

Sea Turtle ID: Whose Shell Could It Be?

An interactive lesson and game

Marine Science Laboratory
Charles E. Schmidt College of Science
Florida Atlantic University

Grade level: 3-5 (Modifications are included for other age groups)

Summary: Students will learn about parts of the sea turtle shell and how they are used to tell species and individuals apart. These are real skills used by researchers at the Florida Atlantic University Marine Lab. This lesson is written in a 5E's format and is estimated to take about 45 minutes to complete.

Related State and National Standards:

Florida

SC.3.N.1.1 Raise questions about the natural world, investigate them individually and in teams through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.

ELA.K12.EE.1.1 Cite evidence to explain and justify reasoning.

ELA.3.R.2.1 Explain how text features contribute to meaning and identify the text structures of chronology, comparison, and cause/effect in texts.

MA.K12.MTR.5.1 Use patterns and structure to help understand and connect mathematical concepts.

MA.3.AR.3.3 Identify, create and extend numerical patterns.

Next Generation Science Standards

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.



Supplemental Materials:

- SM1 - Picture of loggerhead sea turtle
- SM2 - Picture of green sea turtle
- SM3 - Venn Diagram student sheet
- SM4 – Student reading
- SM5 – Puzzle base
- SM6 – Color-coded puzzle pieces (need to be cut out before lesson begins)
- SM7 – Slideshow in .ppt format (modification to use instead of SM4, separate download)
- SM8 – Turtle game board (recommended to be laminated for multiple uses)



Lesson Plan

Engage

Invite students to brainstorm:

- What are a few things you think all sea turtles have in common?
- What are some traits that might be different?

Explore (Think/Pair/Share format)

Think

Have students observe the photos of the loggerhead and green sea turtle (**SM 1 and 2**) and complete the Venn Diagram (**SM 3**) independently. What do these two species appear to have in common? What are some of their differences?

Pair

Instruct students to now work with a partner to circle any traits on their Venn Diagrams that are external, anatomical traits (part of the turtle's body).

Share

Invite students to share out with the group. Are there any that specifically pertain to the shell? We will dive in a little deeper.

Explain

Have students pair up to read through the explanation (**SM 4**) of the shell while completing the color-coded puzzle (**SM 5 and 6**). Students will learn how researchers at the FAU Marine Lab identify and "name" the sea turtle hatchlings that come into our lab!

Modification: The class can go through this information as a slideshow presentation (**SM 7**). Recommended for younger age groups that could struggle reading the content independently.



Expand

Students will use the turtle game board (**SM 8**) to “name” their turtle (Loggerhead or Green and ID number) and play a form of “Guess Who?” with their partner. After choosing their turtle's “name” and marking it correctly on the top portion of the game board, it’s time for them to try to guess their partner’s turtle before the partner guesses theirs!

To play, partners take turns asking yes or no questions about their partner’s turtle.

Examples:

- Is your turtle a loggerhead?
- Does your turtle have 4 lateral scutes?
- Is your turtle from an even-numbered clutch?
- Do the two painted scutes on your turtle touch?

As they eliminate the possibilities, students should use the lower portion of the game board to cross them out. (Folding the game board on the dotted line allows students to keep their turtle a secret, while eliminating the possible ID name combinations of their partner’s turtle). If a student correctly guesses the ID of their partner’s turtle – they win! Be sure the drawing matches the species and ID number.

Evaluate

Have students return to their Venn Diagram (**SM 3**) from before. Have students put a star next to any distinguishing features in the Venn Diagram that they used in the game. Can they add any they learned throughout the lesson? Have students put a plus sign next to any traits they added to their Venn Diagram at this time.



**Supplemental Material 1:
Loggerhead Sea Turtle by Dawn Witherington**

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**Supplemental Material 2:
Green Sea Turtle by Dawn Witherington**

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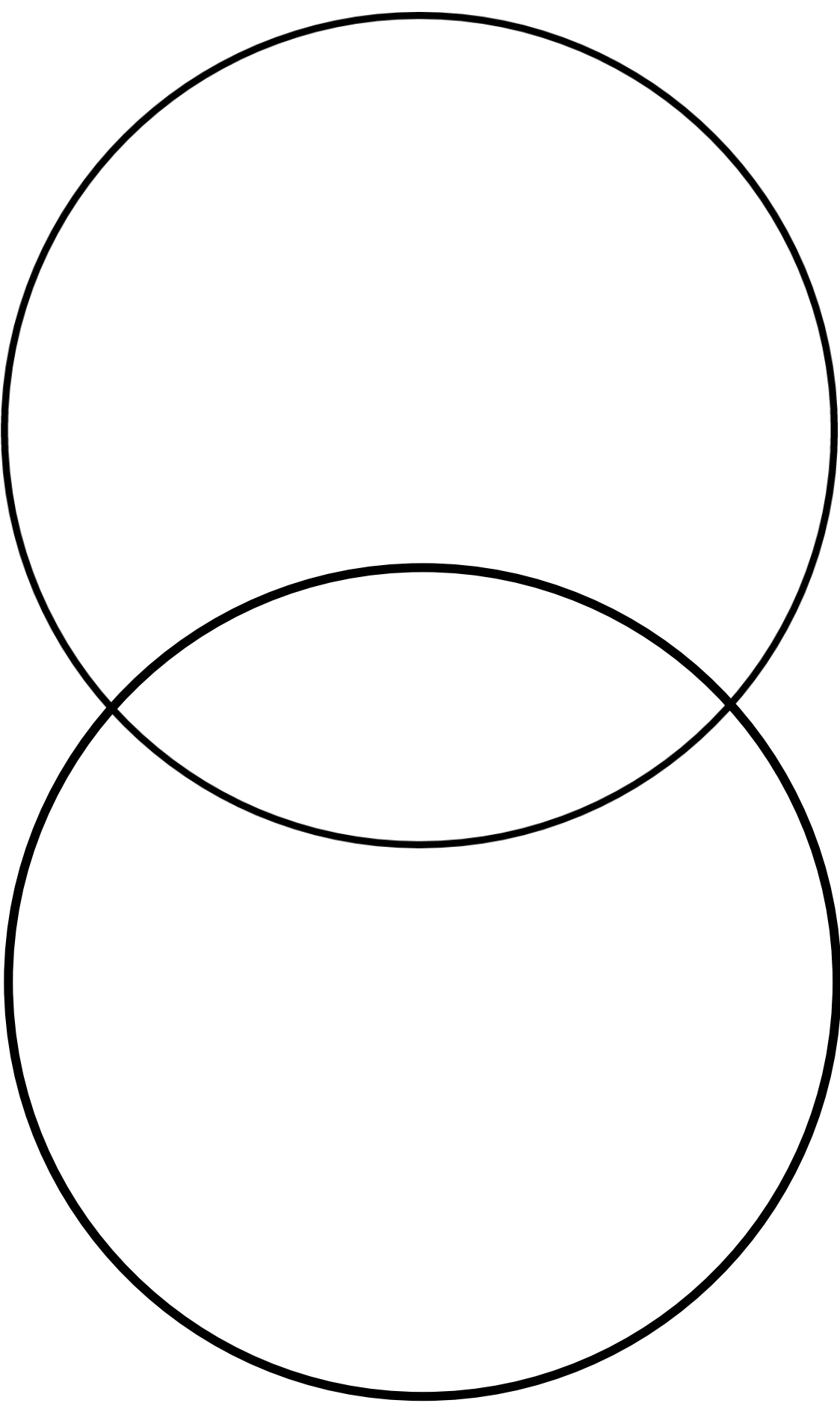


