



11th Grade Human Settlement Inquiry

How Can Humans Address Their Negative Impact on the Environment?



Participant photograph taken at the National Geographic C3 Framework BioBlitz that occurred at Kailua High School on May 5, 2016.

Supporting Questions

1. How do humans interact with the environment in the Kailua and Waimanalo regions/ahupua'a?
2. What is the environmental impact of human settlement activities in the history of Kailua and Waimanalo?
3. What are the spatial and environmental characteristics of the school's campus?
4. What are the spatial and environmental characteristics of the Kailua and Waimanalo ahupua'a?



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How Can Humans Address Their Negative Impact on the Environment?

Hawaii Content and Performance Standard	HCPS III.MHH. Standard 7: Geography: WORLD IN SPATIAL TERMS-Use geographic representations to organize, analyze, and present information on people, places, and environments and understand the nature and interaction of geographic regions and societies around the world.
Staging the Question	Students take pictures of their <i>ahupua'a</i> and discuss ways human settlement has had positive and negative effects.

Supporting Question 1	Supporting Question 2	Supporting Question 3	Supporting Question 4
How do humans interact with the environment in the Kailua and Waimanalo regions/ahupua'a?	What is the environmental impact of human settlement activities in the history of Kailua and Waimanalo?	What are the spatial and environmental characteristics of the school's campus?	What are the spatial and environmental characteristics of the Kailua and Waimanalo ahupua'a?
Formative Performance Task	Formative Performance Task	Formative Performance Task	Formative Performance Task
Understand	Understand	Assess	Assess
Identify and describe how humans interact with the environment in students' region/ahupua'a.	Write a paragraph using evidence that explains historical environmental characteristics of Kailua and Waimanalo.	Conduct a mock BioBlitz of the school's campus.	Participate in a BioBlitz in the Kailua and Waimanalo ahupua'a.
Featured Sources	Featured Sources	Featured Sources	Featured Sources
Source A: <i>Sites of Oahu</i> Source B: "Coastal Sand Dunes Case Study" Source C: "Ka Iwi Coast Land Should Be Protected for Native Plants" Source D: "A Walk on the Coast" Source E: Photographs, "Kailua Memories"	Sources from SQ1 Source A: "Waimanalo Watershed"	Source A: iNaturalist Website and App	Sources from SQ3

Summative Performance Task	ARGUMENT How can humans address their negative impact on the environment? Construct an argument in the form of a proposal (e.g., detailed outline, poster, essay) that discusses the compelling question using specific claims and relevant evidence from contemporary and historical sources while acknowledging competing views.
	EXTENSION Create a visual representation of the written proposal to share with members of their classroom, school, and/or community at large.
Taking Informed Action	ACT Students implement their individual proposals.



Overview

Inquiry Description

This inquiry leads students through an investigation of human-environment interactions using the ahupua'a of Waimanalo and Kailua as a case study. By investigating the compelling question, students examine the environmental particulars of their region, the ways in which humans have historically interacted with the environment, and the current environmental characteristics. This inquiry embeds the Taking Informed Action sequence, wherein students understand and assess the impact of the human-environmental relationship and act on their proposals to address the negative impacts of human settlement.

In addition to the Hawaii Content and Performance Standard listed previously, this inquiry highlights the following C3 Framework Conceptual Understandings:

- **D1.1.9-12.** Explain how a question reflects an enduring issue in the field.
- **D2.Geo.6.9-12.** Evaluate the impact of human settlement activities on the environmental and cultural characteristics of specific places and regions.
- **D2.Geo.1.9-12.** Use geospatial and related technologies to create maps to display and explain the spatial patterns of cultural and environmental characteristics.
- **D3.3.6-8.** Identify evidence that draws information from multiple sources to support claims, noting evidentiary limitations.
- **D4.2.9-12.** Construct explanations using sound reasoning, correct sequence (linear or non-linear), examples, and details with significant and pertinent information and data, while acknowledging the strengths and weaknesses of the explanation given its purpose (e.g., cause and effect, chronological, procedural, technical).
- **D4.8.9-12.** Apply a range of deliberative and democratic strategies and procedures to make decisions and take action in their classrooms, schools, and out-of-school civic contexts.

