Design-a-Diamondback

GRADE LEVEL: K - 5

TIME: 30 MIN

SUMMARY

In this lesson, students will learn about turtle adaptations as they "design" a diamondback terrapin using a volunteer as a life-sized model.

OBJECTIVES

1. Identify and describe physical adaptations that are unique to turtles and specifically diamondback terrapins.
2. Explain how differences in habitat lead to different adaptations.

VOCABULARY

- **Adaptation** - A behavior or physical feature that enables an organism to survive in its habitat.
- **Brackish Water** - A mixture of seawater and fresh water.
- **Camouflage** - Natural coloring of animals that help them to blend in with their background.
- **Carapace** - The bony top of a turtle's shell
- **Dredging -** The process of removing sediment from shipping channels.
- **Dredged Material -** The sediment removed from the shipping channels.
- **Draft-** The vertical distance between the water surface and the bottom of the ship.
- **Lungs** - Each of the pair of organs situated within the rib cage, consisting of elastic sacs with branching passages into which air is drawn, so that oxygen can pass into the blood and carbon dioxide be removed.
- **Plastron** - The bony underside of a turtle's shell.
- **Predator** - An animal that naturally preys on other animals.
- **Shipping Channels -** Areas in the water that are maintained to a depth that can accommodate cargo ships. They are marked by buoys and identified on nautical charts (so captains know where to travel).
- **Scute** - A bony plate of a turtle's shell.
- **Webbed Feet** - Feet or toes that have a piece of skin between the toes .
- **Wetland -** Ecosystems containing water, specialized soils, and plants adapted to living in water-saturated soils. Marshes, swamps, and bogs are types of wetlands.

MATERIALS

- Laminated yellow and blue adaptation cards (may need duplicates to accommodate larger classes)
- Clothes pins
- Laminated wetland photo
- Spray bottle with water
- Adaptation props to correspond with yellow and blue cards (costume)
    - Felt turtle costume
    - 2 whoopie cushions
    - Foam turtle mask
    - 4 white legwarmers with black spots
    - Felt cut-outs (scutes)
    - Goggles
    - 4 swim fins with foam board toenails

BACKGROUND

Because the Port of Baltimore performs maintenance dredging each year (see general introduction), placement sites for dredged material removed from shipping channels are constantly used to contain the sediment. The sediment is often used to restore and support habitat at the placement sites. The restored habitat at these placement sites has attracted a wide array of animals by providing thriving habitats. Animals that are attracted to these sites have special adaptations that allow them to live in wetlands. One animal is the diamondback terrapin. A terrapin is a type of turtle and shares many adaptations with other turtle species. It also has specialized adaptations that make it perfect for the restored Chesapeake Bay habitat that is found at dredged material placement sites.

ACTIVITY

1. **Engage/Elicit (5 min):**
   Describe the Port of Baltimore including its contribution to the financial wellbeing of the state, and the stewardship it provides to Chesapeake Bay wildlife. Explain that one of the many animals that has benefitted from habitat restored by the Port of Baltimore is the diamondback terrapin. The reason the diamondback terrapin has benefitted is that it has special adaptations that allow it to live in Chesapeake Bay habitats. Discuss and define adaptation (a trait that helps a plant or animal survive in its environment). Explain that "today we are going to explore the world of turtles and look at some adaptations of a special kind of turtle, the diamondback terrapin."

2. **Explore (5 min):**
   Ask for a volunteer. This student will be turned first into a turtle, then into a diamondback terrapin. Distribute all flash cards (yellow and blue) to students. Keep all props at the front with you.