**Supplemental Material 3:
Venn Diagram Student Sheet**

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Loggerhead

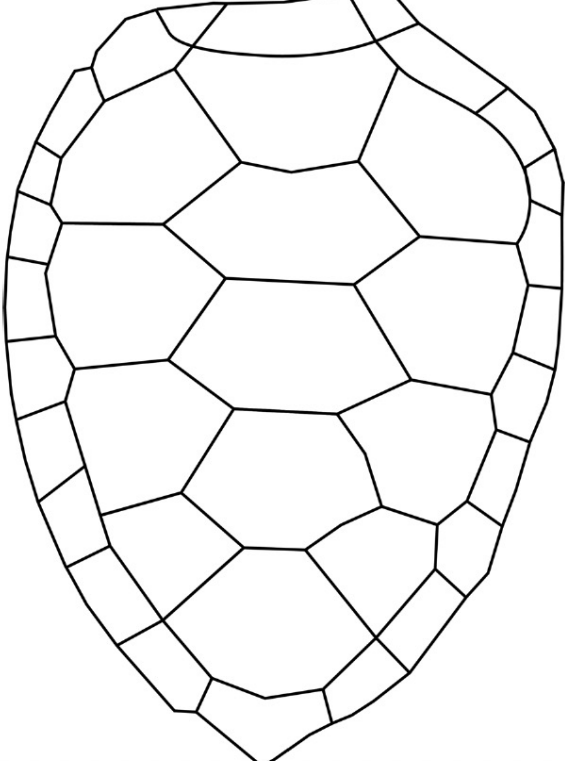
Green



Supplemental Material 4: Student Reading

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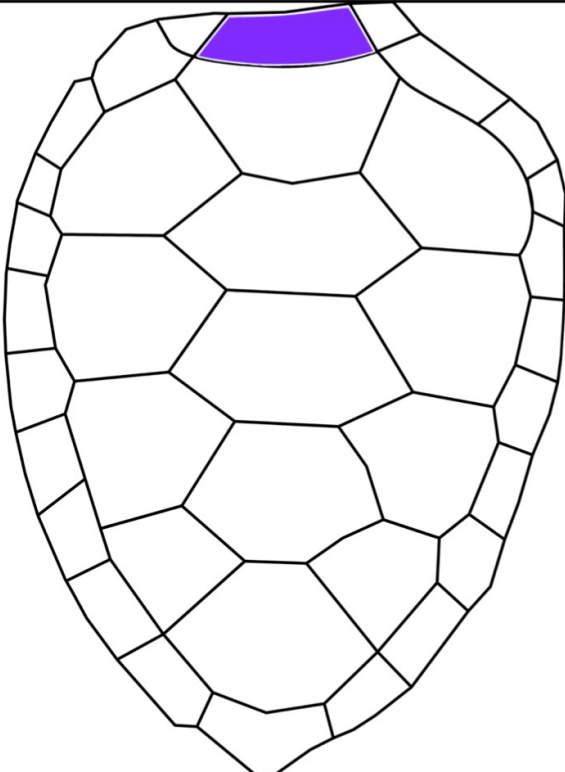
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The diagram shows a top-down view of a turtle shell, divided into various scutes. The scutes are arranged in a symmetrical pattern, with a central row of five scutes and rows of scutes extending outwards to the edges. The scutes are represented by black outlines on a white background.

Scutes

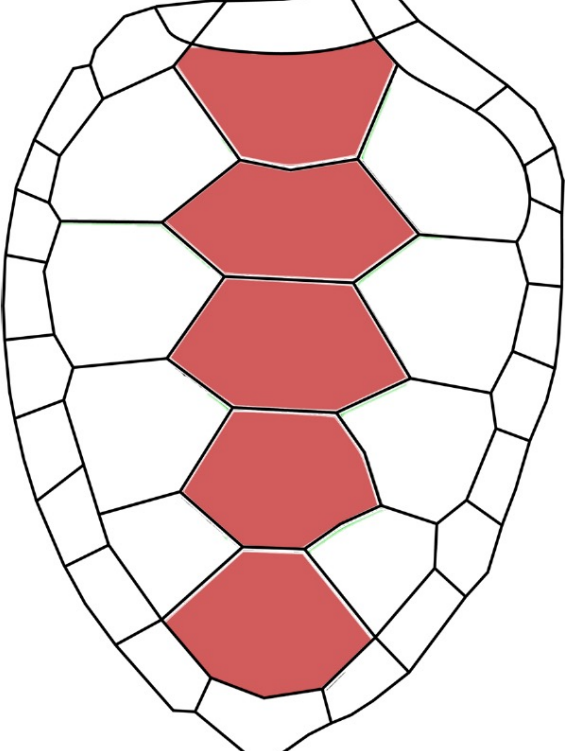
- The scales or special plates that cover a turtle's bony shell are known as **scutes**.
- Researchers use the pattern of these scutes to identify turtles and tell who is who.



The diagram shows a top-down view of a turtle shell, similar to the one above. The top-most, central scute is highlighted in purple. This scute is the nuchal scute.

