What's In A Nest?

TIME & AUDIENCE LEVEL

- 3rd—5th Grade
- 45 Minutes—1 Hour

VOCABULARY

- Emergence
- Excavation
- Hatching success
- Hatchlings
- Percentage
- Emergence Success
- Straggler Hatchling

MATERIALS

- White Board or Visuals of Vocabulary Words
- Worksheets
- Pens/Pencils

SUMMARY

In this activity, students will learn how to calculate percentages by looking at sea turtle nest examples from Jekyll Island, Georgia. They will learn the steps that sea turtle biologists take to monitor nests after they hatch and what data they collect. By using a real-world example from a loggerhead sea turtle nest, they will practice calculating hatching success and emergence success.

OBJECTIVES

- Learn about loggerhead sea turtle nests in Georgia
- Discover the steps biologists take to excavate nests
- Calculate percentages using real-world data
- Understand why data collection is important for monitoring sea turtles

BACKGROUND INFORMATION

Sea turtles spend most of their lives at sea, so it can be hard to find and study them in the wild. One of the easiest ways to locate and study sea turtles is during the brief window of time when they are on the beach. All hatchling sea turtles begin their life on the beach in their nest before they head to sea. After going into the ocean, only adult females will return to land to lay eggs. In this activity, students will learn about the research and data collection biologists perform on nests after they have hatched.

A loggerhead sea turtle lays an average of 120 eggs per nest, and it usually takes those eggs between 45 and 60 days to hatch. When the sea turtles hatch and dig out of the nest it is called an **emergence**. Five days after a nest emergence, biologists perform a nest **excavation** in which they dig up what remains of the nest. By doing this, they can discover many things about the nest, such as: How many eggs hatched? How many eggs did not hatch? Are there any signs of depredation (predators eating the eggs or hatchlings)? They will record all of this information and use it to calculate hatching success and emergence success.

Hatching success is the percentage of eggs in a nest that produced live **hatchlings**, or baby sea turtles. A **percentage** is a number or ratio expressed as a fraction of 100. It shows the portion or share in relation to a whole. To find the hatching success of a nest, researchers calculate the percentage of eggs that hatched out of the overall number of eggs in the nest.

STEM RESOURCES

- Have students look at nesting data from previous years. Are there any conclusions they can draw about success rates?
- Students can use programs like Microsoft Excel to create graphs of the data they use.
- Take a virtual field trip of the Georgia Sea Turtle Center or interview a sea turtle biologist to find out more.

PERCENTAGE FORMULA

$$\left[\frac{\text{Part}}{\text{Whole}}\right] \times 100$$

GEORGIA STANDARDS OF EXCELLENCE

- MGSE3.OA.3
- MGSE3.OA.7
- MGSE4.OA.4
- MGSE4.NF.5
- MGSE.5.OA.1
- MGSE.5.OA.2
- MGSE.5.NBT.1
- MGSE.5.NBT.4

Emergence success is the percentage of hatchings that made it out of the nest. It is calculated by counting the number of hatched egg shells and subtracting any dead or live hatchlings that are found within the nest. That number is then divided by the total number of eggs in the nest (both hatched and unhatched). There are many reasons that a sea turtle may hatch, but not make it out of the nest. One common reason is that the hatchling was depredated by an animal (e.g., fire ants, raccoons, ghost crabs). Another reason a hatchling might not emerge from the nest is that it was too weak to crawl to the top of the nest. Live hatchlings found in a nest during excavation are called **straggler hatchlings**.

Both hatching success and emergence success are important numbers for biologists to know. Using this information, biologists can compare the success of a beach to itself over time, or to other nesting beaches. In this activity, students will calculate the hatching success and emergence success for the nest of a straggler hatchling named Ember. Ember was found in 2021, when GSTC researchers performed an emergency excavation because fire ants were burrowing into the nest. They found many hatchlings and released them to the ocean; however, Ember was not ready for this journey. Instead, the researchers brought this turtle to the GSTC, where Ember was admitted as a patient and has been growing strong ever since. Ember serves as an educational ambassador at the Georgia Sea Turtle Center and will hopefully be released into the wild as a healthy turtle in Fall 2022.

SET UP

To set up for this activity, familiarize yourself with data collection from sea turtle nests at the closest monitoring project to you. A white board or PowerPoint can be used to explain nest monitoring to students and also how to calculate a percentage. There is a worksheet attached to this lesson with data from Ember's nest. This worksheet includes the formulas that students will use to calculate hatching success and emergence success. It also includes two "dig deeper" questions at the end. Each student can have a worksheet or you can work through the examples and questions as a group.

WARM UP/INDRODUCTORY ACTIVITY

To introduce this activity, start by explaining what a percentage is. Explain to the students that a percentage is a part of a whole, and that it is found by dividing the part by the whole. A fun activity can be to ask students to decide on a percentage they want to find. For example: if there are three students wearing hats in the class, they may want to find the percentage of students in the class who have hats on. Let them be creative and work through the equations as a group.