NOTE: This is a three-week inquiry. The inquiry time frame could expand if teachers think their students need additional instructional experiences (i.e., supporting questions, formative performance tasks, and featured sources). Inquiries are not scripts, so teachers are encouraged to modify and adapt them to meet the needs and interests of their particular students and region. Resources can also be modified as necessary to meet individualized education programs (IEPs) or Section 504 Plans for students with disabilities.

Inquiry Context

This *National Geographic* BioBlitz inquiry is the result of professional collaboration between the Hawaii State Department of Education Kailua High School, the University of Hawai'i College of Education Institute of Teacher Education, the University of Hawai'i Uehiro Academy for Philosophy and Ethics in Education, and the University of Hawai'i National Geographic Alliance. It was designed for secondary social studies students who enrolled in Modern History of Hawaii (MHH) and Ethnic Studies (ES) courses at Kailua High School.

In the spring semester of 2016 seven Kailua High School teachers, including University of Hawai'i College of Education Secondary Social Studies teacher candidates planned and carried out this *National Geographic* BioBlitz inquiry with approximately two hundred and fifty MHH and ES students. In this inquiry, students are introduced to a compelling question, develop questions and plan their inquiry, apply disciplinary concepts and tools related to the field of geography, evaluate sources (both primary texts and data from a BioBlitz), use evidence, communicate their conclusions, and take informed action.



The BioBlitz portion of the project occurred on May 5, 2016 between 8:00am and 1:00pm. On this date, Kailua High School teachers in three different cluster groups worked alongside additional experts (e.g., biologists, botanists, and cultural experts) to support students as they gathered data in a five different geographic regions (Ka Iwi Coast, UH CTHAR Waimanalo Research Station, Ulupo Heiau, Na Pohaku and Kahana Iki) located in the Kailua and Waimanalo ahupua'a.



Staging the Compelling Question

Compelling Question	How can humans reverse their negative impact on the environment?
Staging Task	Students take pictures of their <i>ahupua'a</i> and discuss ways human settlement has had positive and negative effects.

THE COMPELLING QUESTION “How can humans address their negative impact on the environment?” asks students to understand and assess the relationship between human settlement and the environment, while finding solutions to address the repercussions. To prepare students for this inquiry, teachers provide students with an overview of the project, including an introduction to the compelling question, as well as the definitions of key terms used throughout the inquiry. For example, the class should work to define “geographic region” in relationship to the Hawaiian concept of “ahupua'a.” Ahupua'a is the Hawaiian term for a large traditional socioeconomic, geologic, and climatic subdivision of land. Students are introduced to their ahupua'a by locating their home and school on the *Sites of Oahu* ahupua'a map. (See Supporting Question 1 sources)

To hook students into the compelling question, they are asked to take and present photographs to their class to display the geographic region in which they live. Their photographs should depict the interaction between humans and the environment in their particular ahupua'a. Ideally, they should illustrate how the region has changed since the account of the region documented in *Sites of Oahu*. They present their photographs to the class and discuss them with their peers. Teachers facilitate the sharing of these photographs by using terminology from the discourse of geography (e.g., nature, interaction, and impact of the society/population on their physical environment).



Supporting Question 1

Supporting Question	How do humans interact with the environment in the Kailua and Waimanalo regions/ahupua'a?
Formative Performance Task	Identify and describe how humans interact with the environment in students' ahupua'a.
Featured Sources	<p>Source A: <i>Sites of Oahu</i></p> <p>Source B: "Coastal Sand Dunes Case Study"</p> <p>Source C: "Ka Iwi Coast Land Should Be Protected for Native Plants"</p> <p>Source D: "A Walk on the Coast"</p> <p>Source E: Photographs, "Kailua Memories"</p>

Supporting Question

The first supporting question—"How do humans interact with the environment in the Kailua and Waimanalo regions/ahupua'a?"— supports students and teachers as they unwrap the factors impacting their region. They do so by defining the term "geographic region" in relationship to the Hawaiian concept of "ahupua'a."