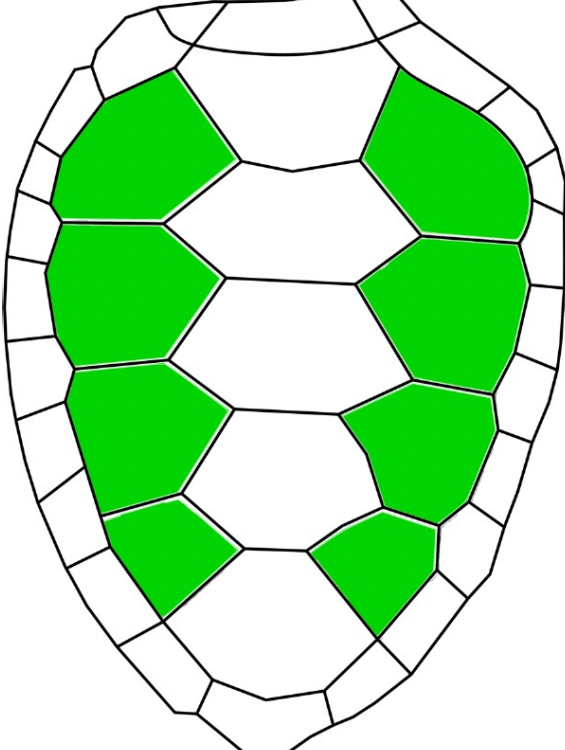
Nuchal

- The top, central scute is called the **nuchal**.
- All hard-shelled sea turtle species have a nuchal scute, which is helpful for researchers when taking size measurements.
- To measure the length of a turtle's shell, researchers start at the top of the nuchal and measure all the way down to the tip of the shell.



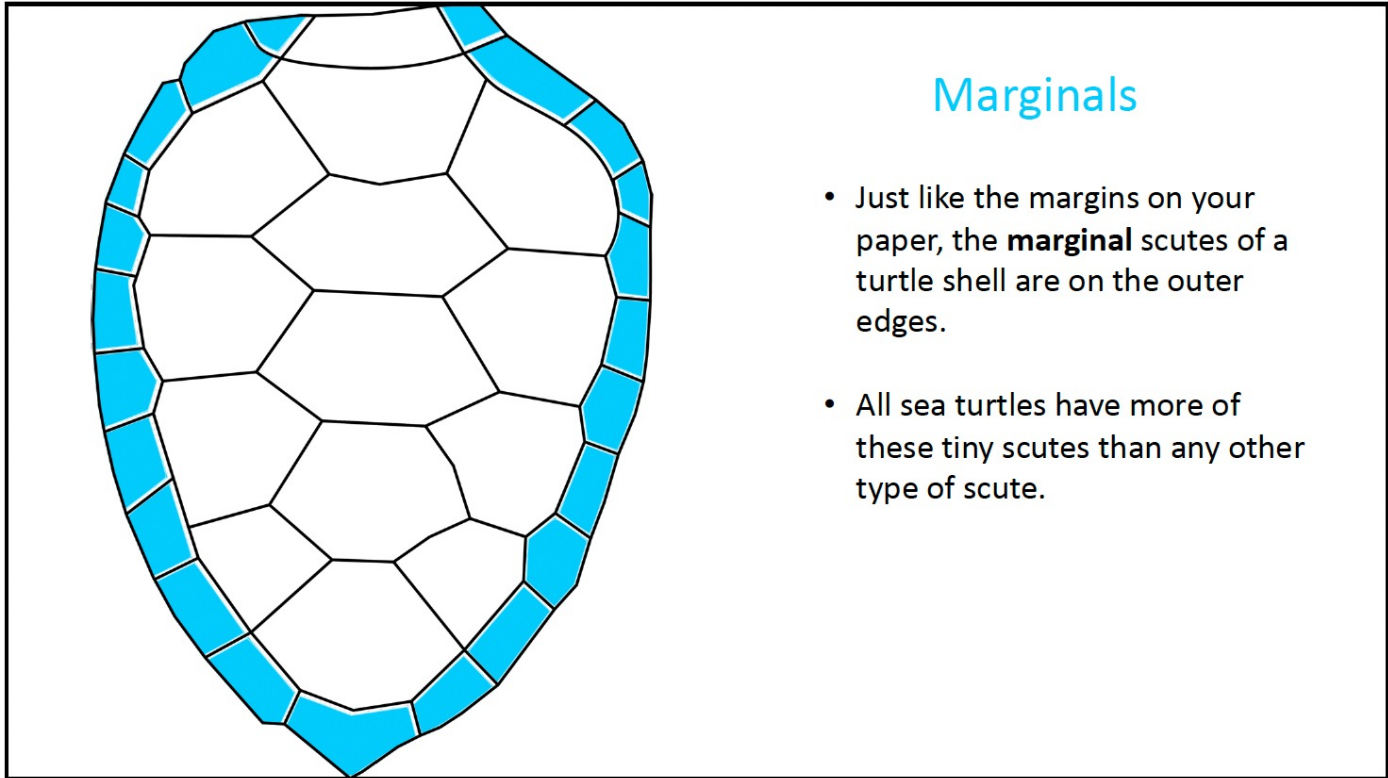
Vertebrales

- The **vertebral** scutes run along the center of a sea turtle's shell over their spine, or vertebral column.
- Did you know a sea turtle's spine is fused to its shell?



