GG104 F 2011 potential final questions: these will be updated after each class meeting, and posted at:  http://www.higp.hawaii.edu/~scott/GG104/GG104_f11_final_review.pdf

All powerpoints from the class are on the web at:  
http://www.higp.hawaii.edu/~scott/GG104/Powerpoint_presentations/  

1. What kind and duration of eruption preceded the explosive Keanakākoʻi eruption?  
2. What did Hiʻiaka see from atop Pōhākea pass?  
3. What kind of eruption was the Keanakākoʻi eruption?  
4. What was Hiʻiaka doing to try and get Lohiʻau back?  
5. What probably caused Kīlauea to be explosive for ~300 years?  
6. Why was Hiʻiaka warned to stop digging?  
7. How are numbers 1-6 related to each other?  
8. Are there arguments that numbers 1-6 arenʻt related to each other?  What are they?  
9. How has western geologyʻs understanding of the Keanakākoʻi eruption changed over time?  
10. What are the Native American stories about Mt. St. Helens, Mt. Mazama, and Devilʻs Tower?  
11. What is the Native Mexican story about Popocatépetl?  
12. What is the Aotearoa story about the North Island volcanoes?  
13. What is the story about Kuwae in Vanuatu, and how were indigenous stories used to try and solve a geological mystery?  
14. Why was it important for the 4 Tahitian healers to come to Hawaiʻi?  
15. Why is it important to provide for a variety of worship techniques and/or beliefs regarding Nā pōhaku Ola?  
16. Why was a fence put up around Nā pōhaku Ola?  
17. What would you look for to decide if the surface on a basalt stone was fresh or weathered?  
18. What are reasons why fresh rock might be exposed here and there on Nā pōhaku Ola?  
19. Why might there be weathered surfaces on Nā pōhaku Ola?  
20. How do you identify rejuvenation-stage volcanism?  
21. Why is rejuvenation-stage volcanism so puzzling?  
22. How has the Pele, Hiʻiaka, Lohiʻau story helped solve the controversy of how long the Keanakākoʻi eruption took?  
23. How have we answered the how-long question most recently?  
24. What might the story of Hiʻiaka viewing the eruption in Puna from a vantage point at Pōhakea (Waiʻanae Mtns., Oʻahu) be really describing?  
25. What probably killed Keoūaʻs warriors?  
26. What are the Native American stories about Mt. St. Helens, Mt. Mazama, and Devilʻs Tower?  
27. What is the Native Mexican story about Popocatépetl?  
28. What is the Aotearoa story about the North Island volcanoes?  
29. What is the story about Kuwae in Vanuatu, and how were indigenous stories used to try and solve a geological mystery?  
30. What are the two scales that are used to measure Earthquakes?  
31. How do these two scales work?  How are they measured?  
32. How are p-waves and s-waves different?  
33. How do you use the s-wave delay to locate an earthquake?
34. What are stress and strain?
35. What is the difference between earthquake focus and earthquake epicenter?
36. Why do we have earthquakes in Hawai‘i?
37. Why are earthquakes dangerous?
38. What are the different kinds of faults, and what do they tell you about the stresses involved?
39. Why are tsunami so difficult to detect in the open ocean?
40. How does the coastline (shape, offshore aspects) affect tsunami run-up and damage?
41. What are natural warning signs of a tsunami?
42. How is it that tsunami can travel all the way across the ocean with only minimal dissipation?
43. Why is it significant that Hawai‘i has not had a significant tsunami since 1960?
44. What do the different levels of tsunami alert (advisory, watch, warning) mean?
45. How are tsunami different from storm waves?
46. How was the Tohoku tsunami different along the Japanese coast with respect to timing and topography?
47. How does a subduction zone produce a tsunami?
48. What is the “orphan tsunami” story?
49. How were giant avalanches off the Hawaiian volcanoes discovered?
50. How do we know the avalanches were catastrophic?
51. What are the differences between a tsunami generated by a giant avalanche and one generated by a large subduction-zone earthquake?
52. How would the tsunami from a giant Hawaiian avalanche be different from one from a subduction zone?
53. What are the arguments against ocean-wide destruction from Hawaiian tsunami?
54. What is the evidence for tsunami from giant avalanches in Hawai‘i?
55. How else can this evidence be interpreted?
56. What is an orphan tsunami? What is the story of the AD 1700 orphan tsunami?
57. Has rejuvenation volcanism of Ko‘olau taken place all over the volcano? (Ozawa et al. 2005; Fig. 1).
58. Has rejuvenation volcanism of Ko‘olau taken place at a constant rate? (Ozawa et al. 2005; Fig. 2).
59. What are some of the caveats involved in using traditional Hawaiian (or any) stories for geological research (Swanson 2008).
