



Build your own hatchling

Created by the NC Aquarium at Fort Fisher Education Section

Essential Question:

How does the Aquarium determine how much to feed sea turtles in its care?

Lesson Overview:

Students will learn about feeding sea turtle hatchlings using a hatchling they build out of rocks and paint. Students will then weigh and measure their hatchling and calculate the amount of food it needs to grow, based on a chart.

Learning Objectives:

By the end of this lesson, students will be able to:

- Create a sea turtle hatchling out of stone.
- Weigh and measure a hatchling turtle.
- Determine how much a turtle should be fed based on its weight.

North Carolina Standards:

Kindergarten:

Art:

- **K.V.2** Apply creative and critical thinking skills to artistic expression.
 - **K.V.2.3** Create original art that does not rely on copying or tracing.
- **K.V.3** Create art using a variety of tools, media, and processes, safely and appropriately.
 - **K.V.3.3** Use the processes of drawing, painting, weaving, printing, collage, mixed media, sculpture, and ceramics to create art.
- **K.CX.2** Understand the interdisciplinary connections and life applications of the visual arts.
 - **K.CX.2.2** Identify relationships between art and concepts from other disciplines, such as math, science, language arts, social studies, and other arts.
 - **K.CX.2.3** Understand that artists sometimes share materials and ideas (collaboration).

Math (Measurement and Data):

- **K.MD.A.1** Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
- **K.MD.A.2** Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.



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Science:

- **K.L.1** Compare characteristics of animals that make them alike and different from other animals and nonliving things
 - **K.L.1.2** Compare characteristics of living and nonliving things in terms of their:
 - Structure
 - Growth
 - Changes
 - Movement
 - Basic needs

First Grade:

Art:

- **1.V.2** Apply creative and critical thinking skills to artistic expression.
 - **1.V.2.1** Recognize that artistic problems have multiple solutions.
 - **1.V.2.3** Create art from imaginary sources of inspiration.
- **1.V.3** Create art using a variety of tools, media, and processes, safely and appropriately.
 - **1.V.3.3** Use the processes of drawing, painting, weaving, printing, collage, mixed media, sculpture, and ceramics to create art.
- **1.CX.2** Understand the interdisciplinary connections and life applications of the visual arts.
 - **1.CX.2.2** Identify connections between art and concepts from other disciplines, such as math, science, language arts, social studies, and other arts.
 - **1.CX.2.3** Differentiate between sharing ideas and copying.

Math (*Measurement and Data*):

- **1.MD.A.2** Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.

Science:

- **1.L.1** Understand characteristics of various environments and behaviors of humans that enable plants and animals to survive
 - **1.L.1.1** Recognize that plants and animals need air, water, light (plants only), space, food and shelter and that these may be found in their environment
 - **1.L.1.2** Give examples of how the needs of different plants and animals can be met by their environments in North Carolina or different places throughout the world
- **1.L.2** Summarize the needs of living organisms for energy and growth
 - **1.L.2.2** Summarize the basic needs of a variety of different animals (including air, water, and food) for energy and growth.



Second Grade:

Art:

- **2.V.2** Apply creative and critical thinking skills to artistic expression.
 - **2.V.2.1** Understand that artistic problems have multiple solutions.
 - **2.V.2.3** Create art from real and imaginary sources of inspiration.
- **2.V.3** Create art using a variety of tools, media, and processes, safely and appropriately.
 - **2.V.3.3** Use the processes of drawing, painting, weaving, printing, collage, mixed media, sculpture, and ceramics to create art.
- **2.CX.2** Understand the interdisciplinary connections and life applications of the visual arts.
 - **2.CX.2.2** Understand relationships between art and concepts from other disciplines, such as math, science, language arts, social studies, and other arts.

Math (Measurement and Data):

- **2.MD.A.1** Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
- **2.MD.A.2** Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
- **2.MD.A.3** Estimate lengths using units of inches, feet, centimeters, and meters.
- **2.MD.A.4** Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

Third Grade:

Art:

- **3.V.2** Apply creative and critical thinking skills to artistic expression.
 - **3.V.2.3** Create art from realistic sources of inspiration.
- **3.V.3** Create art using a variety of tools, media, and processes, safely and appropriately.
 - **3.V.3.3** Use the processes of drawing, painting, weaving, printing, collage, mixed media, sculpture, and ceramics to create art.
- **3.CX.2** Understand the interdisciplinary connections and life applications of the visual arts.
 - **3.CX.2.2** Understand how to use information learned in other disciplines, such as math, science, language arts, social studies, and other arts in visual arts.

