



All about fish: Structure, print, and build



Time:

Introduction: 30 minutes

Activity 1: 40 minutes

Activity 2: 40 minutes

Activity 3: 40 minutes

Total Time: 150 minutes

Objectives

Students will...

- Explain the functions of the body parts of different fish
- Identify the body parts of a fish
- Construct a model of a fish

STEAM connections

Science — Students discover how each specific feature of both a fish and an underwater vessel play a role in navigating through the water.

Technology — Students conduct research on their assigned fish using a variety of websites.

Suggested Research Websites

- Piranha — <https://www.coolkidfacts.com/piranhas-facts/>
- Flounder — http://www.softschools.com/facts/animals/flounder_facts/1400/
- Trout — http://www.softschools.com/facts/animals/rainbow_trout_facts/693/
- Carp — http://www.biokids.umich.edu/critters/Cyprinus_carpio/
- Salmon — http://www.softschools.com/facts/animals/salmon_facts/658/
- Largemouth Bass — https://www.ducksters.com/animals/largemouth_bass.php

Engineering — Students create a model of their own mechanical fish that will enable them to explore the habitat of their fish.

Art — Students will create a print of their assigned fish.

Math — Students measure their model fish. They'll compare the length and width of their model fish with what they learn about the length and width of their actual fish.

Content

Students will research a specific fish and determine the biology that helps the fish live underwater. Using their research, students will create a prototype of their own mechanical fish that will help them investigate the habitat of that particular fish. Finally, students will write a short story about their mechanical fish adventure and use printmaking skills to illustrate their short story.



Standards

3-LS3-2 — Use evidence to support the explanation that traits can be influenced by the environment.

3-LS3-4 — 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.

4-LS1-1 — Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

VA:Cr1.1.3a — Elaborate on an imaginative idea.

VA:Cr1.2.3a — Apply knowledge of available resources, tools, and technologies to investigate personal ideas through the art-making process.

VA:Cr2.1.3a — Create personally satisfying artwork using a variety of artistic processes and materials.

VA:Cr2.3.3a — Individually or collaboratively construct representations, diagrams, or maps of places that are part of everyday life.

VA:Cn10.1.3a — Develop a work of art based on observations of surroundings.

VA:Cn11.1.3a — Recognize that responses to art change depending on knowledge of time and place in which it was made.

Introduction

1. Read or have students watch the video for *Papa's Mechanical Fish*. Ask students to pay careful attention to the different features of the fish that are described and how Papa integrates those features as he modifies his design.
2. Stop after each construction. Ask students what worked well and what didn't work well with each construction. Also ask why it is important for Papa to consider those particular fish features.
3. After finishing the story, work together to create a list of both fish and mechanical fish features that work well to navigate through the water.
4. Tell students that they are going to become an expert about one particular kind of fish. Show them an image and the corresponding fish replica for each of the six fish: piranha, flounder, trout, carp, salmon, and largemouth bass. As you show each fish and corresponding replica, name the fish, ask students what they notice about each fish, and ask them to compare and contrast the different kinds of fish. Sample comparison examples:
 - The flounder is longer than the piranha.
 - The carp and the trout both have two small fins on the bottom of their bodies.
5. Assign each student one of the fish.

Activity 1

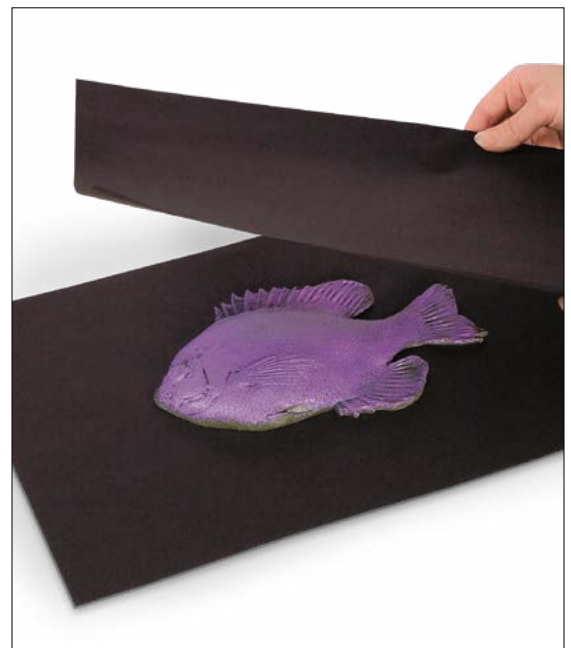
1. Students will conduct research on their assigned fish. Provide them with a graphic organizer and the website they'll use to find their information.
2. Have students fill out their fish bone by adding an important detail about their fish in each bubble. Next, have them write a paragraph about their fish. Finally, have them make some measurements based on what they learn about the actual size of their fish compared to the replica of the fish.
3. You can also have each fish group get together and share their expertise about their assigned fish with the rest of the class.