3. **Explain (15 min):**
   Begin building a generic turtle. Start by calling on students with the yellow cards. (See chart below) Ask them to read the card aloud. Find any other students that have the same card. Have students come up and find the prop(s) that fit the adaptation (help students if necessary) and hand the props to the volunteer to wear. As students attach items to the volunteer's costume, elaborate on the adaptation (as suggested in the third column). After the first transformation to a turtle is complete, announce "Now that our volunteer has been turned into a turtle, let's take it a step further and turn him/her into a special kind of turtle – a diamondback terrapin." Explain that terrapins are turtles that live in brackish water. Ask for someone to explain the definition of brackish water (a mixture of salt and fresh water). Explain that because terrapins live in this special kind of water, they have special adaptations. Have the volunteer stand on the laminated wetland photo to demonstrate this habitat preference. Spray the area around the volunteer ***lightly*** *(not enough to saturate!)* with the water spray bottle. Announce "Our turtle is now a brackish water-loving terrapin!" Next, as with the "generic turtle", ask students with the blue flash cards to help "build a terrapin." Call on them in turn to read the card aloud and come up and find the prop(s) that fits their adaptation. Discuss the adaptations as you proceed (third column).

4. **Evaluate/Wrap-Up (5 min):**
   What makes a turtle a turtle (hard shell, lungs, strong beak)? Describe three special adaptations of terrapins that set them apart from other turtles (thin skin with spots, scutes with diamond patterns, salt gland, large webbed feet with long nails). Why would terrapins need these adaptations (because they are the only kind of turtle to live in brackish water so they need special ways to deal with living in the marsh)?

DIVE DEEPER

If time allows, bring out a live terrapin and point out each adaptation. If applicable, follow DNR regulations regarding minimum age allowed to handle the terrapin, and provide gloves to those who are old enough.

Adaptations Unique to Turtles

Adaptation on front of card	Student will read (from back of card):	You say:	Prop to be used
Hard Shell	A hard shell protects a turtle's soft body.	The shell on a turtle's belly is called a plastron. The shell on a turtle's back is called the carapace. The carapace is actually its backbone and ribs!	Felt costume
Lungs	Many turtles can hold their breath underwater for several hours, but they all have lungs just like people.	Here are the lungs so that the turtle can breathe air.	Whoopie cushions (plus clothes pins)
Strong Beak	Turtles have a strong beak to crush their food.	Turtle have no teeth so they use their beak along with their front feet to rip and crush their food.	Foam mask

Adaptations Unique to Diamondback Terrapins

Adaptation on front of card	Student will read (from back of card):	You say:	Prop to be used
Thin skin with spots	Camouflage helps terrapins blend in with their background.	Where do terrapins live? (wetlands/marshes) The spots on their skin help them blend in with marsh grasses.	2 white legwarmers with black spots. Put them on the volunteer's wrists.
Scutes with diamond patterns	These diamond patterns help with camouflage and give the diamondback terrapin its name.	A terrapin's carapace is covered in tile-like sections called "scutes."	Felt cut-outs (plus clothes pins or Velcro). Place them around the back of the felt costume.
Salt gland	Because terrapins live in water that has salt in it, they need to have a way to get rid of salt from inside their body.	The salt leaves the terrapin's body through a gland next to their eye.	Goggles/sunglasses
Large webbed feet with long nails	Thin skin between their toes helps terrapins paddle through the water. Long nails help them crawl through mud.	Picture a diamondback terrapin's habitat. They spend most of their time in the water, so they need to be able to swim well. When the females lay a nest, they need to be able to dig in the mud.	2 swim fins with foam board toenails. Place these on the volunteer's hands.

Yellow Cards (Turtle Adaptations) Title Slide

Hard shell	Lungs
Strong beak	

Yellow Cards (Turtle Adaptations) Description Slide

Many turtles can hold their breath for several hours, but they all have lungs just like people.	A hard shell protects a turtle's body.
	Turtles have a strong beak to crush their food.

Blue Cards (Terrapin Adaptations) Title Slide

Thin skin with spots	Scutes with diamond patterns
Salt gland	Large webbed feet with long nails

Blue Cards (Terrapin Adaptations) Description Slide

These diamond patterns help with camouflage and give the diamondback terrapin its name.	Camouflage helps terrapins blend in with their background.
Thin skin between their toes helps terrapins paddle through the water. Long nails help them crawl through mud.	Because terrapins live in water that has salt in it, they need to have a way to get rid of salt from inside the body.