Formative Performance Task

The formative performance task calls on students to identify and describe how humans interact with the environment in their ahupua'a. Teachers help the students describe the impacts that societies/populations have had on the physical environment in the Kailua and Waimanalo ahupua'a by using before/after images. Teachers present a number of case studies (from both the students' local region and outside the region) that illustrate historical and contemporary examples of the negative and positive impacts that societies/populations have had on their physical environment globally (e.g., Coastal Sand Dunes Case Study) and locally (e.g., Ka Iwi Coast Preservation).

Featured Source A is an ahupua'a map from *Sites of Oahu*. *Sites of Oahu* contains descriptions and maps of the geographic regions of Kailua and Waimanalo. It also contains a compilation of primary source documents that describe how the geographic regions were historically used and the cultural significance of each region. Students should locate their ahupua'a and their home and school on this map. In Featured Source B, a "Coastal Sand Dunes Case Study," the impact of human settlement on the Stockton Bight Sand Dunes in Australia provides students a framework to consider the many ways humans and the environment interact. Featured Source C, an article from the *Honolulu Star-Advertiser*, presents the detrimental impact to plant life posed by development in Hawaii. Featured Source D, "A Walk on the Coast," is an article from the *Honolulu Star-Bulletin*, which describes some of the impacts of development on the landscape. Featured Source E, a collection of photographs of Kailua, presents both historical and present day photographs of the Kailua ahupua'a, illustrating human interactions with the environment.



Supporting Question 1

Featured Source

Source A: Elspeth P. Sterling & Catherine C. Summers, book, *Sites of Oahu*, 1997, p. 227-259.

See page 257 for Oahu ahupua'a map.

Accessed from: <https://s3.amazonaws.com/idm-dev/u/a/3/5/3/737/a353c4a0bf36cecde13876526d3e49276c31ed47.pdf>



Supporting Question 1

Featured Source

Source B: Steven Newman, webpage, "Coastal Sand Dunes Case Study," *Ecosystems at Risk: Case Study*, 2016.



Accessed from: http://www.mrstevennewman.com/geo/Stockton/Human_Impacts/main.htm



Supporting Question 1

Featured Source

Source C: Heidi Bornhorst, article, "Ka Iwi Coast Land Should Be Protected for Native Plants," *The Honolulu Star-Advertiser*, September 21, 2015.

The community is coming together to preserve the beautiful Ka Iwi mauka lands, 182 acres between the golf course and Makapuu.

We must band together to keep open this wild eastern end of Oahu and protect it from the poor planning and overdevelopment that has plagued the rest of the island.

Wild, open, undeveloped land is something we all need, where nature and open views to the ocean are visible and accessible.

For more than 40 years, the community has battled to keep this area free of development. Every time we thought that we had "won," some new money would come in and people would try to develop the aina for prot.

Now nally we have a victory. The Trust for Public Land and the Livable Hawaii Kai Hui will jointly manage the lands and will help sew up all the details of caring for and managing the aina here.

When we were rst learning about native Hawaiian plants, this was a great introduction. One of my favorites, which used to grow in the area in abundance, is mao, or Hawaiian cotton, *Gossypium tomentosum*.

We used to see the silvery leaved shrubs, with cheerful yellow owers, driving by. If you got out and hiked, you could see them up close and admire the gorgeous, almost fakely perfect when freshly opened, owers.

Some of us from Honolulu Botanical Gardens would then collect the fuzzy, copper- colored seeds so we could grow plants and perpetuate the mao.

