NĀNĀKULI AHUPUA'A FIELD TRIP (Env. Sci. 8):
Thur, MARCH 10, 8:00 am to 11:20 am

**Purpose:** Students will hike to be able to see the entire ahupua’a (watershed) in which they live in order to build on their understanding of these DOE content standards addressed in this &/or next term’s lessons, projects and tests:
- Domain II, Standard 3 – Students make decisions needed to sustain life on Earth now and for future generations by considering the limited resources and fragile environmental conditions.
- Domain II, Standard 19 – students analyze the scientific view of how the Earth’s surface is formed

**Before the Field Trip!**
- Hand in your signed permission form & medical insurance info (no form, no medical, no trip!  *Note: school medical can be obtained – ask your teacher* )
- In class you will be assigned a chaperone. Chaperones will be with no more than 12 students for the morning. Stay within 25 feet of their sight at all times!
- Take this sheet home to let your family know more about the trip & to prepare all you will need to bring with you - this includes:
  1. notepad, pencil & highlighter
  2. sunscreen lotion, hat, umbrella (depending on weather)
  3. running or hiking shoes – slippers will not protect your feet & you will NOT be allowed to go on the trip with any open type of footwear
  4. water & snack for recess (you will return to school in time for lunch as normal)
- Things *not* to bring: music walkmans, gameboys, other valuables

**On the Day of the Field Trip!**
*Note: If you are not going on the trip, report to the class your teacher assigned you with all your term notes to do alternate work. Stay there for only 1 class, & go to your other class as normal.*
- 8:00 – in your classroom, review agenda, meet chaperones & gather supplies  *Note: there is NO public restroom at sites so ... GO before you GO!* 😊
- 8:05 – walk with chaperones to Haleakala St. & along public roads to base of Heleakala Ridge, then hike to saddle of lower ridge (twin telephone poles are markers)
- 8:30 – Group 1, hike to makai geological marker for Map Reading & Native Species Planting activity; Group 2, hike to middle ridge for Rock Treasure Hunt & Ahupua’a Talkstory
- 9:30 – Groups passing & recess (those desperate for restroom break may go with chaperone to NHIS but must hike back up to continue)
- 9:50 – Groups switch activities and locations (Group 1 at mauka ridge; Group 2 at makai marker)
- 10:55 – return to school in time for lunch at 11:20
NOTES TO CHAPERONES/GUIDES

Group 1
1. Rick, teacher
2. Carly, archeologist
3. Kevin, Alu Like

Group 2
4. Matt, Alu Like
5. Alton, archeologist

ACTIVITIES:
TWIN POLES - Group 2 can leave their water for planting here and hike up to Site B immediately; Group 1 can stay to begin Map Activities
SITE A - makai geological marker for Map Activities with Lisa
  • Map Reading & Making – chaperones discuss page 1 map with small group; student pairs find geological marker; chaperones & small groups discuss how to read a map (page 2 & 3 of hand-out: legend & symbols; identify peaks, ridges, valleys, streams; find streets, where we are now); okay to make map after planting (page 4)
  • Native Species Planting activity – chaperones & small groups observe native & non-native flora & fauna; plant, water & tag pili grass; add site to student made maps (page 4)
SITE B - hike to middle mauka ridge for Rock & Talk Activities
  • Uncle Black’s Ahupua’a Talkstory – kai to uka cultural importance & history of ahupua’a
  • Rock Treasure Hunt – student pairs search for a 3 or more different kinds of rocks on Heleakala; chaperones & small groups discuss origins, uses & evolution of rocks & mountains (i.e. identify the kind of flow associated with it, try to date/age the flow from which it came, estimate how old the island is; observe geological features, eg. Why are there such big boulders in Nanakuli? Where did they come from? Why is Palikea lighter colored than the rest of the pali?; what uses could these rocks have for ancient Hawaiians? How did the land come to be shaped this way? Which mountains came first?)
TEACHER’S NOTES & PREP FOR HIKE

Before the Hike: students should read about the geology of their ahupua`a (Life of the Land) and do the map reading practice sheets; students would benefit most from the trip by looking over the grading rubric before hand, and then using it to self-evaluate their work after the trip.