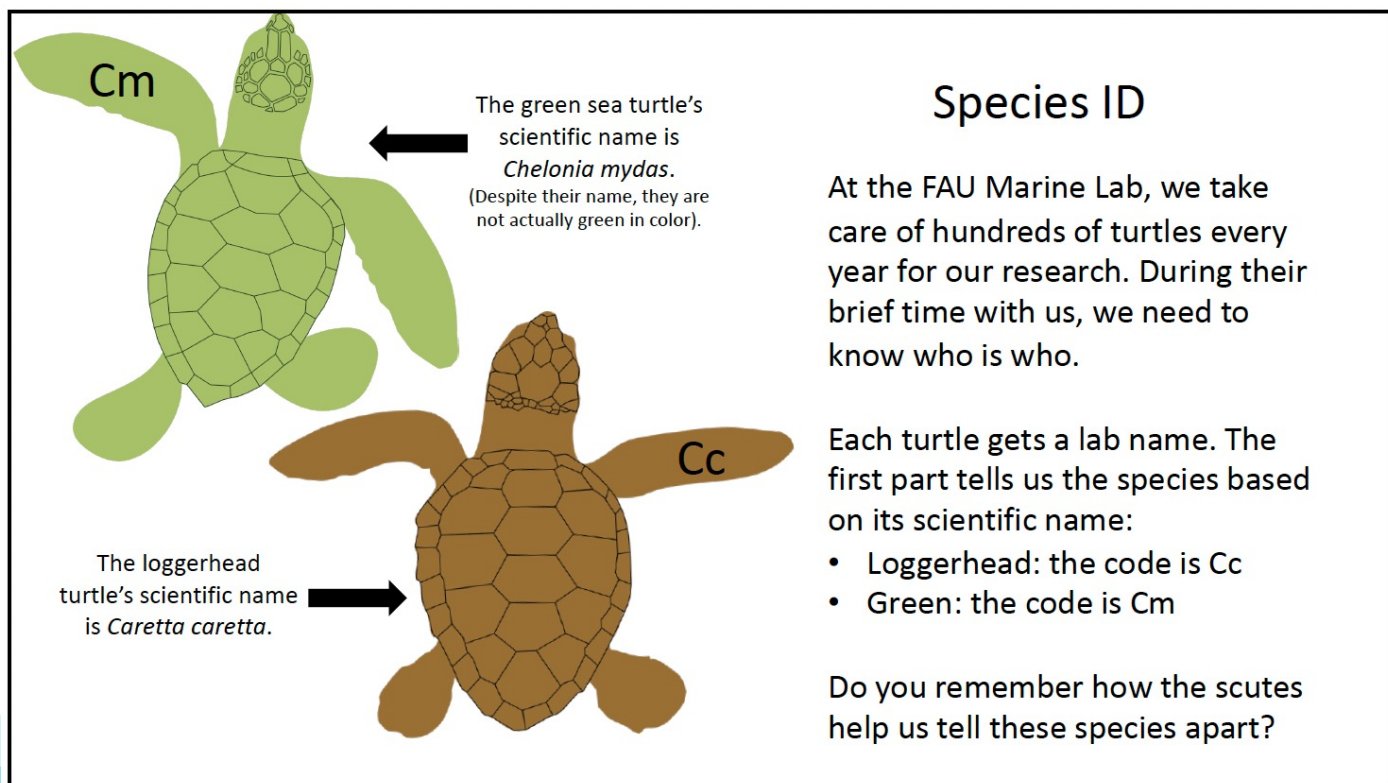
Laterals

- On either side of the vertebral scutes, are the **laterals**.
- Lateral scutes are very important in sea turtle species ID. For example:
 - Green sea turtles will have 4 lateral scutes on each side that do not touch the nuchal.
 - Loggerhead sea turtles have 5 lateral scutes, and the top scute on each side touches the nuchal.
- Can you guess what species this turtle shell is?



Marginals

- Just like the margins on your paper, the **marginal** scutes of a turtle shell are on the outer edges.
- All sea turtles have more of these tiny scutes than any other type of scute.



Species ID

At the FAU Marine Lab, we take care of hundreds of turtles every year for our research. During their brief time with us, we need to know who is who.

Each turtle gets a lab name. The first part tells us the species based on its scientific name:

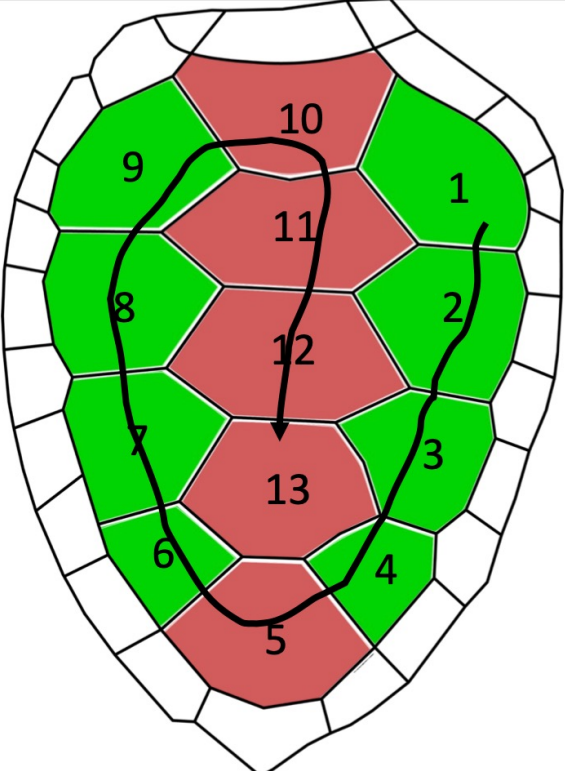
- Loggerhead: the code is Cc
- Green: the code is Cm

Do you remember how the scutes help us tell these species apart?

Supplemental Material 4: Student Reading

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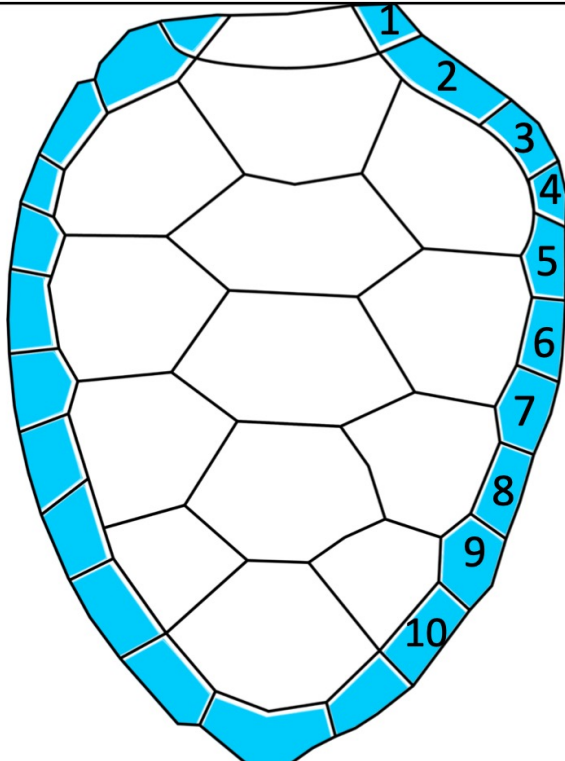


Clutch ID

It is also important to keep track of which turtles came from the same nest, or clutch.

If they come from the first nest of the season, their name will have a 1 in the **hundreds place**.

We paint a specific lateral or vertebral scute with non-toxic nail polish to keep track of this number.



