



E d u c a t i o n a n d R e s e a r c h : T e s t i n g H y p o t h e s e s

Lesson Plan—What Does Your Sawfish Eat?

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Summary

There are 5 species of sawfish, determined by their body shape and teeth placement on the rostrum. Based on these differences, students will attempt to answer if there is an affect on the diets of these species. Students will design and build scale models of the rostrums of the five species (dwarf, long tooth, green, small tooth, narrow) and test which size marine wild life can be caught with those models. Students will explore scale models, species diversity, and adaptations. Students will also be engineering the rostrums from diverse materials, allowing for creativity in their model design. To construct their models, students will be using data from wildlife biologists who have categorized sawfish based on tooth size and tooth placement on sawfish rostrums.

[TAGS: Marine science, sawfish, rostrum, adaptations, scientific models, ecosystems, scale models, mathematics, creativity, design, engineering.]

Key Concepts

- Marine science, sawfish, rostrum, adaptations, scientific models, ecosystems, scale models, mathematics, creativity, design, engineering
- NGSS
 - LS1.A: Structure and Function
 - LS4.B: Natural Selection
 - LS4.C: Adaptation
 - ETS1.A: Defining and Delimiting Engineering Problems
 - ETS1.B: Developing Possible Solutions
 - ETS1.C: Optimizing the Design Solution

Objectives

Include clear, measurable statements of what students will be able to do, such as:

- *Identify differences between sawfish species based on rostrum teeth size and placement*
- *Construct a scale model of sawfish rostrums*
- *Demonstrate scientific models*
- *Communicate results of different model systems*

Materials

- rulers
- corrugated cardboard
- combs of different sizes
- toothpicks
- skewers
- tape
- glue
- popsicle sticks
- data recording sheets
- gelatin
- tissue paper
- balloons
- large plastic bins
- timer

Procedure

1. Lesson prep-make gelatin wiggler fish, cut out tissue fish, inflate balloons.
2. Share what students think they know about sawfish.
3. Explore images of sawfish species and match with names.
4. Compare lengths of rostrums between species (looking at the numbers from research paper put into a table), space between teeth and length of teeth.
5. Break into five groups. Each group designs a scale model of one of the sawfish species.
6. Layout material at stations.
7. Groups construct their models.
8. Test models on tissue fish, gelatin fish, and balloon fish in fish tank (large plastic bin).
9. Record how many fish are injured and of what size.



10. Improve design of sawfish model.
11. Retest in fish tank.

Reflection and Evaluation

- Students share results of different species' models, including what surprised them.
- **Performance**—During the lesson, students will demonstrate understanding how scientific models aren't perfect models of actual sawfish. As a reflection, students will share what inferences can be made with the data collected and what inferences should not be made.
- **Product**—During the lesson, students will construct a model of a sawfish rostrum and demonstrate its function.
- Assessment should be directly related to the lesson objectives
 - *Identify differences between sawfish species based on rostrum teeth size and placement.* During student group presentations, audience members will attempt to identify the sawfish species based on the presented model
 - *Construct a scale model of sawfish rostrums.* Successful models will be shared with the entire class.
 - *Demonstrate scientific models.* By sharing data of types and size of fish injured by the model rostrum, students can evaluate the utility of their model system.
 - *Communicate results of different model systems.* Groups will discuss how their data can be used to understand the different sawfish species.



Additional Resources

Please list any Web sites, books, publications, or other resources that would be helpful for teachers or students preparing for this lesson.