Fourth Grade:

Art:

- **4.V.2** Apply creative and critical thinking skills to artistic expression.
 - **4.V.2.1** Identify different successful solutions to artistic problems.
 - **4.V.2.2** Use ideas and imagery from North Carolina as sources for creating art.
- **4.V.3** Create art using a variety of tools, media, and processes, safely and appropriately.



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- 4.V.3.3 Use the processes of drawing, painting, weaving, printing, collage, mixed media, sculpture, and ceramics to create art.
- 4.CX.2 Understand the interdisciplinary connections and life applications of the visual arts.
 - 4.CX.2.2 Apply skills and concepts learned in other disciplines, such as math, science, language arts, social studies, and other arts, in the visual arts.

Math (Measurement and Data):

- 4.MD.A.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.
- 4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

Science:

- 4.L.2 Understand food and the benefits of vitamins, minerals and exercise.
 - 4.L.2.2 Explain the role of vitamins, minerals and exercise in maintaining a healthy body.

Fifth Grade:

Art:

- 5.V.2 Apply creative and critical thinking skills to artistic expression.
 - 5.V.2.2 Use ideas and imagery from the global environment as sources for creating art.
 - 5.V.2.3 Create realistic, imaginative, abstract, and non-objective art.
- 5.V.3 Create art using a variety of tools, media, and processes, safely and appropriately.
 - 5.V.3.3 Use the processes of drawing, painting, weaving, printing, collage, mixed media, sculpture, and ceramics to create art.

Math:

Measurement and Data

- 5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

Number & Operations-Fractions

- 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.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.



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- **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.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.

Time Frame:

Preparation: 5 minutes

Activity 1: 15 minutes

Activity 2: 15 minutes

Materials:

- Rocks of various sizes
- Hot glue gun
- Sharpies or paint markers
- Rulers (one per student)
- Scale (several per class)
- Data sheet

Supplemental Background Information for Teachers:

Every year, the North Carolina Aquarium at Fort Fisher exhibits rescued sea turtle hatchlings. In order for the aquarium to keep these hatchlings, a federal permit must be obtained. In order to make sure that the turtles get the best care, they are closely monitored. Each week the turtles are weighed and measured to determine how much they are growing. The staff uses the weight of the turtles to determine how much the turtles should be fed. Each turtle is fed a percentage its body weight. The smaller the turtle, the larger the percentage they are fed. You can see the ratios here:

Turtle weight	Feed %
0-100g	15%
100-200g	7%
200-500g	4%
500g+	3%

The turtles are closely monitored each week to make sure they are growing at a healthy rate. If the turtles are fed too much, their bones will grow too quickly. This could potentially weaken the turtle's skeleton. If they are fed too little, the turtles will not grow to be strong and healthy. At the North Carolina Aquarium at Fort Fisher, our turtles are fed half of their food in the morning before they go on exhibit, and the other half at the end of the day. In the morning, the turtles typically receive a gel food, made from unflavored gelatin, vegetables, fish, and calcium powder. The gel food ensures that the hatchlings are receiving all the



necessary nutrients. In the afternoon, the turtles are fed meat, which typically consists of fish or squid. On occasion they are also treated to jellyfish, one of their favorite foods.

Preparation:

Find a location where students can sort through rocks to find a variety of sizes. If you do not have outdoor access, you will need (per student) one larger flat rock, one smaller rounded rock, four thin and narrow rocks, and one small triangle-shaped rock. Plug in the hot glue gun.

Activity:

1. Explain to the students that they will be building their own sea turtle hatchlings.
2. Ask the class to describe a sea turtle hatchling. What do they look like? Sketch one on the board.
3. Tell the students they will be collecting rocks to build a sea turtle. Ask them what shape rocks they should look for.
4. Take the students outside to collect their rocks.
5. Return to the class and have the students assemble their turtles. They will need assistance with the hot glue. Use lots of glue to fill gaps between the rocks.
6. Let them sit until dry. You can use regular glue instead, but you will need to let the turtles dry overnight.
7. Have the students decorate their turtles using sharpies or paint markers. They can do different designs or decorate the shell to look like a sea turtle. See below for descriptions of the turtle shells. Turtles should look something like this:



8. Give each student a data sheet.
9. Have the students measure and weigh their sea turtles.
10. The students will use this information to complete their data sheet.
11. Students can compare their results. As a class, discuss how the keepers would figure out how much food they are feeding their turtles (they use scales to weigh out the food). Can the students come up with reasons why correctly weighing the food is so important? (So the turtles grow at a healthy rate).



