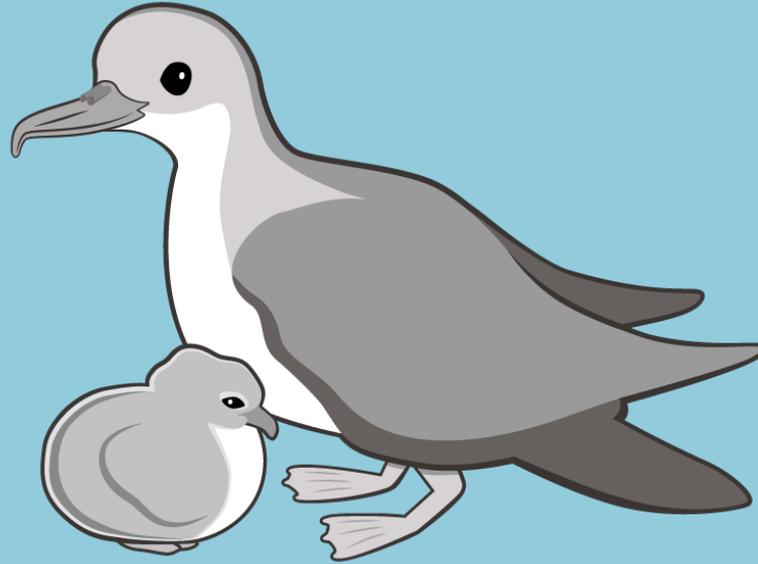


Lesson 4 Engage

Art & Science: Conservation Design



WAY OF THE **WEDGIE**

Survival Lessons
from a Seabird Preserve

Blending Science and Art

California College of the Arts



Oikonos Ecosystem Knowledge



Seabird Nest Program

A collaboration between seabird researchers and artists from California and Hawai'i.



Seabird Nest Program

The primary goal of this collaboration is to create artificial shelters that will maximize protection for nesting shearwaters: eggs, chicks and adults.



A secondary goal is to allow researchers to access the chicks in the nest sites.

Goals of the Clay Shelters

- Provide nesting sites for burrow-nesting seabirds
- Create designs to protect seabirds from predators
- Create durable designs to protect against collapse



A shearwater chick inside of a collapsing underground nest site

Why Use Clay?

- Clay consists of tiny natural mineral particles found in soil, made from degraded rocks
- Commercially available and relatively inexpensive
- It is moldable when wet, and can be sculpted into different shapes
- When fired in a kiln, clay turns into durable ceramic, which can persist for 1000s of years



Properties of Clay as Building Material

Clay is an ideal building material for shearwater nests:

- Fired clay is impermeable and keeps rain water out
- Thick clay is very insulating (e.g., adobe houses)
- Light-colored clay reflects the heat from incoming sunshine (e.g., roof tiles)
- Eventually, breaks down into silt (fine-grained sand)



Benefits of Clay Shelters

- Durable
- Easy to transport
- Will not collapse if stepped on by humans
- Resemble natural burrow: tunnel entrance leads to closed nesting chamber
- Light color reflects incoming solar radiation and heat
- Built to last over 50 years
- Requires no maintenance



Design Challenges

- Keep inside of nest cool in hot climates
- Prevent predators like cats from entering
- Encourage birds to use the nests



- And, if possible, make it easy for researchers to access the birds inside, for monitoring

Brainstorming with Cardboard

Artists and researchers explore possible design options using models of paper and cardboard



Design concepts are first drawn out in paper and cut out

Models can be built to real size (1:1 scale) or scaled down

How much space do shearwaters need?

- Each nest chamber has two rooms
- This design provides enough space for both parents (during mating) or for a chick and at least one parent (during incubation and chick rearing)



Design Features

Louvers (air slits) help keep birds cool and make the shelters more breathable



Design Features

Removable roof offers protection from rain and from sunlight

Can be easily removed by researchers to observe the birds using openings on the chamber's ceiling

Notice the louvers and viewing openings on the chamber's ceiling



Design Features

A small tunnel entry keeps out larger predators like cats and dogs, but is wide enough for the shearwaters to get through

Holes on the floor of the tunnel and the nesting chamber help divert rain water and prevent flooding



Making it Look Natural

Using a lava rock to give the shelter a more natural texture may make it more appealing to the birds and more camouflaged to predators



The finished product !



Installation at the Preserve



Ceramic shelters are partially buried in the soil and assembled

Air Temperature Monitoring

- Ensure the birds in the shelters do not overheat
- Researchers use temperature loggers to track air temperature inside and outside the shelters.
- Shade structures next to shelters provide controls



Loggers Used to Record
Air Temperature



Shade Structures
Used for Controls

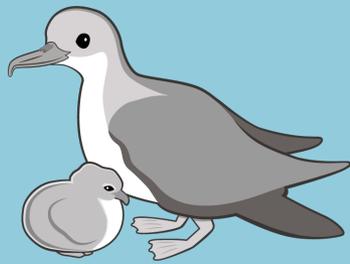


Chick Inside of a Ceramic
Equipped With Logger

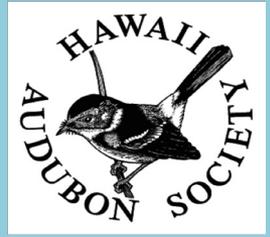
First Chick Successfully Fledged From a Ceramic Shelter







Use Agreement & Credits



**WAY OF THE
WEDGIE**

Survival Lessons
from a Seabird Preserve



CRDG

CURRICULUM RESEARCH
& DEVELOPMENT GROUP
UNIVERSITY OF HAWAII AT MĀNOA



**HAWAII PACIFIC
UNIVERSITY**

These lessons were created by Laura Cottongim, dean of Curriculum and Instruction at the University Laboratory School in Honolulu, Dr. David Hyrenbach (Hawai'i Pacific University) and Wendy Johnson (Hawai'i Audubon Society). With updates from Jenn Urmston and Michelle Hester (Oikonos).

These activities incorporate data from collaborative research by Hawai'i Pacific University, Hawai'i Audubon Society, Oikonos Ecosystem Knowledge, California College of the Arts, and Windward Community College.

Educators, students and researchers may incorporate these materials into their lesson plans, presentations, and worksheets in hard copy and digital formats for internal educational use only, not into any publication for external distribution or commercial purposes.

All photos, art, and data have been contributed free of charge to create this product for educational use. Content may be copyrighted and/or owned by individuals and entities other than the creators. Please contact Oikonos to request external use of content (michelle@oikonos.org).

Funding provided by Disney Conservation Fund and Atherton Family Foundation. Thank you.

We appreciate feedback. Contact Hawai'i Audubon Society at: hiaudsoc@gmail.com
Resources for Way of the Wedgies are free at www.freemanseabirdpreserve.com/lessons-home