



Sandy Shores

Concepts

The sandy shore plays an important part in the life cycle of sea turtles. Sea turtles in Hawaii face many challenges throughout their life cycle that threaten their survival.

HCPS III Benchmarks

SC 2.1.1

SC 2.1.2

SC 2.3.1

SC 2.5.1

PE.K-2.1.1

PE.K-2.2.1

PE.K-2.2.2

PE.K-2.3.1

Duration

1 hour

Source Material

Project Aquatic Wild
(Hawaii Supplement)

Vocabulary

Nesting period

Clutch

Hatchlings

Bask

Prey

Predator

Limiting Factor

Life Cycle of Hawaii's Honu

Summary

Students will become sea turtle hatchlings and limiting factors in a highly active simulation game. They will work together to identify and play the roles of predator and prey in the life cycle of a sea turtle.

Objectives

- Students will be able to describe the life cycle of a sea turtle
- Students will be able to identify sources of mortality for sea turtles
- Students will understand the effects of limiting factors on sea turtle survivability

Materials

Background reading on the life cycle of a sea turtle

One predator name tag with String Necklace per student
(laminiate these so they do not break while students are running).

2 – 100 foot long ropes/thick strings or flagging (length of the course)

2 – 50 foot long ropes/thick strings or flagging (width of the course)

* You could also use four orange cones to mark the boundaries

2 - 10 foot long ropes/thick strings/ hula hoops (must make a circle)

One plastic bag per student

2 rolls of pennies or 100 pennies

1 bag of dried beans

Making Connections

Students may recall personal experiences when they have seen sea turtles on Hawaii's sandy shores. Learning about the life cycle of sea turtles will help students appreciate the challenges sea turtles face throughout their lifespan. Students will gain a better understanding and appreciation behind conservation and protection efforts of nesting habitat and sea turtles populations in general.

Teacher Prep for Activity

Collect the necessary materials for game area and set-up outside in a large area of the school grounds. See game area set-up at the end of this lesson for design and directions.



Background

Sea turtles live in the ocean most of their **life cycle** and only leave the water during nesting periods. The **nesting period** is when they come to the sandy shore to lay their eggs. Most female turtles swim all the way to the French Frigate Shoals in the Northwestern Hawaii Islands to lay their eggs. Female sea turtles crawl up the beach and dig deep holes to lay their eggs in. They use the two back flippers to dig the holes. A female turtle can lay up to 100 eggs about the size of a ping pong ball. All the eggs laid in the nest are called a **clutch**. After the eggs are laid she covers them and fills the hole back up with sand. She then crawls back to the ocean and leaves the eggs to hatch. The eggs are left alone for about 2 months. If they do not get eaten by crabs or taken by humans – they hatch, dig their way out of the sand, and crawl to the ocean.

The baby sea turtles are called **hatchlings**. While they crawl to the ocean they may be eaten by **predators** like crabs and birds. Only about 1 to 5 hatchlings will live past the first year. After they make it to the water they become **prey** and have to face fish, tiger sharks, and humans. Most predators hunt sea turtles for food. Humans use sea turtle eggs and meat for food or to make oil. The shell is used to make jewelry, from which humans can benefit economically. Humans also threaten the lives of turtles when we build houses, hotels, and condos near the beach. The lights can distract them on their journey to the ocean and make them go the wrong way. Some buildings may prevent the females from getting to the right place to lay their eggs. Marine debris kills many sea turtles every year. Marine debris is man-made trash found on the beach or in the ocean. Many sea turtles get stuck in fishing nets and drown because they cannot swim free. Jellyfish is a favorite food of sea turtles. Plastic bags floating in the ocean look like jellyfish and are eaten by sea turtles. Plastic bags and other human trash eaten by turtles get stuck in their stomachs and kills them. Anything that threatens sea turtles is called a **limiting factor**.

Sea turtles also come onto the sandy shore to **bask** in the sun. The warm sand and sunny weather warms them up. This also helps them stay away from their main predator called the tiger shark. This is when most humans get to see turtles.

Procedure

Turtle Hurdles

1. Ask for volunteers – half the number of students in the class would be appropriate.
2. Ask the remaining students to count of by fours: 1 = humans, 2 = birds, 3 = crabs, 4 = sharks
3. Give each student a sign that indicates which predator they represent and a plastic bag with 5 beans.
4. Move the class outside to the designated course area. Ask volunteers to help set up the activity as shown in the diagram provided.
5. Walk the class through the activity and explain where each zone is and what the rules are. Read through or verbally explain the following steps which explain the rules of the game.
 - A. Turtles must hatch, cross the beach and spend 10 years in the open ocean. The time in the ocean is simulated by turtles running between the year zones. They pick up one penny at a year zone and then run to the other year zone to pick up another penny. Each penny represents two years of successful ocean survival. After collecting five pennies, turtles return to the nesting area to reproduce.



- B. Turtle try to avoid limiting factors and predators. If tagged by a limiting factor, a turtle stops, and puts 1 bean in the limiting factor's bag.
- C. The ocean's sea grass areas are turtle safety zones where limiting factors cannot tag them. The teacher may set a time limit (i.e. 20 seconds) for how long a turtle may rest in a sea grass and year zones.
- D. Limiting factors must obey the following rules:
 - They cannot tag the same turtle twice in a row.
 - They cannot tag turtles that are counting out beans to another limiting factor.
 - They must stay at least four steps away from any turtle that is transferring beans to another limiting factor.
- E. Any turtle that losses all 5 beans is dead. It must go to the beach and become a condominium. If the condominiums (sitting side by side) eventually block the access to the nesting beach, the remaining turtles die without reproducing and starting the next cycle.
- F. The activity ends when all turtles are either dead or have returned to the nesting area.
6. Review the rules a second time, if necessary, to make sure the students understand their roles and the procedures. Assign either a turtle or limiting factor role to each student and begin the activity.
7. After completing the activity, encourage the students to discuss the results. It is likely that some students will be disturbed by the high mortality of the turtles and will benefit from the realization that there are groups actively trying to diminish human contributions to the high mortality. It is also important to emphasize that natural limiting factors are built into the scheme of things. If all the sea turtles survived there may be an overabundance of these creatures. Many animals produce more young than will survive, serving as food for other species as part of nature's dynamic balance. Briefly review the life cycle of sea turtles.
8. Summarize the importance of the high numbers of turtles that result from the reproduction. Ask why turtles would produce so many babies at once ? Identify and discuss the factors that limit survival. Since sea turtles are threatened with extinction, the limiting factors affecting their survival seem to be out of balance. What specific recommendations would the students suggest to increase the successful reproduction and survival of sea turtles (This could be given as a homework assignment – ask each student to think about and write two recommendations that can be shared with the class the following day).

Assessments

Questions formulated

Worksheets Completed

Resources

Maui Ocean Center

