



Excavation

Created by the NC Aquarium at Fort Fisher Education Section

Essential Question:

What fraction of sea turtle eggs do not hatch?

Lesson Overview:

Students will use mathematical reasoning to learn about the fates of sea turtle eggs by calculating the fraction of eggs that successfully hatch and comparing that to the fraction that do not hatch.

Learning Objectives:

Students will be able to:

- Simplify fractions by dividing them by common factors.

North Carolina Standards:

Fifth Grade

Math

- 5.NF.B.3 Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
- 5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
- 5.NF.B.7.A Interpret division of a unit fraction by a non-zero whole number, and compute such quotients.
- 5.NF.B.7.C Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem.

Sixth Grade

Math

- 6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm.
- 6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
- 6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor.



Time Frame:

Preparation: 10 minutes

Activity: 15-25 minutes depending on familiarity with fractions

Discussion: 5 minutes

Supplemental Background Information for Teachers:

Sea turtles hatch from their nests about two months after the mother turtle lays the nest on the beach. They have to wiggle and dig and use each other for support to get to the surface. Some of these turtles might not be able to get out of the nest, either because they hatched late or because they are buried under shells. For a variety of reasons, some turtles never even hatch out of their eggs. Other turtles hatch out of their eggs but die before making it out of the nest. This is normal, which is why sea turtles lay lots of eggs.

All sea turtle species are listed as either threatened or endangered, so scientists try to help their populations whenever they can. One way scientists can help the sea turtles is by excavating, or digging up, a nest that has already hatched. There is a lot of information that scientists can get by digging up a nest after it has hatched. Once they have given the healthy hatchlings a chance to dig their way out of the nest, the scientists dig it up the rest of the way and see what is left. They count the number of eggshells left in the nest to see how many of the turtles hatched. Hopefully, most of these hatched turtles were able to get out of the nest. Some hatched turtles might still be hanging out in the nest, unable to get out. Others may have died before being able to get out of the nest. Scientists also count the number of unhatched eggs, which indicates the total number laid in the nest.

The people who dig up sea turtle nests are professionals. They have to be very careful not to dig up the nest too soon. They are also concerned about not wanting to harm any turtles that might be left in the nest. If you see a sea turtle nest hatch, the best thing you can do is to leave it alone. If it is an unmarked nest (without a sign or other information), report the nest to the local authorities.

Materials:

- Excavation worksheet

Preparation:

Students should be familiar with fractions and the idea that they can be simplified by dividing both the numerator and denominator by a common factor. The fractions on the worksheet should be divisible by 2, 3 or 5.



Procedure:

1. Go over background information about nest excavation with the students.
2. Remind students of how fractions can be simplified. Do a few easy simplifications with your students at first. For example, $\frac{4}{6}$ can be divided by 2 to give you $\frac{2}{3}$.
3. Have students complete the worksheet. You can have them use an extra sheet to show their work or they can use calculators to do the division.
4. Discuss with your students what they think they should do if they see a nest hatching on the beach. Go over the correct protocol with them so they understand what they should do if it actually happens.

Extensions:

1. Plan a fieldtrip to the North Carolina Aquarium at Fort Fisher and meet a turtle that was rescued from a nest.

**Sea Turtle Excavation Information:**

The following table is based on the data that scientists collected from nests in Carolina and Kure Beaches. The North Carolina Aquarium at Fort Fisher received hatchlings from these nests. These hatchlings were recovered as one of the “live-in-nest” baby turtles. Turtles listed as **hatched** were able to get out of the nest on their own. **Unhatched** turtles did not hatch out of their eggs, and turtles listed as **dead** were able to hatch but died before making it out of the nest.

Year	Location	Total Eggs	Hatched	Live-in-nest	Unhatched	Dead
2012	Kure Beach	88	60	2	26	0
2011	Kure Beach	114	66	18	12	18
2011	Carolina Beach	150	75	5	65	5
2010	Kure Beach	140	90	28	20	2
2010	Carolina Beach	115	105	5	5	0
2009	Carolina Beach	132	120	6	6	0

Write the following fractions below. All fractions are out of total eggs.

The first one is done for you:

1. Fraction of eggs that hatched from the 2012 Kure nest (out of the total eggs).

Answer: 60 eggs hatched out of 88 total eggs = 60/88. To simplify:

$$\frac{60}{88} \div 2 = \frac{30}{44} \quad \text{Can we simplify this number? YES}$$

How? BOTH NUMBERS ARE EVEN, DIVIDE BY 2.

$$\frac{30}{44} \div 2 = \frac{15}{22} \quad \text{Can } 30/44 \text{ be simplified? YES, BOTH NUMBERS ARE EVEN SO DIVIDE BY 2}$$

Can 15/22 be simplified? NO, THEY HAVE NO COMMON FACTORS

2. Fraction of turtles that were dead in the 2011 Kure nest. Simplify.

3. Fraction of turtles found live-in-nest in the 2011 Carolina nest. Simplify.

4. Fraction of eggs unhatched in the 2010 Kure nest. Simplify.



5. Fraction of eggs that hatched in the 2010 Carolina nest. Simplify.

6. Fraction of turtles found live-in-nest in the 2009 Carolina nest. Simplify.

7. Fraction of unhatched eggs in the 2012 Kure nest. Simplify.

8. Fraction of turtles that were dead in the 2010 Carolina nest. Simplify.

9. Fraction of turtles found live-in-nest in the 2010 Kure nest. Simplify.

10. Fraction of eggs that hatched in the 2011 Carolina nest. Simplify.