Individual ID

The FAU Marine Lab brings in up to 10 hatchlings from each clutch, so we need to be able to tell siblings apart as well!

The individual number of each turtle goes in the **ones place**, and that marginal scute gets painted.

This ensures every turtle in our care has a distinct name.

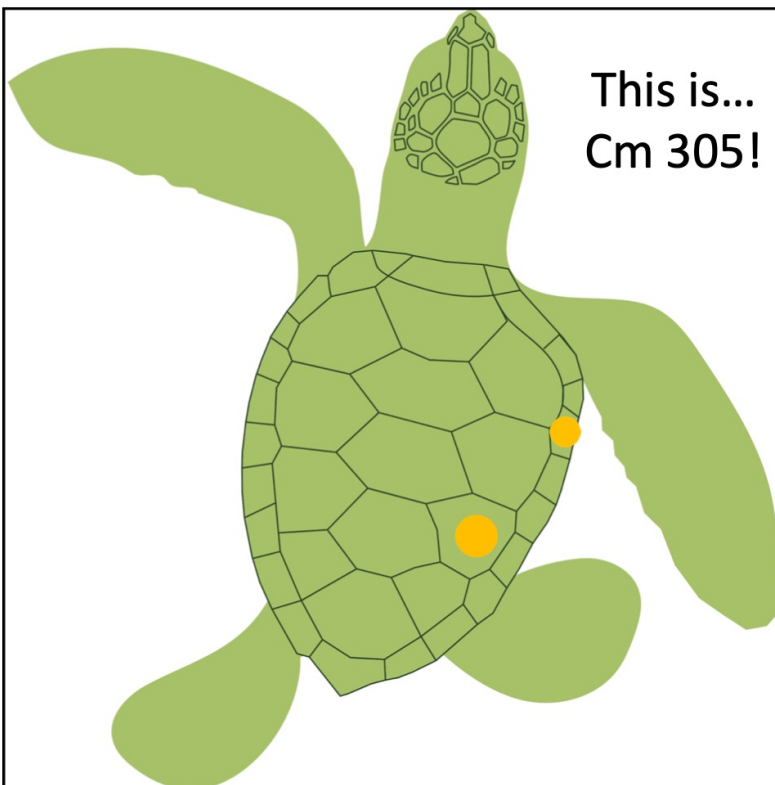
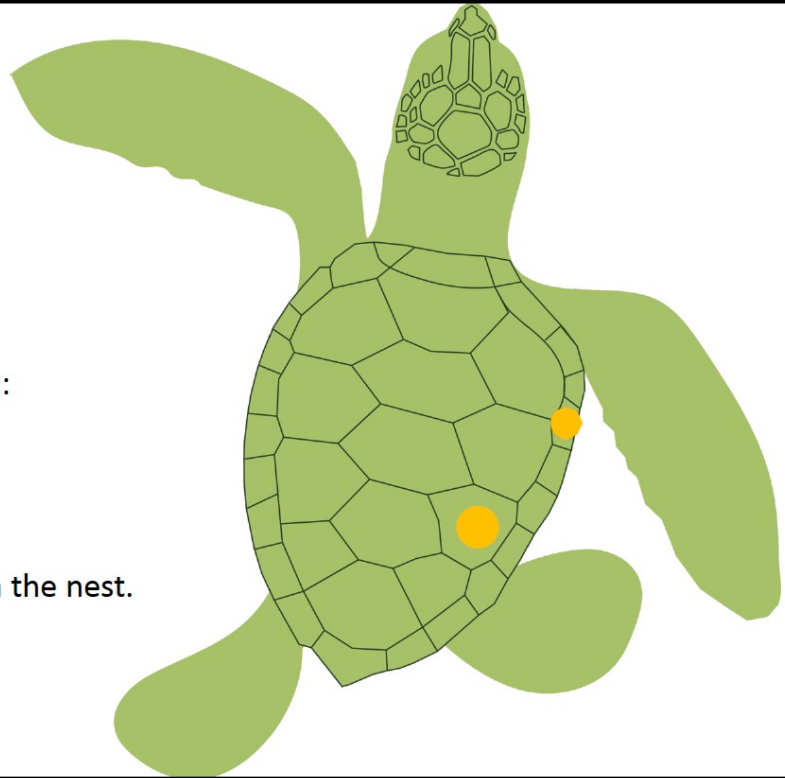
Supplemental Material 4:
Student Reading
Page 5

Let's try it!

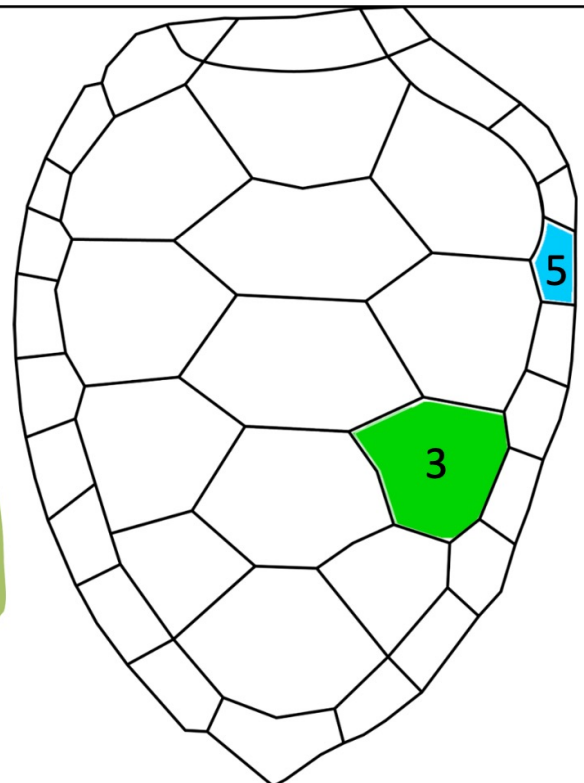
Can you name this
sea turtle?

We will give you some clues this time:

This is a **green** sea turtle hatchling,
from the **3rd nest** of the season,
and the **5th turtle** we checked in from the nest.



This is...
Cm 305!