Accessed from: <http://www.staradvertiser.com/features/ka-iwi-coast-land-should-be-protected-for-native-plants-2/%C2%A0>.



Supporting Question 1

Featured Source

Source D: Greg Ambrose, article, "A Walk on the Coast: A Hike along the Kaiwi Coast Displays the Spectacular Natural Beauty of an Area that's Perched on the Edge of Development," *The Honolulu Star Bulletin*, October 14, 1996.

THE sunrise gently peels away the cover of darkness, revealing a breathtaking vista of the lower Windward side from the cliffs above Makapuu Beach. With a little exertion you have a commanding view from Rabbit Island all the way to the Mokapu peninsula, including the sharp peak of Mount Olomana and the sheer, emerald cliffs of the Koolaus stretching to Kahaluu. There is little evidence of human habitation. As the sunrise glows on the beaches of Waimanalo, with a little imagination you can convince yourself you're on a French Polynesian or Micronesian paradise, and not on the most densely populated island in the eastern Pacific. Climbing higher, the view becomes impossibly stunning, as you pause to contemplate the scene, a thought comes to mind that you too seldom have occasion to think these days: Lucky you live Hawaii. The rocks provide a chronology of the history of this area. You can almost see the molten lava flowing into the ocean and hear it explode as it hits the cool ocean. There is little to mark the passage of the ancient Hawaiians, who traveled lightly and made little lasting impression upon the land. *'Gated' lookout points allow a grand view from above the Makapuu lighthouse.* The stone image the supernatural woman Makapuu and another stone image of Malei vanished years ago, but there are still remnants of heiau, fishing shrines and canoe shelters in Kealakupapa Valley on the other side of the Makapuu cliffs. Cliffside concrete bunkers bring to the imagination nervous GIs, author James Jones and his fellow soldiers anxiously scanning the horizon for the Japanese invasion fleet that they were sure would sail into sight any day and finish what they started at Pearl Harbor. Past the summit, there are foundations of buildings that housed Coast Guard members who tended the Makapuu Lighthouse, buildings later occupied by Bumpy Kanahele and his followers until police surprised them before dawn and carted them off to jail.

Finally, firmly entrenched on the edge of the cliff are new steel railings and concrete platforms, protecting the unwary as they admire the view. Seabirds ride the air currents effortlessly they commute to a long day of fishing while along nearby Kalaniana'ole Highway a steady stream of cars carries workers toward town. At the highest part of the cliff, the illusion of solitude - already tarnished by the highway - is further eroded as the elevation displays the hundreds of houses crawling up Kamehame Ridge. The cluster extends all the way to the distant Black Point at the foot of Diamond Head. Daniel Kim regularly makes the climb to the lookout before dawn with his wife and dogs to greet the sunrise and meditate. The Kahala dive instructor was dismayed to learn of plans to fill the valley and ridges with houses, a hotel and a golf course. "They would take away the last special place in the area." The descent from the cliffs leads into Kealakupapa Valley with its austere simplicity usually found in deserts. But the little movements, little tracks, the drift of the clouds and the blowing of the wind catch the attention. It's a rugged environment where hardy succulents cling to the rocky soil and shrug off the relentless salt spray. Beach naupaka provides a dash of color with their green leaves and white berries. Kiawe and haole koa trees add more greenery in the sun-seared landscape, and the sight of the plants and animals struggling to live in the harsh environment gives a new appreciation for the tenacity of life.

It wasn't always this way. Kealakupapa Valley was once the site of an ancient Hawaiian village called Wawamalu, which means shady valley. It was famous for growing yams and sweet potatoes to provision whaling ships.

Corporate official Alan Sanford Davis, a head trustee of Campbell Estate, built a beautiful home and in the valley and called it Wawamalu Ranch. But on April 1, 1946 a tsunami raged through the valley and waves ripped away the ranch and scattered pieces as far away as Hanauma Bay and Kalama Valley. The tsunami also left boulders in the valley and coated it with salt, leaving it barren. But there are also unique native and endangered species here, archaeological sites of cultural significance, including the old king's highway, and sites known to Hawaiian legend.