For the Native Species Planting activity:
Before or during the hike, teacher or chaperones can teach students about …

Botanist’s Accession Number System
1. Discuss how botanists track plant successes/failures and propagation techniques (such as when to cut, plant, fertilize, water, thin, etc.) with “accession numbers” & file notes for others to refer to in future (see eg)
   - 99s361 might be a seed (s) received in 1999 (99) and was the 361st plant received that year
   - 99C362 might be a cutting rec'd in 1999 and was the 362nd plant rec'd that year

2. Let students decode this example info

<table>
<thead>
<tr>
<th>Acc #</th>
<th>Plant Name</th>
<th>Source/Donor</th>
<th>Material Rec’d</th>
</tr>
</thead>
<tbody>
<tr>
<td>04S01</td>
<td>Sesbania tomentosa</td>
<td>Ka‘ala Farms</td>
<td>4 Seeds</td>
</tr>
<tr>
<td>04C02</td>
<td>Gardenia brighamii</td>
<td>Josephine Hoh</td>
<td>3 Cuttings</td>
</tr>
</tbody>
</table>

3. Ask students to create their own accession numbers for this native species planting activity (see anticipated student example)

   EG Student Accession Number: 05C03  pili     Home Depot  1 cutting

For the Map Activities:
On the hike, teacher or chaperones discuss the 4 pages of this hand-out …
Page 1 – read aloud & check for understanding (map includes streams, gulches, railroad, ocean, map maker & scale); make sure pairs look for Geological Marker in makai direction.
Page 2, top – read aloud top of page (summit is over 1400 ft)
Page 3 – this map is difficult to read because original is much bigger, so begin by asking students to find the streets (can find school site & Geological Marker site); then look at contour lines (note these are different from darker zone lines showing forest, shrub, wetland & dryland areas); then look at many tiny marks and lines in center area, mauka of the school (these are cultural sites)
Page 2, bottom – read directions aloud & direct students to make preliminary sketch of their map on Page 4 (should include kai, kula & uka/ocean, midland & mountain); refinements to map can be made in class later.
For the Rock Activities:
On the hike, pairs find 3 rock samples then teacher or chaperones & groups ask students to observe their rocks & the geology of the land they found them by noting features (similarities, differences), making hypotheses, and asking questions of the group. Anticipated teacher/chaperone info needed is …

1. origins – Heleakala was once part of the 4 million year old Wai`anae Shield Volcano; it is the eastern wall of a caldera that was about 10 miles across and like Kilauea, took a million years to build up above sea level; across the valley, Piliokahe ridge looks different because it was formed about 3 million yrs ago on the outside ridge of the caldera by vents that spewed a different kind of lava in downward moving flows (Hekeakala was formed by horizontal flows that stacked up over time); the beach area is older than Piliokahe & was formed 4 million yrs ago & was under water when the ancient sea levels were higher (so has fossilized coral embedded in it)

2. evolution by erosion by wind, rain, heat & gravity is seen in Piliokahe’s small rockslides & errant boulders (note, paths were also carved into the hillside in the 1800s for basalt and exploratory mining); erosion in Hekeakala shows the many layers of every major eruption, and the tilt of the horizontal lines to the east shows how the caldera slowly slumped into the ocean (the present mountain range is only ½ of the original volcano … the rest is underwater where it sank due to its extreme weight); only 1 major slide occurred long ago off Ka`ena Point when the north ridge suddenly slid 60 miles into the ocean, causing a massive tsunami).

3. uses – (see more notes below) main ideas: ancient Hawaiians used basalt rocks for digging tools (attached to sticks), & may have used them as grinders, scrapers, weapons, in religious ceremonies … basalt is found all over the world and has been used to do these things and make art pieces; basalt is coarse, hard and harmless, so modern uses just combine technology with ancient observations to make roads, concrete, brake pads, fire protection & acid-resistant materials, durable & non-toxic containers, etc.

For the Ahupua`a Talkstory
All everyone needs to do is listen to the guest presenter and ask questions. After the hike, students can use the info they learn to make a quiz with answers.

Closure & After the Hike
During the hike students can help clean up the area (or at least avoid leaving trash behind); they can return on their own time to water & monitor the pili grass or attempt to plant other native species.
Subsequent lessons should let students complete their ahupua`a map & the 10 question & answer quiz (do in pairs & encourage variety of who/what/when/where/why & how items in short-answer, multiple choice, matching, fill in the blank, true or false, or long answer format). They can also exchange their quizzes & correct each others’ work & present or write about what they learned.
Suggestions to improve or alter this trip are also always welcome by yours truly.

☺

DRAFT: Science in Hawai`i: Nā Hana Ma Ka Ahupua`a – A Culturally Responsive Curriculum Project 4
DIRECTIONS: Before the hike, read the left column to plan how to get your best grade. After the hike & follow-up activities, write in the boxes below explaining what work you did. Write your scores in the right column. Then complete the bottom part of this sheet.