Summary:

Keeping sea turtle hatchlings in an aquarium is a big responsibility. It is important that they get the best care. Sea turtles must be well-fed so they stay healthy. Sea turtle keepers must make sure that sea turtles are not overfed so their bones do not grow too fast and become weak. To make sure the turtles get the right amount of food, their keepers use a formula based on their weight.

Extensions:

1. As a class, build larger sea turtle models and find out how much the new turtles should be fed.
2. Have the students create an ocean habitat for their hatchlings to live in. What does a sea turtle need to survive? As a class, research the Sargasso Sea to find out why young hatchlings hide there.
3. If your class is following our [blog](http://seaturtleexploration.com/masonry-blog/) (<http://seaturtleexploration.com/masonry-blog/>) for the latest hatchling updates, use the data to calculate how much the turtle is being fed this week.
4. On our website, you will find a video showing how we weigh and measure our turtles at the aquarium. Have the students watch the video to see how this is done with a real turtle. (<https://www.youtube.com/watch?v=yVkispOZM8k>)
5. Visit the North Carolina Aquarium at Fort Fisher to meet our hatchling turtles.



Data Sheet

1. When measuring sea turtles for length, scientists use this unit _____.
2. Scientists measure turtles starting at the top of the shell below the neck. Using your ruler, measure the length of your turtle from top to bottom in centimeters. How long is your turtle's shell? _____
3. Convert the length of your sea turtle from centimeters to inches. How long is your sea turtle? _____
4. Find the widest part of your shell. Measure from one side to the other. How wide is your sea turtle? _____
5. Convert the width of your sea turtle from centimeters to inches. How wide is your sea turtle? _____
6. Using a scale, find the weight of your turtle in grams. How much does your turtle weigh? _____
7. Convert the weight of your turtle from grams to ounces. How much does your turtle weigh? _____

8. Sea turtles are fed based on weight. Using this chart, find out how much you should feed your turtle. How many grams of food should your turtle get?

Turtle weight	Feed %
0-100g	15%
100-200g	7%
200-500g	4%
500g+	3%

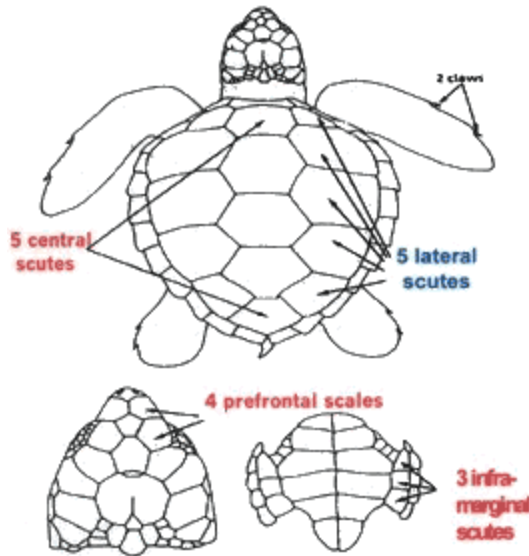
9. At the North Carolina Aquarium at Fort Fisher, sea turtles get half of their food in the morning and half in the evening. How many grams of food should your turtle get in the morning? _____

In the evening? _____



Sea Turtle Shell Patterns

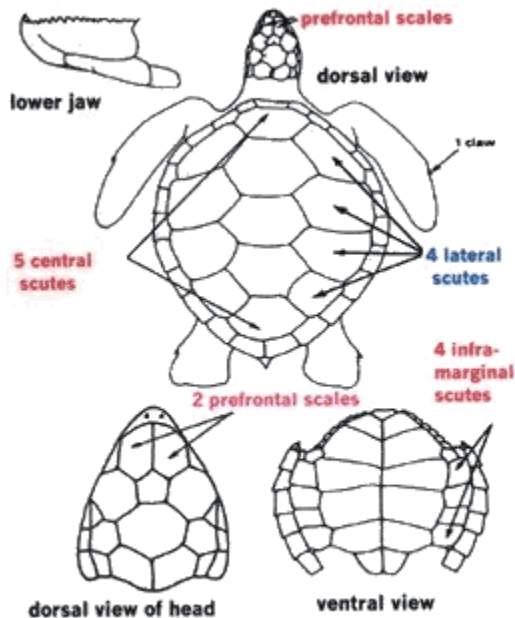
Loggerhead Turtle Shell



- Heart shaped shell
- Reddish/orange color
- 5 pairs of lateral scutes
- 5 central scutes
- 4 prefrontal scales
- 3 inframarginal scutes