60. 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?
61. In general, what is the Pele/Hi‘iaka/Lohi‘au story? (Emerson 1915; Westervelt 1916; Ho‘ulumāhiehie/Nogelmeier 2006).
63. Why do we think that the volcanism on East-Maui volcano isn’t rejuvenated volcanism?
64. What are the different types of Pacific islands?
65. What are the various benefits and drawbacks of the different types of Pacific islands?
66. What are some of the characteristics of islands that make them good or not so good for developing advanced societies?
67. How do the following island characteristics affect the development of societies, and how are these characteristics related to geology and/or geophysics: isolation, rainfall, good vs. poor
soil, steep vs. gradual topography, presence or absence of reefs, access from land to sea and vice versa.

68. What are high islands and low islands?
69. With regard to living on them, what is the biggest difference between high and low islands?
70. What are the different types of high islands?
71. What are the different types of low islands?
72. What is an atoll, and how does it form?
73. How would you get a raised coral platform island?
74. How does island age affect island society?
75. How does island topography affect island society?
76. What is the difference between looking at societies’ “success” pre-contact vs. post-contact?
77. What kinds of tool materials are available on a raised coral platform?
78. How do young shield volcanoes compare to young strato volcanoes when it comes to living there?
79. What is the evidence for glaciation on Mauna Kea?
80. Why would there be glaciers there in the first place?
81. What do you need to produce a glacier?
82. What is a moraine?
83. What is hyaloclastite?
84. How do you recognize a moraine?
85. Who are the deities associated with ice and snow in Hawaiian mythology?
86. What might the fights between Poli‘ahu and Pele represent?
87. Where, in Hawai‘i, could these possibly have been witnessed by people?
88. What explains some of the deeply-eroded gullies on the upper flanks of Mauna Kea?
89. What is the possible connection between glaciers and Haleakalā?
90. Was there ever glaciation on Mauna Loa?
91. What are some of the geological aspects of islands that might have an effect on the cultures that develop there?
92. How did Laupāhoehoe form (two versions)?
93. What is the difference between relative and absolute age dating?
94. What are the laws of superposition and cutting?
95. What is an isotope?
96. Why are some isotopes useful for age-dating?
97. What do you need to know about an isotope if you are going to use it for age-dating?
98. Why do you need to know the quantity of both parent and daughter isotopes to determine an age?
99. What determines the limits (young and old) for a particular isotopic dating system?
100. How does carbon dating work?
101. How can you use carbon dating to get the age of a lava flow?
102. What big assumption do you have to make if you are going to use carbon dating to get the age of a lava flow?
103. Was there anything perhaps unusual about the 4 Tahitian healers? (Boyd 1923)
104. Why did the 4 Tahitians want the stones to be set up? (Boyd 1923)
105. What is the general shape of Niuafo‘ou? (Rogers 1986)
106. What was the Tongan government’s response to the 1946 Niuafo’ou eruption, and why was it controversial? (Rogers 1986)
107. How much time did the people of Niuafo’ou have before the 1946 eruption started? (Rogers 1986, pp. 19-23)
108. What is a megapode, and how are they related to the geology of Niuafo’ou? (Nunn 2003)
109. What are “fished-up” and “thrown-down” myths? (Nunn 2003)
110. What is/are the argument(s) that some of these myths must have come from places other than where they are told? (Nunn 2003)
111. What geological events might be the source for “fished-up” myths? (Nunn 2003)
112. What geological events might be the source for “thrown-down” myths (Nunn 2003)
113. What are alternative explanations (other than geological) for the “fished-up” and “thrown-down” myths (Nunn 2003)
114. During the 2006 Kilolo Bay earthquake, was the intensity of shaking directly related to distance from the epicenter? (Robertson et al. 2006)
115. What are some examples of structural and infrastructure damage that occurred during the 2006 Kilolo Bay earthquake (Robertson et al. 2006)