Activity 2

Students will complete a print of their fish.

1. Select a few iridescent acrylic paints or inks and place a small bit of each onto an old plastic lid (old margarine or whipped topping lids work well for this). Make sure to add some white to your colors. Besides having a shiny quality, the white seems to lighten up all the other colors and make them more dynamic on black paper. Set the plastic lids with paints around the room like stations and let students move from one station to another, depending on the colors they wish to use.
2. Have students place their fish replica on a clean surface — flat side down.
3. Students should coat the brayer lightly with paint or ink and roll evenly onto the fish. This may also be done with a brush, which makes it easier to vary the colors of paint directly on the fish. If using a brush, be sure to brush from the head to the tail. A brush may also be used to accent the gills, fins, or eyes. Students should be sure to apply only a thin layer of paint/ink on the fish, otherwise the detail of the scales won't show up. When done, students should move their fish to a clean area to avoid any paint/ink that may have gotten on their work surface.
4. **For printing on paper** — Students should take a sheet of paper and lay it on top of the fish. They should be sure to hold the paper still with one hand so it doesn't move and cause a double image or smudging. Holding the paper in place with one hand, students should use the other hand to transfer the image to paper by rubbing the entire fish surface. Remind students to rub all the areas — head, tail, and fins.
5. **For printing on fabric** — Students need to lay the fish paint-side down on the shirt and use a gentle rolling motion to transfer the print of the fish onto the shirt. Students should be sure to rub down on the tail, fins, and head. They will also need to lift up the dorsal fin and pull down on the anal fin to make sure their images print. NOTE: It's a good idea to do a couple of practice prints using this method before printing on the actual piece of fabric or T-shirt.
6. Students can now add embellishments. They can use black and accent the details of their fish, like the tail, fins, and eyes. They can also create their fish's habitat by adding details of their environment to the background.
7. Once the prints have dried, ask students to label some of the parts of the fish, such as the gills, fin, dorsal fin, eye, mouth, tail, and scales.



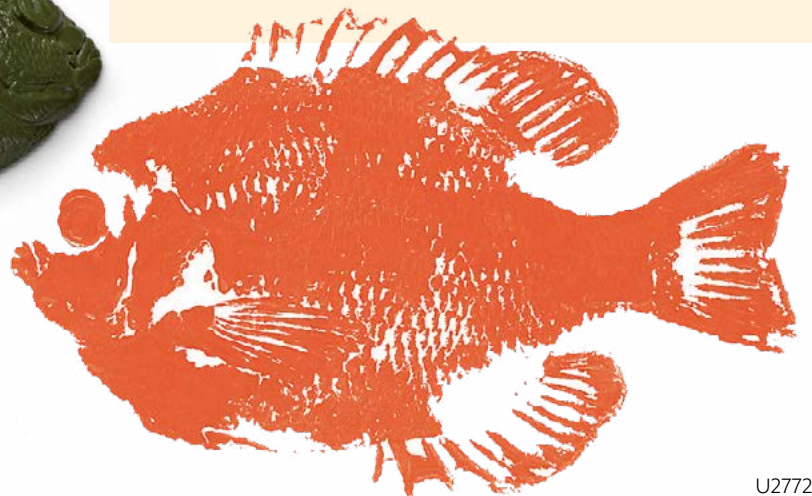


Activity 3

1. Ask students to reflect on what helps both Papa's mechanical fish and the fish they researched move through the water, especially on the similarities and the differences.
2. Show students the list they generated as you read *Papa's Mechanical Fish*. Students will create their own three-dimensional mechanical fish model by using the simple building materials you provide to create their model. Take a few moments to brainstorm how different building materials could be useful for different features of their underwater vehicles.
3. Hand out the "Design process sheet" and have students fill this out as they build their model. Students should choose two or more features that help the fish move through the water and incorporate them into their fish model design.