The walk along the rutted dirt road toward Queen's Beach belie evidence of humanity. Corpses of cars riddled with bullets quietly bleed rust. An incredible amount of rubbish is tossed about: shoes, clothes, huge nylon fishing nets and gear, glasses and cups, nylon nets, a whole oven and the hand cart that was used to carry it.

At times on the weekend, the solitude is shattered by off-road vehicles and dirt bikes roaring around, tearing up plants and digging ruts, sneaking by the barriers the landlord has erected. The giant pohaku (stone), high on the cliff that guards the beginning of Makapuu Point, has been tagged by teen-agers to immortalize their fleeting romances or proclaim 'Yes, I am somebody!' At the end of the long dirt road is a little bay, a sheltered cove where the sand has more bird tracks than human footprints. Once again traffic noisy is buffered by the roar of waves as they smash ashore, covering the black lava rocks briefly in white. Here, the tension of city life evaporates, and lines of worry ease from the face. You can breathe deeply and pause to ponder the world around you, to enjoy a sublime sense of solitude, see things you've never noticed before. *Salt from a tsunami's waters years ago has made this portion barren although there is some greenery.* You are away from the hustling and bustling of humanity crammed cheek to jowl and bumper to bumper on this little island. There aren't many places near Honolulu where you can breathe freely, temporarily free from being crammed into prisons of our own creation. Nearby, mangrove trees line the shore of the estuary that separates the two sides Queen's Beach. As you walk through, you have the feeling that at any moment an alligator might lunge out of the shallows. At the old Wawamalu Bridge, look one way and you see the magnificent sweep of the cliffs at Makapuu, look the other and you see the artificially landscaped and watered golf course and golfers happily putting away. Look again and there is the bulwark of the backside of Koko Crater; turn your head the other way and the ocean awaits. Finally, at Wawamalu Beach the lava rocks give way to white sand and invitingly blue water, with tide pools in the rocks teeming with sea life for children to discover and waves that can snatch the unwary right off the rocks. A miniature blowhole erupts and spews sea spray into the air with each wave, an attraction most tourists and residents never see. Cindy and Lisa Ichioka are among the few who do. When they returned to visit Hawaii from their new home in Florida they head straight for Wawamalu Beach. In small-kid times, their father use to bring them them to Wawamalu to play.

They return to Wawamalu because it's the only place on Oahu that hasn't changed over the years. So the young sisters are horrified to learn that change threatens the valley and ridges with a proposed golf course, homes, hotel and industrial complex. "We don't need any more golf courses," Cindy says indignantly. "There are so few untouched places. There is no traffic, no tourists, no tall highrises." "This is why we came here," her sister adds quietly. *Wawamalu Beach has long been a favorite fishing spot for Richard Tamaoka, above, and his brother Kelly. "Too much city, not enough Hawaii," said Kelly, when told of the proposed development. "There is no place else to go" said Richard. "This is the last frontier."* Kelly and Richard Tamaoka drive out to Wawamalu Beach from the Ala Moana area often. The two elderly but spry brothers cast lines into the surf, catching reef fish and putting them in tide pools to keep them alive. It has been their favorite spot for decades. They, too, are aghast when told of the proposed development for the area. "That will be the end for us," says Richard. "There is no place else to go. "Too much city, not enough Hawaii," says Kelly. Says Richard, "This is the last frontier."

Accessed from: <http://archives.starbulletin.com/96/10/14/features/story1.html%C2%A0>



Supporting Question 1

Featured Source

Source E: Dennis Hollier, photographs, "Kailua Memories," *Honolulu Magazine*, 1997.

