112. What are some of the caveats involved in using traditional Hawaiian (or any) stories for geological research (Swanson 2008).
113. How significant was the ‘Ai Lā‘au eruption with respect to duration and areal coverage (Swanson 2008; Fig. 2). Does this significance enter into Swanson’s analysis at all?
114. In general, what is the Pele/Hi‘iaka/Lohi‘au story? (Emerson 1915; Westervelt 1916; Ho‘ulumāhiehie/Nogelmeier 2006; lecture).
116. What are some of the ways that Pele is considered for modern-day people? (Kanahele & Wise 1989 + lecture)
117. When describing Hawaiian beliefs and/or practices, how are the results likely to be different depending on who (Westerner or Hawaiian) does the describing? (Kanahele & Wise 1989)