Materials list

- *Papa's Mechanical Fish* by Candace Fleming (https://www.youtube.com/watch?v=QV2mKBPd_ug)
- Fish bone graphic organizer (included)
- Design process sheet (included)
- Materials Kit for All About Fish, Vol. 2 (**SB53389**)
- Nasco 4-Scale 12" Student Ruler (**TB26737**)
- Sargent Art® Metallic Acrylic Paints, set of 6 (**9722513**)
- Sargent Art® Acrylic Glitter Glaze, 16 oz. (**9719915**)
- Liquitex® Iridescent Tinting Medium, 8 oz. (**9706939**)
- Liquitex® Ink! Metallics, set of 6 (**9728390**)
- Royal Brush® Big Kid's Choice™ Super Value Brush Set (**9742098**)
- Foam Paintbrushes, 40-piece assortment (**9715991**)
- Foam Rollers, set of 12 (**9724344**)
- Nasco White All Media Drawing Paper, 9" x 12", 500 sheets, 80 lb. (**9728257**)
- Nasco Piranha Replica (**9719197**)
- Nasco Flounder Replica (**9714343**)
- Nasco Trout Replica (**9714344**)
- Nasco Carp Replica (**9713262**)
- Nasco Salmon Replica (**9719198**)
- Nasco Largemouth Bass Replica (**9716673**)
- Simple Building Materials Kit (**TB27626**)