Sample Image: The Kailua Theater



Accessed from: <http://www.honolulumagazine.com/Honolulu-Magazine/Kailua/Kailua-Memories/>



Supporting Question 2

Supporting Question	What is the environmental impact of human settlement activities in the history of Kailua and Waimanalo?
Formative Performance Task	Write a paragraph using evidence that explains historical environmental characteristics of Kailua and Waimanalo.
Featured Sources	Sources from SQ1 Source A: “Waimanalo Watershed”

Supporting Question

For the second supporting question—“What is the environmental impact of human settlement activities in the history of Kailua and Waimanalo?”—students build on their exploration of interaction with the environment in their ahupua’a to consider the environmental impact of historical factors. The purpose of this supporting question is to help students as they generate questions, evaluate sources, and use evidence to determine the historical/environmental characteristics of their region so that they have an evidence-based starting point for thinking about the impact of human settlement activities on the Kailua and Waimanalo ahupua’a over time.

Formative Performance Task

Based on the pictures that the students took of their geographic region/ahupua’a and data from the case studies provided in the previous supporting question, students use the [Good Thinker’s Tool Kit](#) to generate five questions that they want to guide their learning. Next, the students use the *Sites of Oahu* text to help answer their questions. Depending on their particular questions, they might also have to find additional sources to supplement this part of the inquiry. Based on the sources and the answers to their questions, students write a paragraph using evidence that explains the historical environmental characteristics of the region they live in: Kailua or Waimanalo.

In addition to the previous sources from the first performance task describing the history of these geographic regions, students read Featured Source A, *Waimanalo Watershed-Portable Water* to stimulate thinking and discussion about the possible negative impacts that human settlement has had on the region. Doing so leads students and teachers into a [Plain Vanilla Deliberative Inquiry](#) related to the negative and positive interactions between societies/populations and their physical environment.



Supporting Question 2

Featured Source

Source A: "Waimanalo watershed: Potable-water," web article, modified from Marine Corps Base Hawaii, Kaneohe. *Mokapu: Manual for Watershed Health and Water Quality*, Section 3.5, 1998.

Unlike the watersheds of [Kâne'ohe](#) and [Kailua](#), the Waimânalo watershed has retained much of its rural character. Waimânalo's water resources were historically diverted from areas in Kailua (e.g., upper Maunawili Valley) for agriculture. Prehistoric burial sites and ancient Hawaiian villages have been recorded near the shoreline, which, along the central portion of [Waimânalo Bay](#), consists of beach sand backed by a series of dunes that are among the most extensive on O'ahu. The reef platform off Waimânalo is well developed although somewhat submerged.

Wailea Point (also known as Popo`oka`ala) is a volcanic headland marking the western end of Waimanalo Bay. Seawalls line the shoreline around the Point, and their presence has probably contributed to loss of sand in several shoreline sections nearby (Clark, 1977). (1)

One of the most visible features along Waimânalo Bay is Waimânalo Beach, which, with an overall length of nearly 5.5 mi (8.8 km), is the longest stretch of sandy shoreline on O'ahu. Waimânalo Beach is a popular sun-bathing and swimming area, especially where its sandy bottom slopes gently offshore. Lithified dunes occur on the alluvial plain behind the beach. Located just north of Waimânalo Beach, Bellows Air Force Station, with its several ditches, streams, and wetland areas, provides habitat for endangered waterbird species. Shoreline access permits moderate to heavy fishing for *ulua*, *pâpio*, *weke*, and *'ô'io* along the length of [Waimânalo Bay](#).

Waimanalo Valley, long a sugar plantation and now [1972] a ranch, had less wet taro in olden days, being blessed with only one stream. Yet much of what was until recent years sugar-cane land had previously been planted in taro. There were evidences in 1935 of old *lo`i* much further inland, in a semicircle at the back of the broad valley. *Akama`aina* of the place at that time named nine such *lo`i* sections whose water came from springs.