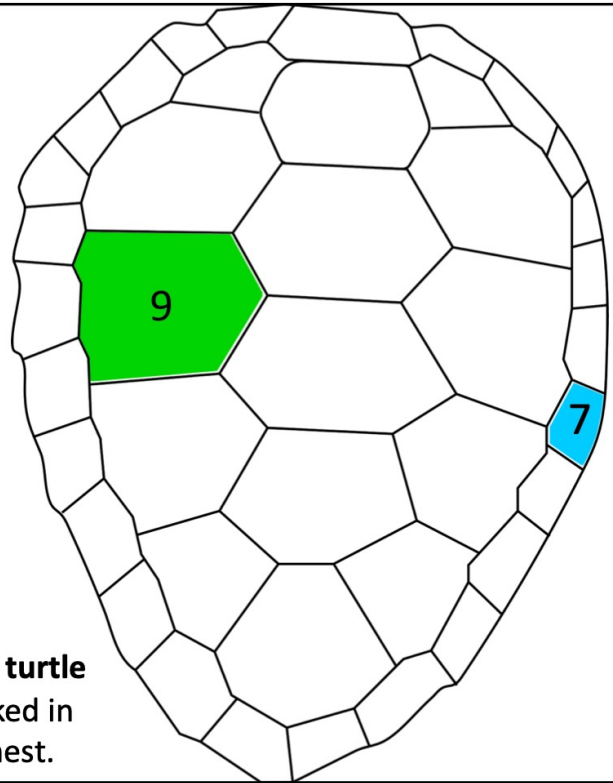
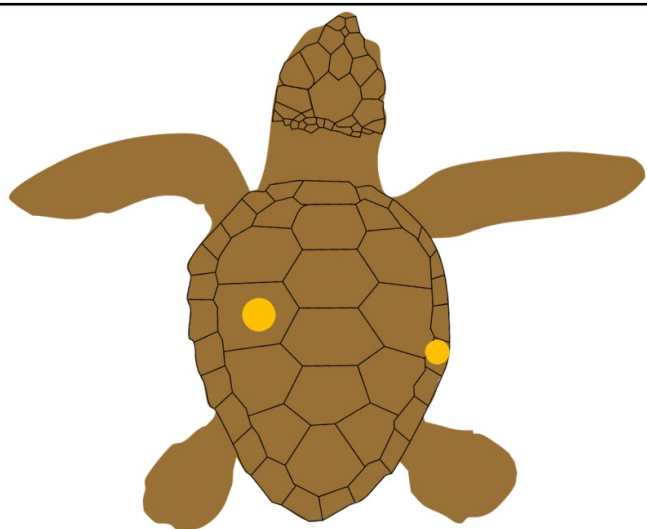
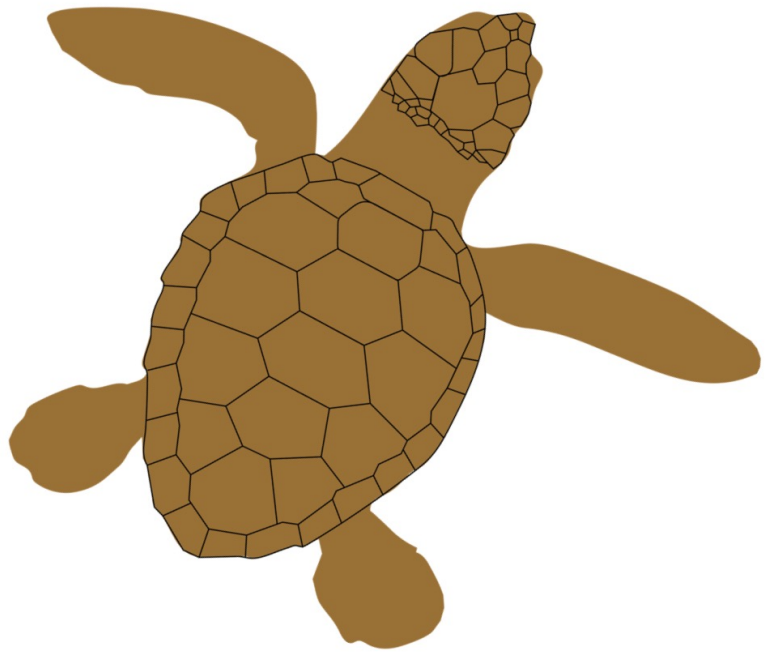


**Supplemental Material 4:
Student Reading**
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Let's try it in reverse!
Can you paint this sea turtle?

Only one hint this time:
This is **Cc 907**.

What can you tell us about the species, nest number, and individual number if this turtle?



