LESSON 9: BIG MOUTH FROG AND SIMPLE SWIMMING FISH

Activities

Activity 1: Fold a Big Mouth Frog

Activity 2: Fold a Simple Swimming Fish

Models for this lesson:

Big Mouth Frog, Simple Swimming Fish

Materials needed:

Square paper

Targeted grade levels:

K-3 (Frog), 3-6 (Frog and Fish)

Math Concepts:

Shapes, symmetry, congruent, parallel, bisect

Teaching Tips and Techniques:

- Use math vocabulary that best defines your moves as you model the folds with students.
- Discuss which recycled papers might work best for these models.
- Prepare a place where students' work can be displayed.
- Have a student or team of students prepare a series of steps of these models that can be posted on the wall or trifold for future reference.

Lesson Introduction

In this lesson we will share two action models to inspire and promote the visual "magic" of Origami. The first is the Big Mouth Frog by Robert E. Neale, an action model with repeating triangle folds. The second is the Simple Swimming Fish, a variation of Robert E. Neale's 8 Point Star module with the movement of Paul Jackson's Swimming Fish. Both of these folds can be used in art, math, science, and social studies lessons.

If the budget does not support the purchase of Origami paper, remember the "re"-use of printer paper, giftwrap, or old school menus as a viable alternative as we discussed in Lesson 7. Whatever paper is chosen, there is a special delight in creating paper models that move.

It is a challenge keeping young minds focused with traditional teaching methods near the end of the school term or going into a summer session. These fun models can be incorporated into your lessons and offer breadth and depth of understanding for concepts in Common Core Curriculum.

Young and old will find simple joy in making these models to share. Please allow them to quietly share their ideas as well, perhaps discovering how to invent a long tongue for the frog or patterns for schooling their fish.

NCTM Standards:

1. Make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions.

2. Explore congruence and similarity.

3. Investigate, describe, and reason about the results of subdividing, combining, and transforming shapes.

4. Recognize the attributes of length, volume, area, and time; compare and order objects according to these attributes.

5. Explore what happens to measurements of a two-dimensional shape, such as its perimeter and area, when the shape is changed in some way.

6. Describe a motion or a series of motions that will show that two shapes are congruent.

ACTIVITY 1 - *Fold a Big Mouth Frog*

This model is rather forgiving for new and/or young folders. The model has 5 steps involving triangles. The triangular folds get smaller and smaller. Remind students always to check the model with each step and make sure it looks like the picture in the next step.

1. Before folding, discuss the shape of the square and some common characteristics it shares with the rectangle.

2. While looking at step 1, discuss white versus color side up (when using origami or duo colored paper) and its relationship to following diagrams. Begin with the white (mouth color) side up.

3. What triangle is formed in step 2 (look at step 3)?

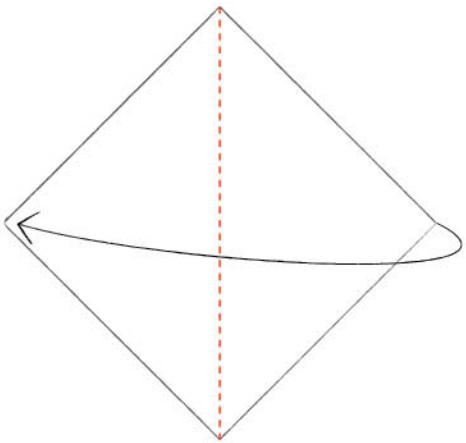
4. Explore the new smaller triangles as they are formed. Are they all the same?

5. When the model is complete, allow students to share quietly and enjoy the creative ideas they have while folding.

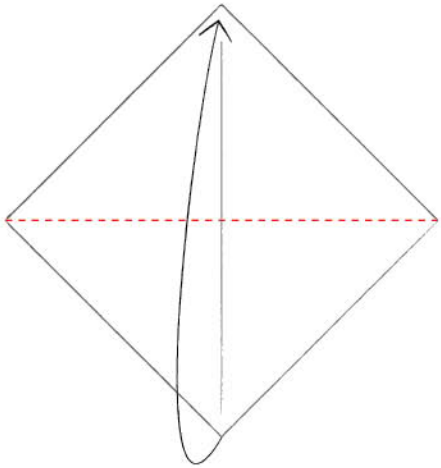
6. Encourage practice by giving out smaller sheets of paper to construct a family of frogs. Feel free to embellish the frogs with colors and stickers. Encourage the use of these action Origami models as puppets. Help the students compose a story and have them act it out with their Origami Big Mouth Frogs.