Green Turtle Shell

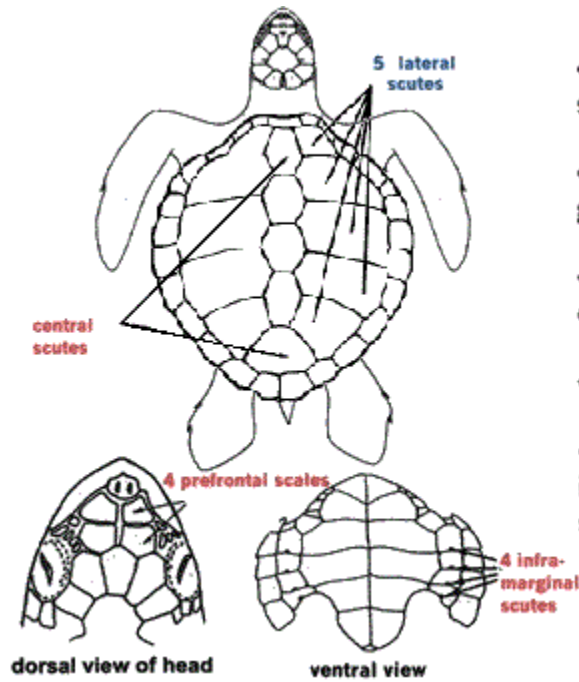


- Smooth oval shell
- Brown/yellow greenish color
- 4 pairs of lateral scutes
- 5 central scutes
- 2 prefrontal scales
- Serrated lower jaw





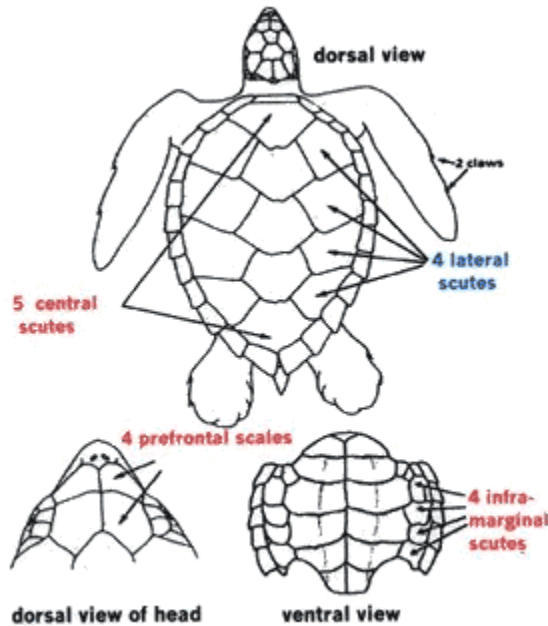
Kemps Ridley Turtle Shell



- Almost round-shaped shell
- Olive/grayish green color
- 5 pairs of lateral scutes
- 4 prefrontal scales
- 4 pairs infra-marginal scutes



Hawksbill Turtle Shell

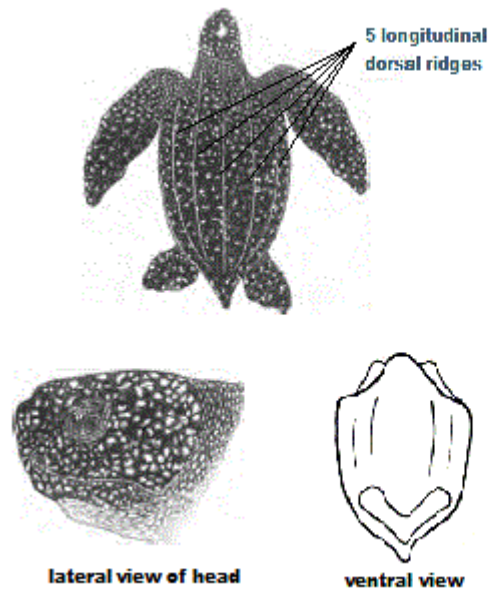


- Overlapping scutes
- Narrow shell
- Hawk-like beak
- 4 pairs of lateral scutes
- 5 central scutes
- 4 prefrontal scales





Leatherback Turtle Shell



- **Leathery, no scutes;**
- **Longitudinal dorsal ridges**
- **Dark gray / black with white spots**
- **Plastron white with dark blotches**



Turtle shell images from the NOAA National Marine Fisheries Galveston Laboratory:
<http://www.galvestonlab.sefsc.noaa.gov/seaturtles/>