Levi Chamberlain is quoted (Sterling and Summers, 1962, BK 5, Vol. 2, p. 344) as reporting in 1828 the location of a small and quite poor fishing village near the beach,

toward Makapu`u Point from the present Waimanalo town, just beyond which there was a pool named *Kawai-kupanaha* where these people got their fresh water. This has since been covered by the roadway. It is probably adjacent to this site that the remains of a fishing shrine (*ko`a*) are visible on a point of land just offshore, surrounded by water at high tide (McAllister, 1933, p. 195).

Beyond the old plantation town of Waimanalo and toward Makapu`u Point is a narrow stretch of land lying between the dry windward face of this southeast end of the Ko`olau range and the sea, the name of which was Ko`o-o-na-pou (mistakenly called Kaupo in recent times). This was a sweetpotato planting area. A village was established here by

a *kahuna* who had a peculiar grass house with two rooms: the front room into which visitors came; and his private room behind this, which abutted on a low cave with a rather thin roof of lava shaped like a flat dome. In this little cave the *kahuna* kept his paraphernalia. The site was exposed to heavy winds, so the house frame was braced by heavy props (*ko`o*) that held the posts (*na pou*) secure against the winds of the sea. The village and the land took their descriptive names from this house.



The scattered rocks where the house had been and the little lava dome were carried off during World War II, and likewise the stones of a fisherman's *heiau* on the rocky foreshore where the beach begins, named Ka-ala-pueo.....

Ka-ala-pueo (Rallying-of-the-owls) was the last settlement near Makapu`u Point, and consisted of only a few fishermen's huts.

Offshore lies Manana, the true name of the little gray volcanic island shaped somewhat like a crouching or recumbent animal and now popularly called "Rabbit Island." It has very little vegetation, and yet is the home of numerous wild rabbits [in 1972]. Just off its shore is a rock named Ka-ipu (The-cup) because of a depression in its top surface which held water coming from the waves breaking over it. On this rock there was another fishing shrine. (2)

Waimânalô in Hawaiian means "potable, or sweet water." Seasonal discharges from Puhâ Stream, which drains a primarily agricultural area, contribute to poor water quality along the shore. Net fishing for crabs, throw-netting, and bait-collecting occur where this stream enters the bay. The bay is influenced to a larger extent by Waimânalô Stream, which flows perennially, although there are several diversions in the upstream valley. The channelized mouth of this stream is estuarine.

(1) AECOS, Inc. 1979. Hawai`i Coral Reef Inventory. Island of O`ahu (OCRI). Part B - Sectional Map Descriptions. U.S. Army Engineer District, Honolulu. p. 36

(2) E. S. C. Handy, E. G. Handy, and Mary Pukui. 1972. *Native Planters in Old Hawaii. Their Life, Lore, and Environment*, Bernice P. Bishop Museum Bulletin 233: p. 457-459

Accessed from: http://www.koolau.net/watershed_11.html



Supporting Question 3

Supporting Question	What are the spatial and environmental characteristics of the school’s campus?
Formative Performance Task	Conduct a mock BioBlitz of the school’s campus.
Featured Source(s)	Source A: iNaturalist website and app

Supporting Question

For the third supporting question—“What are the spatial and environmental characteristics of the school’s campus?”—students take their understandings of the human-environmental relationship of their ahupua’a and connect them to the contemporary characteristics of their school’s campus.

Formative Performance Task

To address this question, the performance task guides students through the process of learning how to use the iNaturalist app and website to display and explain current spatial patterns and the contemporary environmental characteristics of the Kailua and Waimanalo ahupua’a.

This performance task helps prepare students for the official BioBlitz that they conduct off campus during this inquiry by having them practice on their high school campus. The first featured source for this task is the iNaturalist app and website, which allows students to catalogue and share observations of flora and fauna. It also explains procedures for the cataloguing of data during BioBlitz events.



Supporting Question 3

Featured Source

Source A: BioBlitz Guide, webpage, *iNaturalist*, 2016

Excerpt

What is a BioBlitz?

