

<b>Issue Area/ Problem Statement</b>	<b>PROTECTING GUAM'S REEFS THROUGH REEF HEALTH MONITORING</b>		<b>Point of Contact:</b> Kina-Doreen Lewis <b>klewis@pacifichistoricparks.org</b> 777-4301 or 477-7278 ext. 1017
Age Group	14 to 18		
Project Description	<b>LEARN:</b> Classroom training to learn about coral ecology, the various threats to our coral reef ecosystem, marine species identification, scientific monitoring methods, analyzing and interpreting data, safety (1st Aid, CPR & AED and water safety), and mentorship and effective public speaking	5+ hours	
	<b>SERVE:</b> Participate in in-water snorkeling monitoring events scheduled throughout the year and gather data on the health of coral and other marine species in and around our reef systems	10 hours	
	<b>INSPIRE:</b> Create public presentations such as Public Service Announcements (PSA) in video and print formats, Blogs, trifold boards, or other types of or formats for presentations and share their experiences, observations, and data gathered with the general public or their peers in public venues and during park public events.	10 hours	
Agency/Program Description	War in the Pacific National Historical Park (WAPA) is the western most park of all the National Park Service (NPS) units. It was created to honor all those who participated in the campaigns of the Pacific Theater of World War II and to conserve and to interpret the natural, scenic, and historic values and objects on the island of Guam. With over 1000 acres of submerged lands and 800 acres of public lands, the park units serve as the opportune environment to increase the awareness of conservation of a variety of animal and plant species and their habitats on land and underwater. War in the Pacific National Historical Park's dedication to educating the community on Guam about the park's mission and valuable resources has been an ongoing endeavor. Over the years working in collaboration with Pacific Historic Parks (PHP), the parks non-profit cooperating association, educational programs have exponentially enhanced the parks missions, presence, and contributions to the island community of Guam.		
No. of Participants	30		
Problem Statement	There are many threats to Guam's coral reefs. The effects of climate change being the most eminent threat. The increasing temperature of the ocean causes coral to bleach, which weakens the health of the corals to the point of death. The health of our reefs need to be monitored to ensure their existence and there are not enough scientists available to gather the data needed, students assisting them with this is a great way to help the scientific community and their community as well.		
School Subject	<p><b>Science:</b></p> <p><b>PS.1.5</b> Demonstrate by actions in the school community caring and respect for the environment and the physical world.</p> <p><b>PS.5.1</b> Use computers to produce tables and graphs for physical science information, make spreadsheet calculations, and prepare reports of investigations and findings.</p> <p><b>BI.1.3</b> Defend and support conclusions and explanations based on evidence from data and scientific knowledge.</p> <p><b>BI.2.1</b> Describe cycles within ecosystems, such as the water cycle or the nitrogen cycle.</p> <p><b>BI.2.2</b> Explain the chemical reactions that occur in photosynthesis and cellular respiration that result in the cycling of energy.</p> <p><b>BI.2.3</b> Identify and describe specialized cellular parts for the transport of materials, energy capture and release, protein building, waste disposal, information feedback, and movement. In addition to these basic cellular functions, understand that cells in multicellular organisms perform specialized functions.</p> <p><b>BI.2.4</b> Describe the flow of matter, nutrients, and energy within ecosystems.</p> <p><b>BI.2.5</b> Explain dynamic equilibrium in organisms, populations, and ecosystems; explain the effect of equilibrium shifts.</p> <p><b>BI.2.7</b> Understand and explain the significance of the introduction of species, such as the brown tree snake and other invasive species into Guam's ecosystem, and describe the consequent harm to native species and the environment in general.</p> <p>English/Math/Chamorro/Geography/Other (Please contact me for additional standards)</p>		
Activity Level	Moderate		
Cost/Materials	FREE: Snorkel gear, water booties, and life jackets will be made available to be borrowed for each participant (provided by NPS)		
Activity Title	<b>Preservation Rangers Reef Health Monitoring Program</b>		