<table>
<thead>
<tr>
<th>Activity, Criteria &amp; Points (30 points + bonus)</th>
<th>Exceeds Expectations (80% +)</th>
<th>Approaching Expectations (60% +)</th>
<th>Does not meet Expectations (60% or less)</th>
<th>My Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Map Making (5) - read maps on hike &amp; make own map of ahupua’a with 8 features and legend</td>
<td>___/5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Native Species Planting (5) – plant native species; observe &amp; record all species of flora &amp; fauna at site</td>
<td>___/5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Rock Treasure Hunt (5) – collect rock samples; hypothesize origins, uses, evolution</td>
<td>___/5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Ahupua‘a Talkstory (10) - listen to hike guides; create Student-Made Quiz (10 questions &amp; answers, with partner)</td>
<td>___/10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Presentation or Reflection (5) – write 75 words or more or give 2 min. speech about what was learned on hike</td>
<td>___/5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Site Clean up (bonus) – bring trash bag to collect</td>
<td><em><strong>/</strong></em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Environmental Action List (bonus) - write what students can do to malama i ka `aina</td>
<td><em><strong>/</strong></em></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

My total: _____/30, plus____ bonus. My grade: A B C D F

What I did well was ____________________________________________
________________________________________________________________

What I could have done better was __________________________________
________________________________________________________________

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Term 3 Ahupua‘a Hike: Self-Evaluation

DIRECTIONS: Before the hike, read the left column to plan how to get your best grade. After the hike & follow-up activities, circle the boxes below & write your scores in the right column. Then complete the bottom part of this sheet.

<table>
<thead>
<tr>
<th>Activity, Criteria &amp; Points</th>
<th>Exceeds Expectations (80% +)</th>
<th>Approaching Expectations (60% +)</th>
<th>Does not meet Expectations (60% or less)</th>
<th>My Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Map Making (5) - read maps on hike &amp; make own map of ahupua‘a with 8 features and legend</td>
<td>I can find &amp; interpret map sites fully; I drew own map &amp; symbols with 80% accuracy or better</td>
<td>I can find &amp; interpret map sites adequately; I drew own map &amp; symbols with 60% accuracy or better</td>
<td>I can find &amp; interpret less than half the map sites; I drew own map &amp; symbols with more than 4 mistakes</td>
<td>____/5</td>
</tr>
<tr>
<td>2. Native Species Planting (5) – plant native species; observe &amp; record all species of flora &amp; fauna at site</td>
<td>I planted &amp; tagged species accurately; I drew &amp; listed 5 or more species at site</td>
<td>I planted &amp; tagged species accurately; I drew &amp; listed 3 or more species at site</td>
<td>I did not plant &amp; tag species accurately; I drew &amp; listed less than 3 species at site</td>
<td>____/5</td>
</tr>
<tr>
<td>3. Rock Treasure Hunt (5) – collect rock samples; hypothesize origins, uses, evolution</td>
<td>I collected 5 or more samples; identified type, origins, uses, &amp; evolution with 80% accuracy or better</td>
<td>I collected 3 or more samples; identified type, origins, uses, evolution with 60% accuracy or better</td>
<td>I collected less than 3 samples; identified type, origins, uses, evolution with less than 60% accuracy</td>
<td>____/5</td>
</tr>
<tr>
<td>4. Ahupua‘a Talkstory (10) - listen to hike guides; create Student-Made Quiz (10 questions &amp; answers, with partner)</td>
<td>We made accurate quiz recalling 80% or more of info given on cultural &amp; geological history of ahupua‘a</td>
<td>We made accurate quiz recalling 60% or more of info given on cultural &amp; geological history of ahupua‘a</td>
<td>We made accurate quiz recalling less than 60% of info given on cultural &amp; geological history of ahupua‘a</td>
<td>____/10</td>
</tr>
<tr>
<td>5. Presentation or Reflection (5) – write 75 words or more or give 2 min. speech about what was learned on hike</td>
<td>I wrote or presented clearly &amp; on topic, showing personal insight made about any hike topic</td>
<td>I wrote or presented on topic, recalling key ideas instructors said about a hike topic</td>
<td>I did not write or present on topic, or recall key ideas instructors said about a hike topic</td>
<td>____/5</td>
</tr>
<tr>
<td>6. Site Clean up (bonus) – bring trash bag to collect</td>
<td>I did a lot of extra work to collect trash &amp; preserve the area</td>
<td>I did something extra to preserve the area</td>
<td>I did no extra work to preserve the area</td>
<td>____/</td>
</tr>
<tr>
<td>7. Environmental Action List (bonus) - write what students can do to malama i ka ‘aina</td>
<td>I wrote several things that I will &amp; others can do to care for our land</td>
<td>I wrote a few things that I will &amp; others can do to care for our land</td>
<td>I did not write anything about what we can do to care for our land</td>
<td>____/</td>
</tr>
</tbody>
</table>

My total: _____/30, plus____ bonus. My grade:  A  B  C  D  F

What I did well was ________________________________________________
________________________________________________________________
What I could have done better was ____________________________________
________________________________________________________________

NAME:  CLASS:

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