CRITICAL THINKING QUESTIONS

- What can actions can biologists take if hatching success is low on their beach?
- What actions can they take if emergence success is low on the beach?
- How can sea turtle nests be protected from predators?
- How can female sea turtles coming to the beach to nest be encouraged?

REFERENCES

- seaturtle.org
- georgiawildlife.com/conservation/seaturtles
- seaturtleexploration.com
- gadnr.org

CONTACT INFORMATION

214 Stable Road
Jekyll Island, GA 31527
(912) 635-4141

jekyllisland.com/gstc

ACTIVY PROCEDURES

Next, explain that percentages are important for many professions, and today you'll be looking at some of the ways they're used by sea turtle biologists. Explain the process, terminology, and how the percentages are used to the students. It can be helpful to use a book, such as "Sea Turtle Scientist" for students to read or to discuss the research being done on beaches for sea turtle nests. After students understand the concepts, tell them Ember's story and hand out the worksheets. They will be using real data from Ember's nest to practice the equations they just learned.

WRAP UP/CONSERVATION MESSAGE

Ask students why they think this information is recorded. Conservation is extremely important for species that are slowly disappearing in the wild, and by monitoring the overall success of nests biologists can make the best management decisions. This is a great time to go over ways that the students can make a difference for sea turtle hatchlings. These conservation messages can include: turning off lights or using only red lights on the beach at night; staying a good distance from marked sea turtle nests; knocking down sand castles; filling in holes in the sand; cutting down on single-use plastics; and picking up trash in the environment.

ADDITIONAL ACTIVITIES:

Keep practicing percentages! Students can use more data from nests to calculate hatching success and emergence success.

Make your own sea turtle nests! Use materials like ping pong balls to symbolize hatched and unhatched eggs and sea turtle toys to symbolize straggler hatchlings. Make a nest for your students to excavate or have them make nests for each other. They can calculate hatching success and emergence success and compare their results as a class.

REAL DATA EXTENSION:

Many sea turtle organizations, including the Georgia Sea Turtle Center, offer an Adopt-a-Nest program in the summer during sea turtle nesting season. To extend this activity, you and your students can symbolically adopt a nest to learn how successful it is. More information on the Georgia Sea Turtle Center's Adopt-a-Nest program can be found on our website at: https://www.jekyllisland.com/gstc.

Sea Turtle Nest Excavation

EDUCATOR KEY

Become a sea turtle researcher! Use the information below to calculate the Hatching Success and Emergence Success of Ember's nest.

Nest Information:

Species:	Loggerhead
Location:	Jekyll Island, GA
Laid:	Jun. 6th, 2021
Inventoried:	Aug. 20th, 2021
Threats:	Fire Ants in Nest

Excavation Results:

# Hatched Eggs:	116
# Unhatched Eggs:	19
Total Egg Count:	**136**
# Dead Hatchlings:	12
# Live Hatchlings:	94
Total Hatchling Count:	**106**

Hatching Success:

$$\frac{\#\ \text{Hatched Eggs}}{\text{Total Egg Count}} = \frac{116}{136} = 85\ \%$$

Emergence Success:

$$\frac{\#\ \text{Hatched Eggs} - \text{Total Hatchling Count}}{\text{Total Egg Count}} = \frac{116 - 106}{136} = 7\ \%$$

Dig Deeper:

Why was there a low emergence success?

Most hatchlings weren't ready to naturally emerge, but the nest was infested with fire ants. The GSTC did an emergency excavation to get them out.

How can you help sea turtle hatchlings?

I can pick up trash, reduce my plastic use, fill in holes at the beach, knock down sandcastles, use turtle friendly red lights, educate others, etc.

Sea Turtle Nest Excavation

Researcher's Name: _____

Become a sea turtle researcher! Use the information below to calculate the Hatching Success and Emergence Success of Ember's nest.

Nest Information:

Species:	Loggerhead
Location:	Jekyll Island, GA
Laid:	Jun. 6th, 2021
Inventoried:	Aug. 20th, 2021
Threats:	Fire Ants in Nest

Excavation Results:

# Hatched Eggs:	116
# Unhatched Eggs:	19
Total Egg Count:	**136**
# Dead Hatchlings:	12
# Live Hatchlings:	94
Total Hatchling Count:	**106**

Hatching Success:

$$\frac{\text{\# Hatched Eggs}}{\text{Total Egg Count}} = \frac{\_\_\_\_\_}{\div} = \_\_\_\_\_\ \%$$

Emergence Success:

$$\frac{\text{\# Hatched Eggs - Total Hatchling Count}}{\text{Total Egg Count}} = \frac{\_\_\_\_ - \_\_\_\_}{\div} = \_\_\_\_\_\ \%$$

Dig Deeper:

Why was there a low emergence success?

How can you help sea turtle hatchlings?