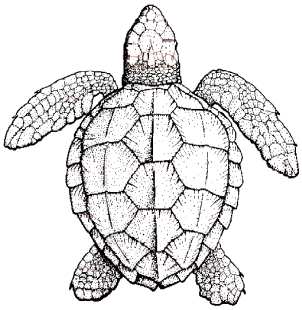

Image from USFWS

Calculating Loggerhead Hatchling Success Rates

5Es Lesson by Rachel Teller

National Science Standards

Content Standards: Level 5-8

Life Science

> Regulation and behavior
> Populations and ecosystems

Unifying Concepts and Processes

> Change, constancy, and measurement
> Evolution and equilibrium

Background

Measuring the success of sea turtle nests and hatchlings is essential to monitoring the health of a local sea turtle population. The data can be used to develop information such as effectiveness of the management program, individual female reproductive health, estimates of future adult populations, and effects of weather phenomena (i.e. hurricanes, El Niño-Southern Oscillation events).

When a nest on a managed beach needs to be relocated (only as a last resort), volunteers record the date the nest was laid and the number of eggs in the cavity, then the nest area is marked and possibly caged or screened to deter predators. If the nest is left in situ, only the date can be recorded.

The incubation period for nests in South Carolina is about 55-60 days, but varies with temperature. Nest inventories are conducted about three days after emergence because it can take the hatchlings several days to climb out of the nest and it is important to let them climb out on their own. Based on the contents of the nest during the inventory, volunteers can calculate nest and hatchling success rates. This particular activity involves hatchling success rates, but it can be replicated for nest success rates too. A nest is considered successful if it has a hatchling success rate of at least ten percent.

Activity

ENGAGE Ask the students to consider what these *numerical representations* have in common: a baseball player's batting average, the grade they received on their last science test, and a basketball player's free-throw percentage. They are all ways to describe a number of something out of the total number of things. (How many times they got a hit out of how many times they were at bat, how many answers they got right out of how many total questions there were, etc.)

EXPLORE First, discuss what defines a successful hatchling in this case. Are the hatchlings that are alive in the nest cavity three days after *emergence* really a success? Why or why not? They did make it through incubation and out of the shell– this is a feat in itself, but they are probably not as fit as their siblings, or they would have been able to emerge on their own. Next, ask the students to use the nest inventory data and accompanying worksheet (both provided) to determine the hatchling success rate for each nest.

EXPLICATE Ask the students to calculate the overall hatchling success rate for relocated nests versus in situ nests. What can they infer about the effectiveness of this management project? What are other factors that need to be considered in terms of nest and hatchling success? This question is included on the worksheet.

ELABORATE Ask each student to list, on the back of the nest inventory data sheet, possible reasons nest number 8 could have had a zero percent hatchling success rate. Remind them to ensure their responses are appropriate for the region and time of year (i.e. the eggs probably won't blow away during a tornado). This question is also included on the worksheet.

EVALUATE Ask the students to create an advisory that warns the management team or the mother sea turtle (this is a creative exercise in which they pretend the sea turtle can read) of some event that may put a nest in jeopardy. Be sure the advisory addresses some event that really could cause a low chance for hatchling success, contains at least one graphic, mentions possible alternatives that should be considered and why these are suitable alternatives. Use the example warning sign to get the creativity flowing. Erosion, water inundation, predation and human disturbance are the primary causes of zero percent hatchling success, but creativity should be encouraged.