



## Egg-Laying Rates

Created by the NC Aquarium at Fort Fisher Education Section

### Essential Question:

How do you calculate the time sea turtles spend nesting and how many eggs they lay?

### Lesson Overview:

Students use operations, logic, and algebraic thinking to solve problems regarding how much time sea turtles spend nesting and the rate at which they lay their eggs.

### Learning Objectives:

Students will be able to:

- Use multiplication and division to calculate the rate that females lay eggs.
- Solve word problems using addition, subtraction, multiplication and division, as well as logic.

### North Carolina Standards:

#### Fourth Grade:

##### *Math- Operations & Algebraic Thinking*

- **4.OA.2** Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison.
- **4.OA.4** Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.

##### *Math- Number & Operations in Base Ten*

- **4.NBT.4** Fluently add and subtract multi-digit whole numbers using the standard algorithm.
- **4.NBT.5** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
- **4.NBT.6** Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

#### Fifth Grade:

##### *Math- Operations & Algebraic Thinking*

- **5.OA.2** Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.



*Math- Number & Operations in Base Ten*

- **5.NBT.5** Fluently multiply multi-digit whole numbers using the standard algorithm.
- **5.NBT.6** Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

**Time Frame:**

Preparation: 5 minutes

Activity: 10 minutes

**Materials:**

- Worksheets

**Supplemental Background Information for Teachers:**

Sea turtles lay their eggs on land in the sandy dune areas of beaches. There are 5 main parts of the egg-laying process. The female will 1) crawl up the beach toward the dunes, 2) dig her nest, 3) lay the eggs, 4) cover the nest back up and 5) crawl back to the water. She is out of the water the entire time. Since turtles are reptiles and breathe air, she doesn't have trouble with breathing while on the beach. The hardest part is moving her heavy body around on land! Sometimes a female will go up onto a beach and decide that she doesn't want to lay a nest there. This is called a "false crawl."

**Preparation:**

- Make any copies necessary.
- Familiarize yourself with the information on sea turtle nesting.

**Procedure:**

1. Go over the background information with your students. Knowing the 5 steps a female goes through to lay her eggs will be important on the worksheets. You can also begin with the "You make the crawl" lesson.
2. After giving students the worksheet, solve the first problem together. Have students work on their own to solve the other problems. Page 1 contains easier problems and page 2 has harder problems that involve increased reasoning skills.

**Extensions:**

Have students watch a video of sea turtles going through the different steps of nesting on the beach.



**Egg Laying By the Numbers**

**A. Use multiplication and division to solve the following problems:**

1. A sea turtle lays 100 eggs and it takes her 20 minutes. How many eggs does she lay in one minute? ( $100 \div 20 = ?$ )
2. A Loggerhead lays eggs for 19 minutes. She lays 5 eggs a minute. How many eggs does she lay?
3. Another Loggerhead lays eggs for 24 minutes. She lays 96 eggs. How many eggs does she lay in one minute?
4. A nest is laid in 16 minutes at a rate of 6 eggs per minute. How many eggs did the female Loggerhead lay?

**B. A turtle has 5 steps when nesting: 1) crawling up the beach, 2) digging her nest, 3) laying her eggs, 4) covering up her nest and 5) crawling back to the water. Use addition, subtraction, multiplication and / or division to solve the following problems:**

1. A female turtle crawls up the beach for 15 minutes and takes another 10 minutes to dig her nest. She lays eggs for 20 minutes and spends 3 minutes covering her nest. Her crawl back to the water takes 12 minutes. How long was she out of the water?
2. A female turtle is out of the water for 1 hr and 10 minutes. She spends 20 minutes crawling up the beach and another 12 crawling back at the end. She spends half of her remaining time digging her nest and covering it back up. How long did she spend laying eggs?
3. A female Loggerhead goes up the beach for 15 minutes before deciding not to lay a nest there. It takes her another 15 minutes to get back to the water. This is considered a false crawl. If she lays a nest somewhere else and was out of the water for 2 hours total that night, how long did it take her to complete the second nest?
4. The turtle spends 10 minutes crawling up and another 10 minutes crawling back down the beach. She spends twice as long digging, laying and covering up her nest as she does crawling. How long does she spend out the water total?



**C. Use addition, subtraction, multiplication and / or division to solve the following problems:**

1. A sea turtle has three false crawls and lays 2 nests in 2012. If she spent an average of 25 minutes on a false crawl and 1 hr and 10 minutes laying a nest, how long did she spend out of the water that year?
2. In 2013, a sea turtle lays 3 nests. It takes her 1 hour to complete each nest. If she spends  $\frac{1}{4}$  of her time actually laying the eggs, how long did she spend laying eggs in 2013?
3. Three nests are laid in 2012 by a female who can lay about 4 eggs in one minute. If she spends 20 minutes laying her first nest, 17 minutes laying her second nest and 23 minutes laying her third nest, about how many eggs did she lay in 2013?
4. Twelve sea turtle nests were laid on a stretch of beach by three females. It took the females an average of 1 hour and 13 minutes lay each nest. What was the total combined time they were out of the water? If the average nest size was 90 eggs, how many eggs were laid on the beach?
5. A female lays 380 eggs in 2013 in 4 different nests. If she could lay eggs at a rate of 5 eggs per minute, how long did it take her to lay all of her eggs? About how long did it take her per nest? About how many eggs were in each nest?



**Answer Key**

A:

1. 5 eggs
2. 95 eggs
3. 4 eggs
4. 96 eggs

B:

1. 1 hour
2. 19 minutes
3. 1 hour 30 minutes
4. 1 hour

C:

1. 3 hours 35 minutes
2. 45 minutes
3. 240 eggs
4. 14 hours 36 minutes; 1080 eggs
5. 1 hour 16 minutes; 19 minutes; 95 eggs