BIG MOUTH FROG

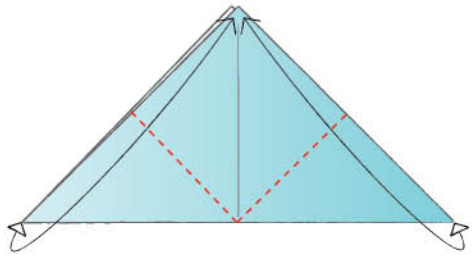
Robert E. Neale



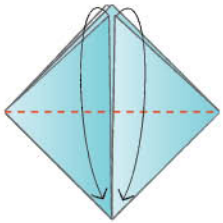
1 Start with frog color side down and the paper oriented like a diamond. Fold a diagonal. Unfold.



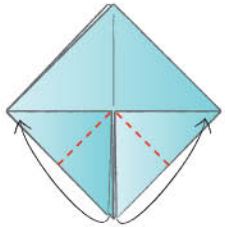
2 Fold a diagonal in the other direction.



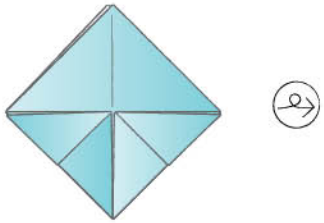
3 Fold side points to meet the top point.



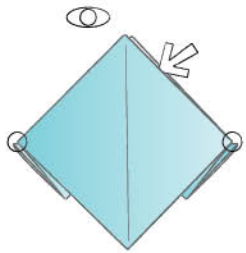
4 On top layer only, fold points down to meet bottom point.



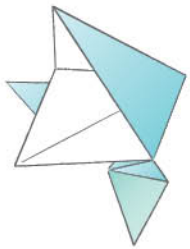
5 On top layer only, fold bottom points out to meet side points.



6 Turn over.



7 Open the mouth and gently push the sides in at the indicated points to make the frog's mouth move.



Finished Big Mouth Frog!

ACTIVITY 2 - *Fold a Simple Swimming Fish*

This is a fun model that can be used as a toy or a puppet. Encourage the use of Origami puppets like this action model and the Big Mouth Frog to make a small class play.

1. In step 1 discuss the two sides of the paper. What are the two scenarios possible for the colors for the fish? Start with the white side (or mouth color) up.

2. In step 2 the folds are often referred to as a house roof folds or airplane folds. Explore the reason for this. What triangles are being formed with these folds?

3. Make sure the fold is fairly wide. This fold creates the mouth of the fish. Notice the color change being introduced.

4. Make sure when you put the folds back (step 4), you use the crease lines made in step 2. Do not make any new creases.

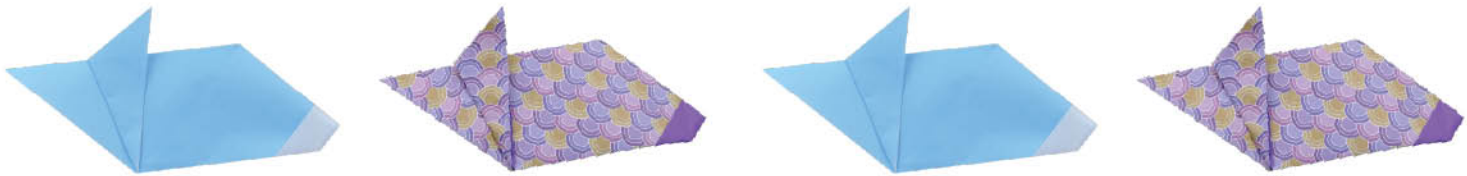
5. What is the shape of the perimeter in step 5?

6. Before doing the fold in step 7, make sure the crease made in step 6 folds back and forth on both sides. This will greatly ease the next step - an inside reverse fold.

7. What is the shape of the perimeter in step 8? Explore the symmetry of this model.

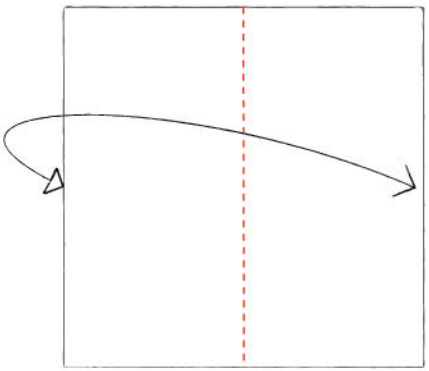
8. Have the class make an entire school of fish with different colors and sizes.