Cc 907

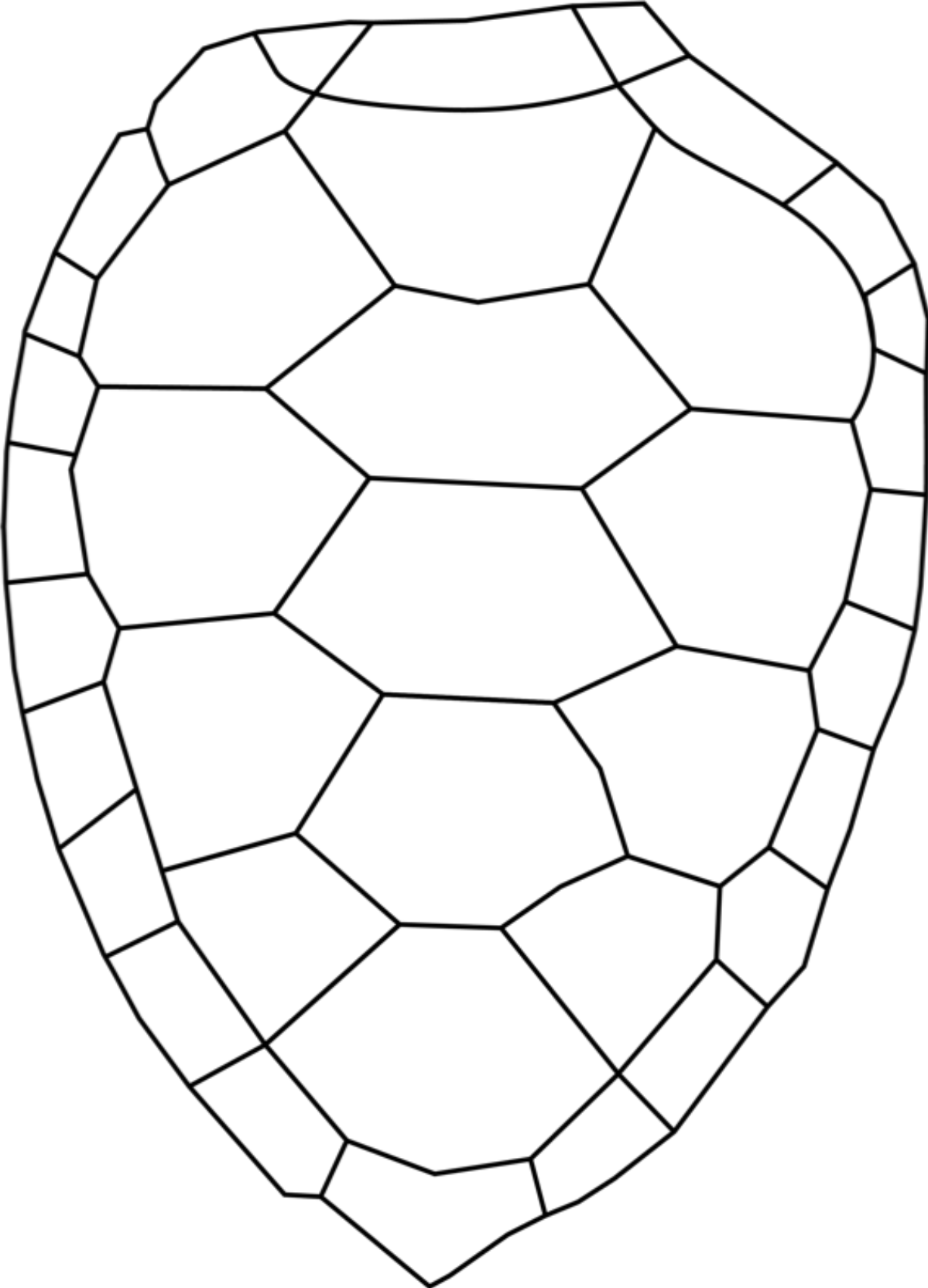
This is a **loggerhead** hatchling,

from the **9th** nest of the season,

and the **7th** turtle to be checked in from that nest.

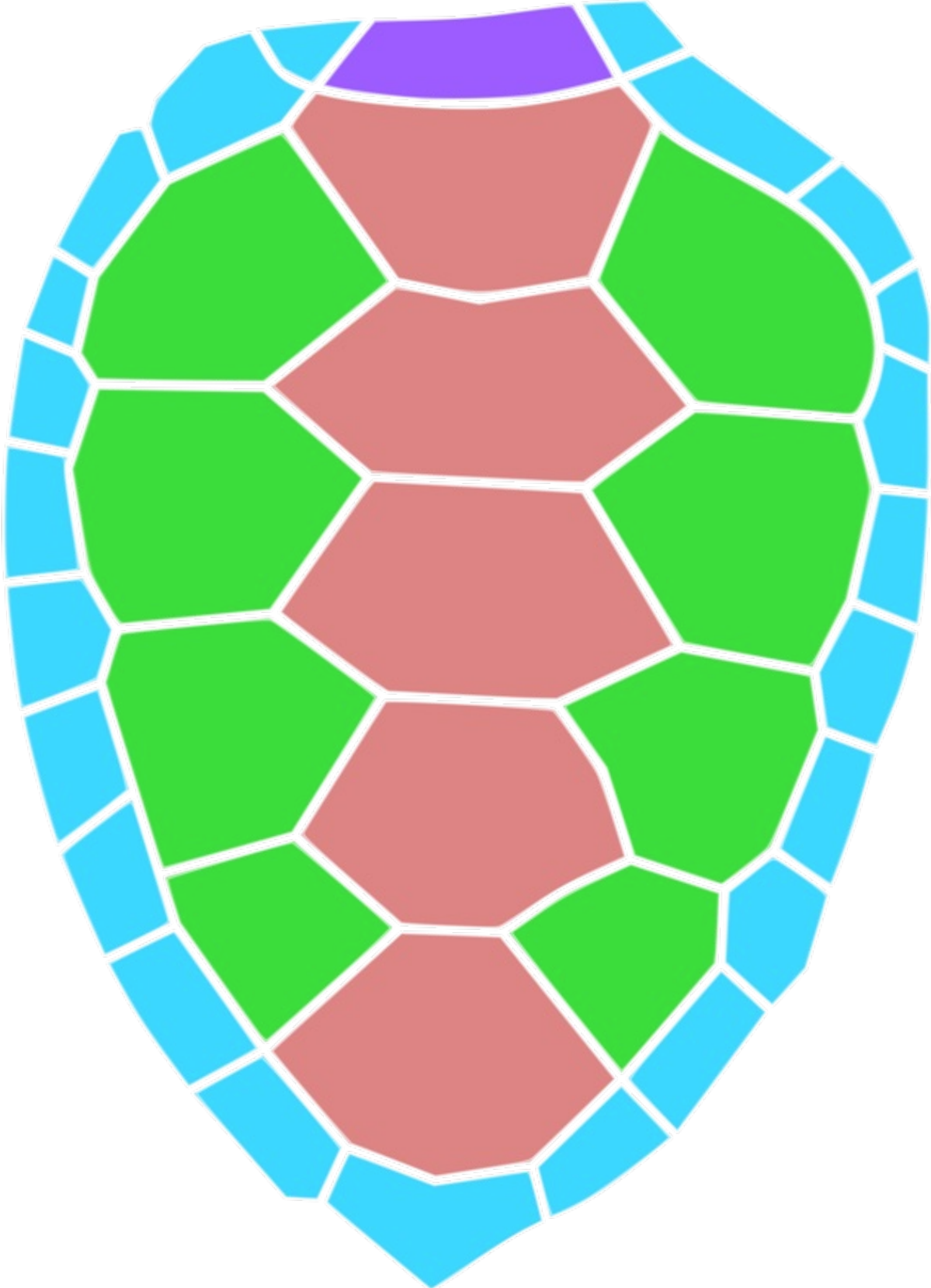
**Supplemental Material 5:
Puzzle Base**