A BioBlitz is a communal citizen-science effort to record as many species within a designated location and time period as possible. BioBlitzes are great ways to engage the public to connect to their environment while generating useful data for science and conservation. They are also an excuse for naturalists, scientists, and curious members of the public to meet in person in the great outdoors and are a lot of fun!

Why Should I Use iNaturalist for my BioBlitz?

Encourage Public Participation

Public participation is what separates BioBlitzes from traditional biological inventories. iNaturalist makes it easy for anyone to genuinely participate in your BioBlitz by recording observations.

Create high quality data

Who says BioBlitzes are just about outreach? Because iNaturalist observations are independently identified and verified as research-quality data, your BioBlitz, no matter how small, will contribute directly to science.

Make tallying your species count easy

iNaturalist will automatically tally a species count for your BioBlitz and provides many tools for visualizing and communicating BioBlitz results to participants and onlookers.

Accessed from: <http://www.inaturalist.org/pages/bioblitz+guide>



Supporting Question 4

Supporting Question	What are the spatial and environmental characteristics of the Kailua and Waimanalo ahupua'a?
Formative Performance Task	Participate in a BioBlitz in their ahupua'a.
Featured Source(s)	Sources from SQ3

Supporting Question

The fourth supporting question—"What are the spatial and environmental characteristics of the Kailua and Waimanalo ahupua'a?"—students expand their assessment of the human-environment interaction to include their larger ahupua'a.

Formative Performance Task

The resources from the previous supporting task assist students as they catalogue and share observations of flora and fauna in the BioBlitz event at one of five sites in the Waimanalo and Kailua regions.



Summative Performance Task

Summative Performance Task	ARGUMENT How can humans address their negative impact on the environment? Construct an argument in the form of a proposal that addresses the compelling question, using specific claims and relevant evidence from historical and contemporary sources, while acknowledging competing views.
	EXTENSION Students create a visual representation of their written proposal that will be shared with members of their classroom, school, and/or community at large.
Taking Informed Action	ACT Students will implement their individual proposals.

At this point in the inquiry, students have examined the geographic and historical particulars of their region, with consideration as to how human settlement has impacted the environment over time. Their work included assessing the current conditions of their region at a school and community level. Now, they compare their historical understanding of the region with the contemporary data that they gathered during the BioBlitz and draw conclusions about how they might address the negative impact of humans in their geographic region.

Students should be expected to demonstrate the breadth of their understandings and their abilities to use evidence from multiple sources to support their claims. In the form of a proposal with a plan for action, students construct an evidence-based argument using multiple sources to answer the compelling question “How can humans address their negative impact on the environment?”

Students’ arguments will likely vary, but could include any of the following:

- Based on the decreasing amounts of native plants found in Kailua over the past 100 years, I plan to plant native plants on the Kailua High School campus.
- Given the increasing amounts of invasive species in the Waimanalo watershed over the past 100 years, I plan to participate in a local stream clean up to remove invasive species from the stream.
- Now that I have evidence of the negative impact that housing development has had on important Hawaiian cultural sites, I plan to write a letter to the editor about the significance of particular Hawaiian cultural sites in my ahupua’a and what we can do as a community to preserve them.

To extend their arguments, students can create a visual representation of their written proposal to be shared with members of their classroom, school, and/or community at large. This visual representation can be a PowerPoint or Prezi presentation. It could also be a short video or poster. The students should think about their intended audience when constructing the visual representation of their proposal.

Students have the opportunity to Take Informed Action by using the information from the inquiry to create a proposal that would address negative ways in which human settlement has impacted the local environment. Students demonstrate that they *understand* how humans have interacted with the local environment through their work on Supporting Questions 1 and 2, while they *assess* its impact in Supporting Questions 3 and 4. Students *act* by each creating and implementing a proposal that would address the negative impact. This task can be done in addition to, or as a substitute for, the Summative Performance Task.