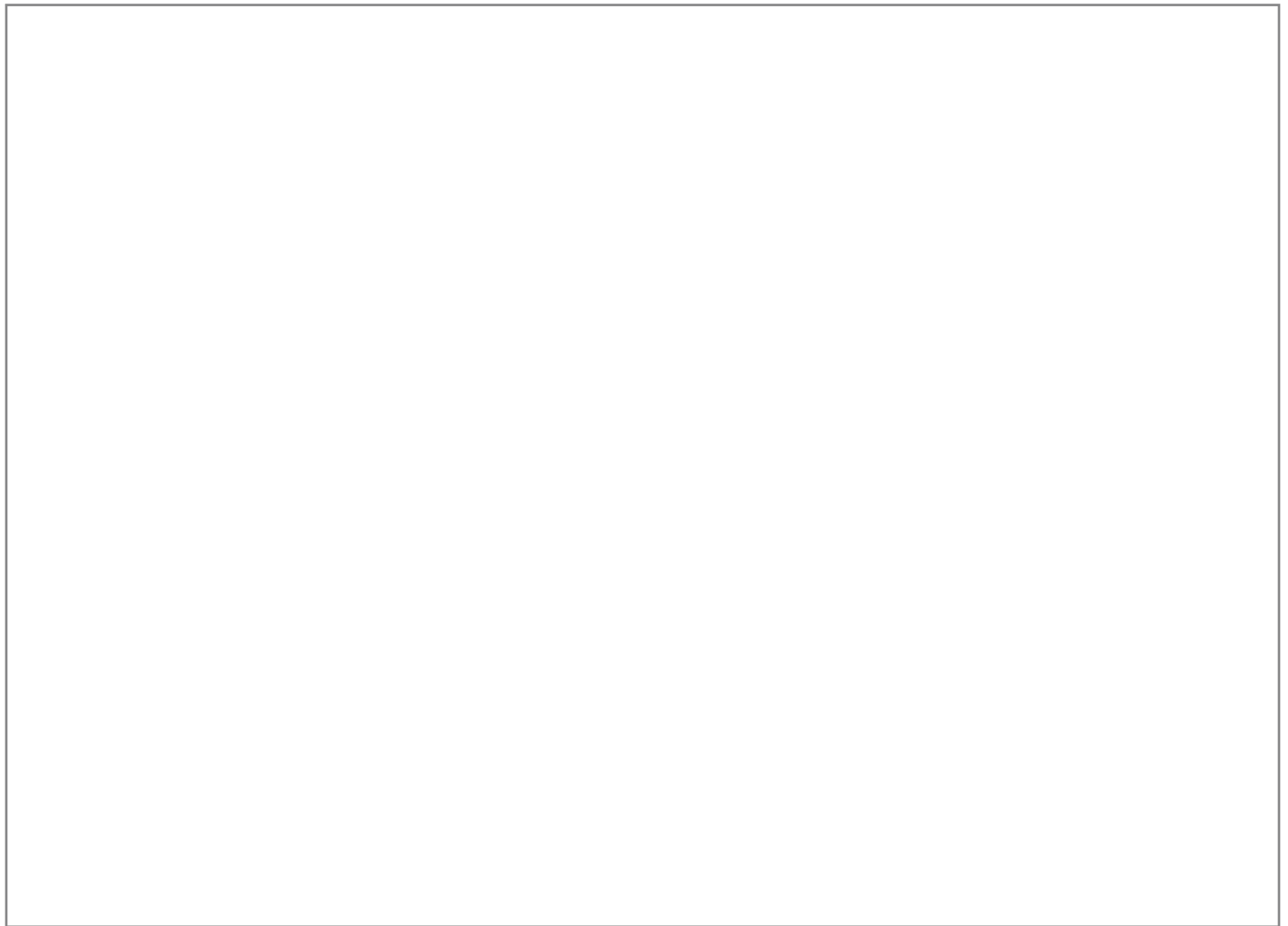
Design process sheet

Name: _____ Date: _____

Step 1: Decide on which features you will focus.

Step 2: Think about the materials you can use to highlight those features.

Step 3: Sketch your model in the space below.



Step 4: Start constructing.

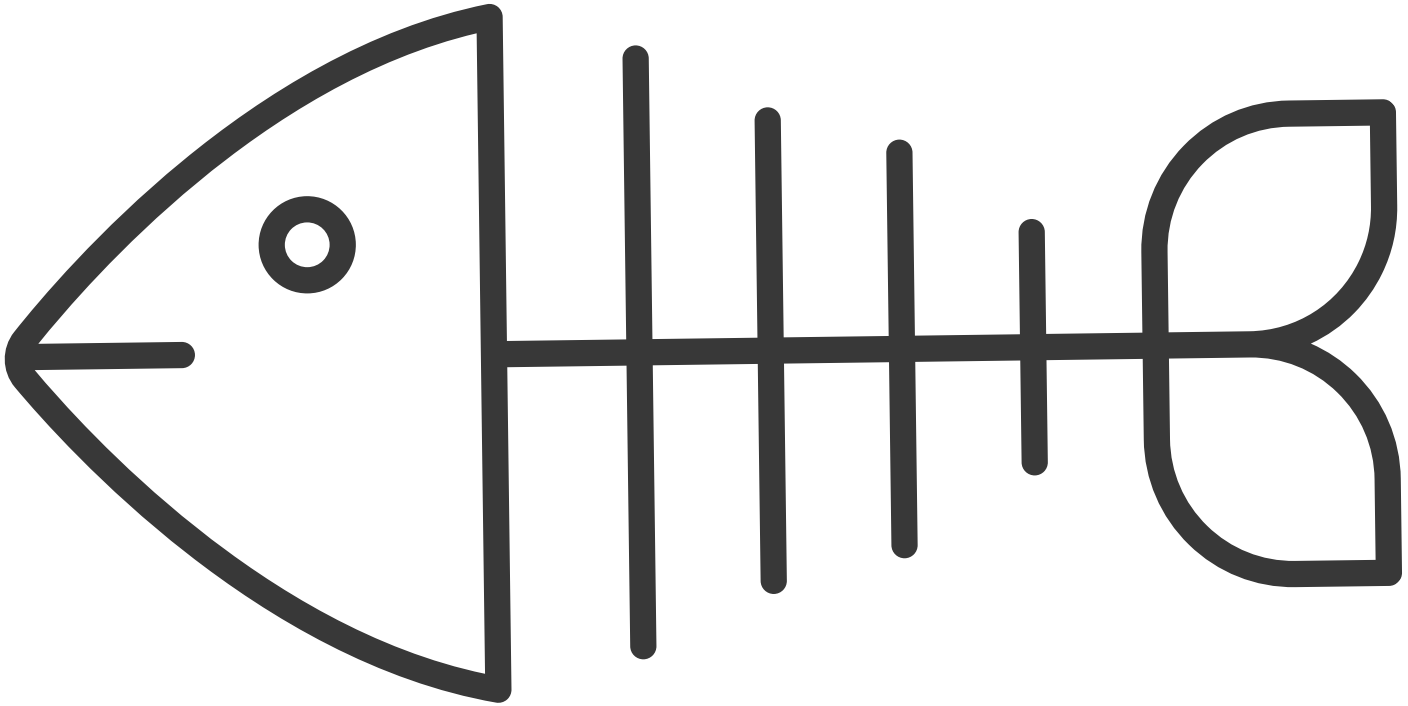
Step 5: On another sheet of paper, write a story about your mechanical fish adventure.

Fish bone graphic organizer

Name: _____ Date: _____

What kind of fish do you have? _____

On each line of the fish bone below, write a fact about your fish.



My Fish Paragraph

Fish Measurements

Actual Fish Length: _____ Model Fish Length: _____ Difference: _____