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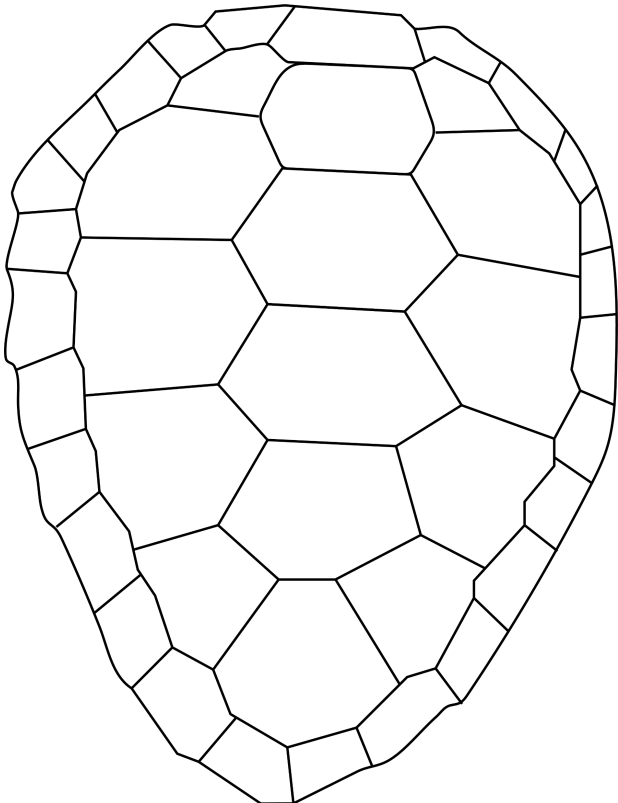
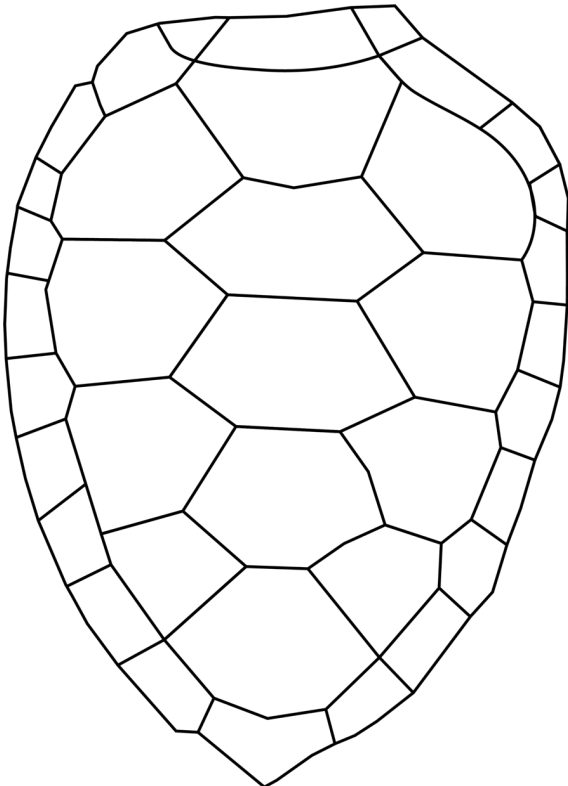
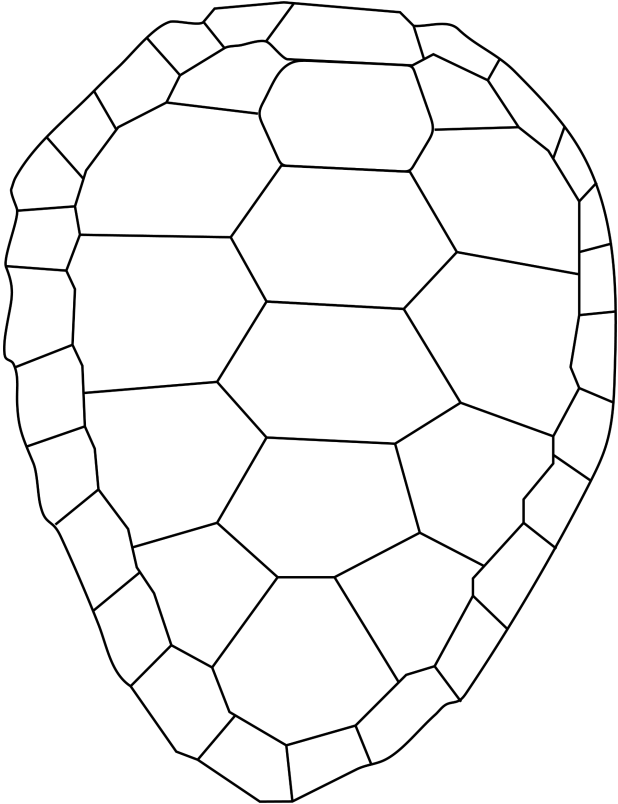
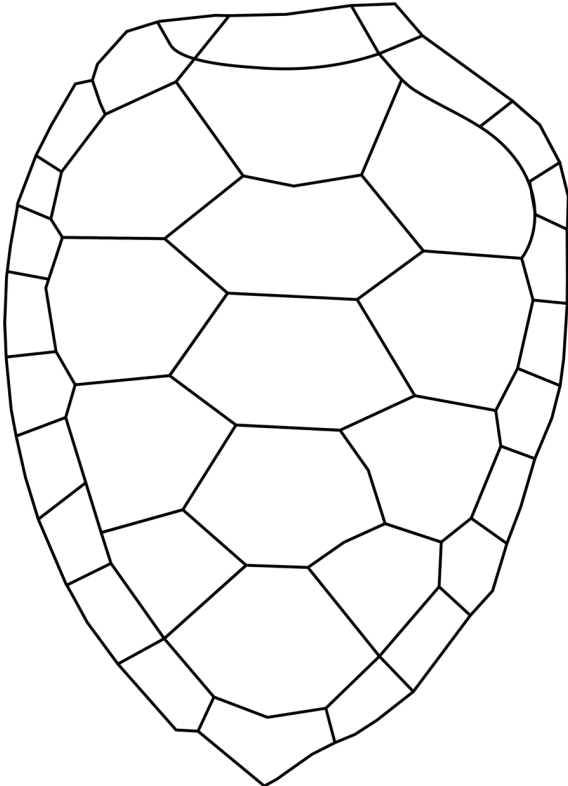
**Supplemental Material 6:
Puzzle Pieces**

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**Supplemental Material 8:
Student Game Board**

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About Us:

This lesson was created by the FAU Marine Science Laboratory and the Glenn W. & Cornelia T. Bailey Marine SEA Scholars.

The FAU Marine Science Lab is a unique site of scientific inquiry and discovery where faculty and students conduct world-class research on marine species like sea turtles and sharks.

The Glenn W. and Cornelia T. Bailey Marine SEA Scholars program develops well-rounded, skilled, and knowledgeable people who are motivated to understand science through established studies, public engagement and outreach, and effective communication of science to broad audiences.

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