9. If a student has trouble making the fish head move side to side by rubbing the tail section between the thumb and index finger, he or she can simply hold the two tail sections, one in each hand, and move the fish head from side to side by pulling on alternating sides.

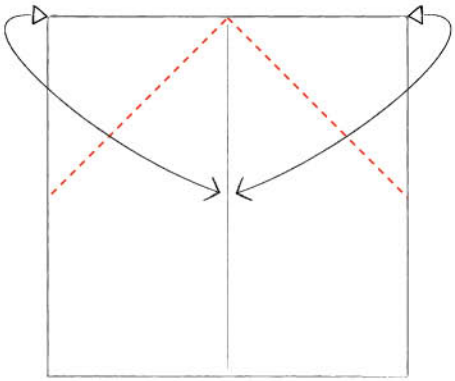


SIMPLE SWIMMING FISH

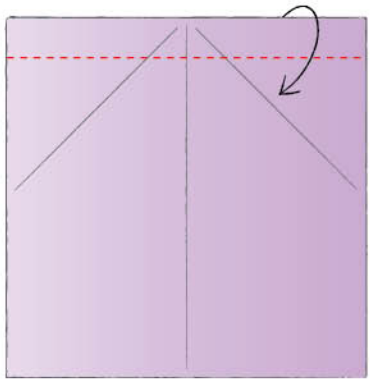
Variation of an 8 Point Star module by Robert E. Neale utilizing the action part of Paul Jackson's Swimming Fish.



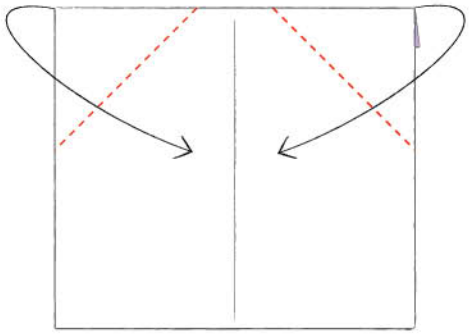
1 Start with fish color down. Fold in half side to side. Unfold.



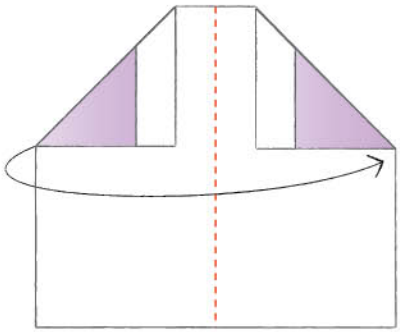
2 Fold top two edges down along center crease. Unfold. Turn over.



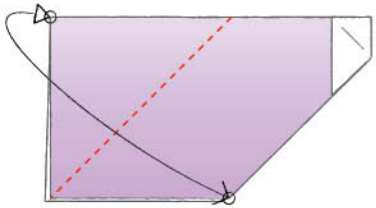
3 Fold down a hem along top edge. This creates the fish's mouth. Turn over.



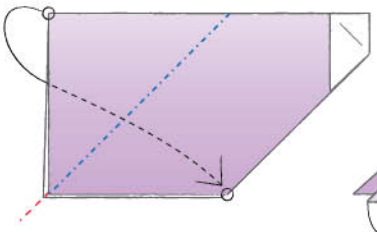
4 Refold the creases made in step 2. Note: they will no longer meet the center crease.



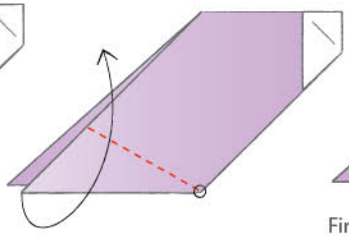
5 Fold the left side over to the right using existing crease. Rotate 90 degrees as shown.



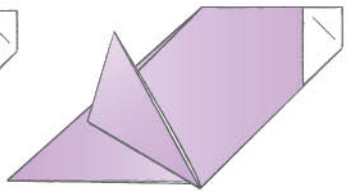
6 Fold the top point down to indicated point. Unfold. This is a precrease preparing for next step.



7 Inside reverse by moving the indicated point inside the model to meet the other indicated point and pushing the top layer down.



8 Starting at the indicated point, make a crease to create the fish's tail.



Finished Simple Swimming Fish!

Make the fish move by rubbing the tail section between your thumb and index finger.