116. Besides the sliding of tectonic plates, what are some other causes of earthquakes? (Reynolds et al. 2008)
117. What is the typical earthquake distribution in a subduction zone? (Reynolds et al. 2008)
118. How does a seismometer work? (Reynolds et al. 2008)
119. What kinds of damage (direct and indirect) can be caused by earthquakes? (Reynolds et al. 2008)
120. What is a geological reason that might explain why Kamehameha I never conquered Kaua‘i? (Reynolds et al. 2008)
121. Can earthquakes be predicted? How or how not? (Reynolds et al. 2008)
122. What do wai and puna mean, and why do they feature so commonly in Hawaiian place names? (Reynolds et al. 2008)
123. What is the Ghyben-Hertzberg lens?
124. How can humans help/hurt fresh groundwater resources on ocean islands?
125. Why are there commonly springs along island coastlines?
126. What is dike-impounded water, and why is it important?
127. What is caprock, and why is it important?
128. What is an artesian well?
129. What kinds of water were/are Kāne and Lono responsible for?
130. What is OTEC?
131. What was OTEC water originally planned for, but currently being used for?
132. What is an amphitheater-headed valley, and why do they form?
133. What is stream piracy, and how does it work?
134. Why do Hawaiian streams typically have lots of little waterfalls?
135. What causes eroded valley walls to have a stair-step profile?
136. What is the relative resistance to erosion of different Hawaiian rock types?
137. What are some of the ways that warming of the earth causes sea level to rise?
138. Describe the two types of Tuvaluan islands.
139. Why is sea level rise in Tuvalu more serious than in Hawai‘i? Why is sea level rise in Hawai‘i more serious than in California?
140. If sea level rises on a small island, are waves coming in from the ocean the only thing you have to worry about?
141. What human-caused environmental problems exist on Tuvalu in addition to sea level rise?
142. What are some potential choices for Tuvaluans to make with regard to their shrinking islands?
143. What from Jane Ta‘afaki-Sam’s talk makes it clear that at least some parts of Michaels’ (2000) article is false?
144. Is there anything in Michaels (2000) that might make you suspicious of his objectivity?
145. Why do we have seasons?
146. Why is the Arctic a key place to study climate change?
147. Why is the SW Pacific a key place to study climate change?
148. What are the effects of ENSO/El Niño on Pacific winds, currents, ocean temperature, etc?
149. How would ENSO/El Niño have an effect on sea level measurements?
150. What are some natural indicators of global warming?
151. How do we know that global warming is not caused by an increase in solar activity?
152. What are some ways that people can reduce the amount of CO$_2$ entering the atmosphere?
153. What are some ways that developed and developing countries can adapt to climate change and/or sea level rise?
154. What are some of the things that are involved in the names for different parts of the ocean? (Kamakau 1976)
155. What did pre-contact Hawaiians need to use instead of horses, shovels, plows, etc? (Kamakau 1976)
156. What were the different kinds of lands used for planting sweet potatoes (‘uala)? (Kamakau 1976) Geologically, what kinds of places would these represent?
157. How easy was it to plant kalo? (Kamakau 1976)
158. Were Monzier et al. (1994) the first to propose a large explosive, caldera-forming eruption that was possibly tied to oral histories?
159. What are some ways that glaciers lose volume? (Macdonald et al. 1983)
160. What are the processes that allow glaciers to erode the substrate? (Macdonald et al. 1983)
161. How are glacial stages on Mauna Kea dated? (Macdonald et al. 1983)
162. How is it that Lake Waiau can exist near the summit of Mauna Kea? (Hazlett & Hyndman 1996)
163. If you wanted to tie a real event or type of event to the story of Aiwohikapua and Poliahu, what might it be? (Westervelt 1916)
164. What kinds of water were Kāne and Lono responsible for?
165. What is meant by “wet” and “dry” agriculture?
166. What are the aspects of the different types of agriculture that were practiced on Pacific islands? What were their benefits and drawbacks?
167. What geological, topographical, climatic, etc. conditions control whether or not a society uses wet vs. dry agriculture?
168. What are the human and time resources needed to maintain wet and dry agriculture?
169. What is the connection between wet and dry agriculture and conflicts between societies?
170. What is a geological reason that might explain why Kamehameha I never conquered Kaua‘i?
171. What is lithic mulching?
172. What is the relationship between wave erosion, river erosion, and island size? (Menard 1986)
173. Why is there so little sand on volcanic islands that don’t have coral reefs? (Menard 1986)
174. As an island erodes to a little nub standing above a much wider (and submerged) wave-cut platform, what might cause it to not be in the middle of the platform? (Menard 1986)
175. What is the relationship between permeability and volcanic-island age, and how does it affect stream erosion? (Menard 1986)
176. Why, supposedly, could the outcome of the collision between Maori and Moriori have been predicted? (Diamond 1999)
177. Why did the Moriori have to “revert” to being hunter gatherers when they arrived at the Chatham islands? (Diamond 1999)
178. What are the environmental variables that contribute to differences among Polynesian societies? (Diamond 1999)
179. What is “sustainable yield” with respect to groundwater? (Miike 2004)
180. What does “base flow” mean with respect to a stream? (Miike 2004)
181. Besides lo‘i, what are the other kinds of “wet” Polynesian agriculture? (Kirch 1994)
182. What is the “hydraulic hypothesis” and why did it come about? (Kirch 1994)
183. What is arboriculture? (Kirch 1994)
184. What is the general relationship between farming style and island age in Hawai‘i nei? (Kirch 1994)