Prerequisites	The learn portion of the training needs to be completed PRIOR to in-water snorkel monitoring. MUST BE ABLE TO SWIM AND MAKE A COMMITMENT TO COMPLETE TRAINING AND 3 IN-WATER MONITORING ACTIVITIES AND 3 OUTREACH PRESENTATIONS.	
Conditions to Consider	NPS OF301a Volunteer Agreement, Preservation Ranger Application and commitment form need to be completed and signed, participants under 18 a parent/guardian signature is also required. Special medical conditions of students need be to be clarified ahead of time.	
Project Dates	Will be announced	
Objective(s)	<p>1) Understand the importance of the island's coral reefs as a natural resource</p> <p>2) Understand significance of community stewardship in natural resource management through science</p> <p>3) Survey, locate and collect data on various marine species: i.e. giant clams, algae, sea grass, invertebrates, coral, and substrate.</p> <p>4) Give presentation or create Public Service Announcements regarding coral reef or other natural resources threats.</p>	
Location(s)	Classroom Training	<i>On Campus:</i> The learning portion of training can be accommodated in your classroom.
		<i>Off Campus:</i> War in the Pacific National Historical Park can also host a learning session at their Hagatna office.
	In-Water Training & Monitoring Surveys	<i>Off Campus:</i> Asan Beach & Adelup Governor's complex
Research Pre-Activity	Write down, blog or vlog about your experiences or knowledge of the ocean, coral reefs or other marine organisms prior to participating in the event.	30 mins.
Activity	-Students are required to participate in the Reef Health Monitoring Training, which can either be held in the classroom setting or at another venue arranged by the facilitators. Students will learn about climate change, coral ecology, marine organisms commonly found in Guam's reef flats, their functions and how to identify them, scientific monitoring methods to monitor coral bleaching and for identifying macroinvertebrates and benthic substrate, and safety protocols that need to be followed when participating in the in-water snorkeling activity. They will also be given a lesson on public speaking, learn about how to give presentations to the public about what they are learning and how they can share their findings and experiences, how to make a public service announcements and the protocols to follow to complete these presentations.	4 to 6 Hours
	1 <sup>ST</sup> Aid, CPR & AED certification course, and Basic Water safety training MUST be completed in order to receive a completion certificate. These training opportunities will be scheduled.	4 to 6 Hours
	In-water monitoring events will be scheduled on a regular basis and the students must commit to participating in at least 3 in-water snorkeling events to complete the program.	4 to 5 Hours
	Students will be required to wear a life jacket, booties/tabis, snorkel and mask, and fins while participating in the in-water monitoring event and NPS will provide all of that equipment for them to use during the event. Marine forecast and conditions monitored and considered day of event by lifeguard. The students will snorkel along a transect line and use the scientific monitoring methods taught to them at the training. A Life Guard, Life Guard Assistant, and adult 1 <sup>st</sup> Aid, CPR & AED certified in-water supervisors with a 5:1 ratio will be present during in-water snorkel monitoring events and will be provided by NPS and PHP.	
Action		

Reflection	Post-Activity Individual/Group	<p><b>Science</b></p> <ul style="list-style-type: none"> <li>- Connect your visual observations &amp; data collection to threats to Guam’s coral reefs. Reflect on field experience.</li> <li>-How do activities in the watershed impact our coral reefs? Support explanations with field observations.</li> <li>- Is there a more diverse and healthy population of tridacna or other macro invertebrates in marine preserves?</li> </ul> <p><b>Math</b> – Input data results into MS Excel spreadsheet and CoralWatch’s online database. Generate charts/graphs. Reflect on field experience and connect with chart results (use percentage/ratios).</p> <p><b>Ed. Tech</b> -Student/Group will be taught how to make a map using a Google maps app to show where the giant clams are located and where they occur the most within the transect lines.</p> <p><b>English</b></p> <ul style="list-style-type: none"> <li>-What impacted you most Classroom/In-Water Training? Why?</li> <li>-Are marine preserves effective in protecting coral reefs and other marine organisms?</li> <li>-Write letters to lawmakers regarding issues surrounding coral reef preservation and protection. E.g.: More conservation enforcement patrol.</li> </ul> <p><b>Civic engagement-</b></p> <ul style="list-style-type: none"> <li>-Mentor younger youth using knowledge gained from Classroom Training and In-water field experiences.</li> <li>-Serve as a role model for responsible stewardship of the environment.</li> <li>-Write letters to government officials advocating for the preservation of marine environments and species.</li> </ul> <p><b>Chamorro</b></p> <ul style="list-style-type: none"> <li>– Are any of marine species surveyed harvested locally?</li> <li>- What are they harvested for?</li> <li>-What are their local names, do they have cultural significance?</li> <li>-What is the significance of different types of marine species to the Chamorro culture and diet?</li> </ul> <p><b>Drama/Theater</b> – Create puppet shows or videos teaching environmentally responsible habits.</p>	1-2 hours Will vary by subject.
	Celebration	Media Product	<p><b>Technology</b> – Create Public Service Announcements (PSAs) in video, print or other digital formats regarding coral bleaching, protecting our reefs, etc...</p> <ul style="list-style-type: none"> <li>-Share with school/village community/public/social media</li> </ul>
Group Presentation		<p>Create presentation to display data collected and explain findings to Audience and present these in different public venues such as Science Sunday, Interpretive programs, etc...</p> <ul style="list-style-type: none"> <li>-Analyze data collected from site</li> <li>-Include photos of process</li> </ul>	3+ hours (Prep) 20+ min presentation
Teacher Notes			