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**Topic**  
Geometry

### Key Question

How can you put together a set of geometric shapes to make different animals?

### Learning Goals

Students will:

- name and recognize the geometric shapes that make up a set of tangrams, and
- use problem solving to assemble a set of tangrams in a variety of ways.

### Guiding Document

*Common Core Standards for Math\**

- *Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). (K.G)*
- *Analyze, compare, create, and compose shapes. (K.G)*

### Math

Geometry  
two-dimensional shapes  
Problem solving

### Integrated Processes

Observing  
Identifying  
Recording

### Problem-Solving Strategies

Guess and check  
Use manipulatives

### Materials

Student pages  
Tangram puzzle pieces  
(see *Management 1*)

### Background Information

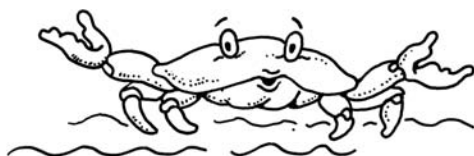
The tangram puzzle is one that has been around for a very long time, with a multitude of variations. The puzzle consists of five isosceles right triangles (two large, one medium, and two small), a square, and a parallelogram. All of the shapes (except the two large triangles) can be combined with others in some way to make one or more of the larger shapes. For example, the two small triangles can be put together to make the medium-sized triangle, the square, or the parallelogram. The traditional challenge is to use all of the shapes to make a square, but the pieces lend themselves to creating many other figures as well.

This activity gives young learners the opportunity to use their problem-solving skills as they try to put the tangram pieces together to form a variety of shapes. The strategy of guessing and checking is very appropriate here and is the strategy most often used by adults and children alike when confronted with problems of this nature.

There are many different challenges presented, some more difficult than others, so that students at every level can be given appropriate problems. There is also the opportunity to build and develop geometric vocabulary and spatial sense as the students name the shapes they are working with and learn the results of moving them around and putting them in different orientations.

### Management

1. Each student will need his or her own set of tangram puzzle pieces. Tangram puzzles are available from AIMS (item numbers 4180, 4181, and 4182). If you have access to a die-cut machine, you can also use the tangram die to make a class set of puzzle pieces, or you can copy the page provided and cut out the puzzles for the students. If you make your own puzzles, it is recommended that you use card stock and/or laminate the pieces for durability and ease of handling.
2. There are a total of seven challenges given, all at different levels of difficulty. All students should begin with the first page and only move on to the remaining pages if appropriate.
3. To record their solutions, have students trace around their tangram pieces inside the frame of the shape.



### Procedure

1. Give each student a set of tangram puzzle pieces. Have them name and describe each kind of shape in the set. Ask them what they can tell you about each of the shapes.
2. Allow time for some free exploration with the shapes so that students can see how they fit together and the relationship between the sizes of the different pieces.
3. Distribute the first student page and be sure that everyone understands the challenges. Allow time for students to solve each of the three puzzles.
4. Have students share their solutions with the class. Encourage them to make use of geometric vocabulary as they describe how they put the pieces together.
5. As appropriate, distribute the remaining student pages. For this portion, students may be less frustrated if they work in groups to solve the puzzles.
6. Close with a time of class discussion and sharing.

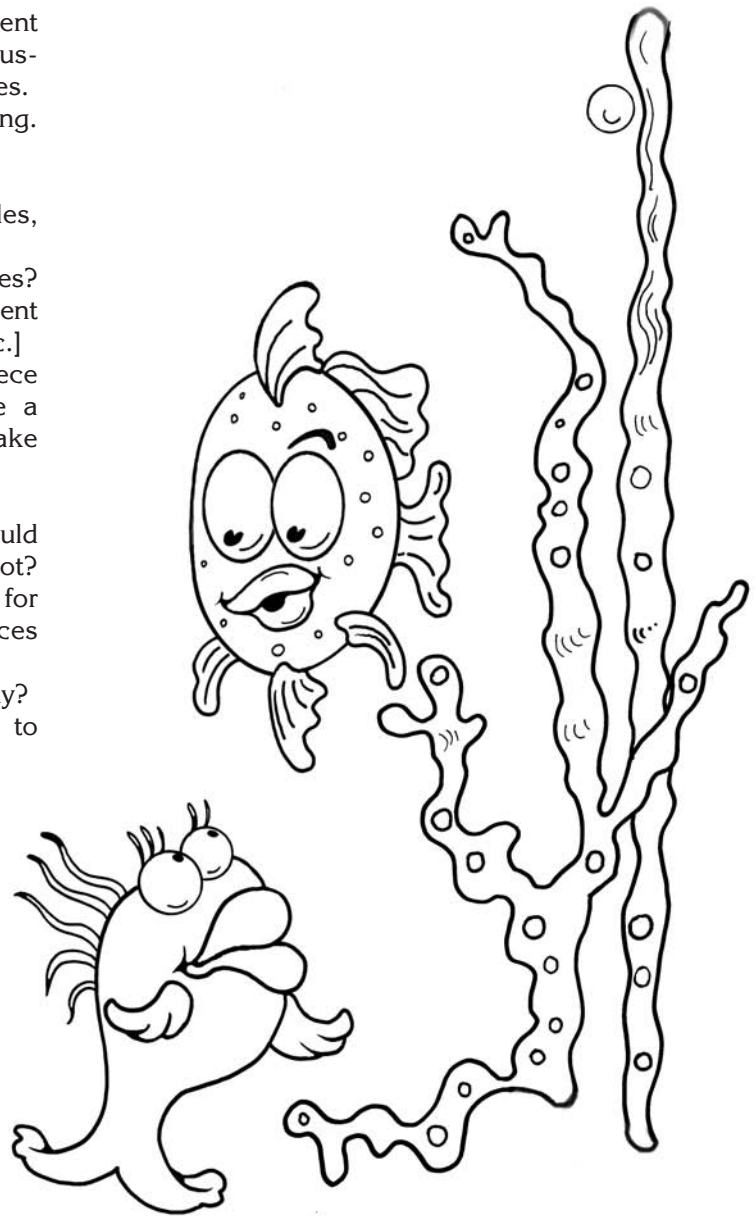
### Connecting Learning

1. What shapes are your puzzle pieces? [triangles, square, parallelogram]
2. What do you notice about all of the triangle pieces? [Various. They are all the same shape, just different sizes; two little ones make one medium one; etc.]
3. What else do you notice about the puzzle piece shapes? [Various. Two small triangles make a square, the square and two small triangles make a big triangle, etc.]
4. How did you solve the puzzles?
5. Was this problem-solving strategy one you would use again on a similar problem? Why or why not?
6. How did you decide which puzzle pieces to use for each puzzle? Could you ever use different pieces to solve the same puzzle?
7. Which puzzle was the easiest for you to solve? Why?
8. Which puzzle was the most difficult for you to solve? Why?

### Extensions

1. Have students create their own tangram puzzles and trade them with other classmates to solve.
2. Have students work in groups and use two or three sets of tangrams to see what shapes can be created.
3. Use the tangram pieces to explore concepts of symmetry, rotation, flips, slides, turns, etc.

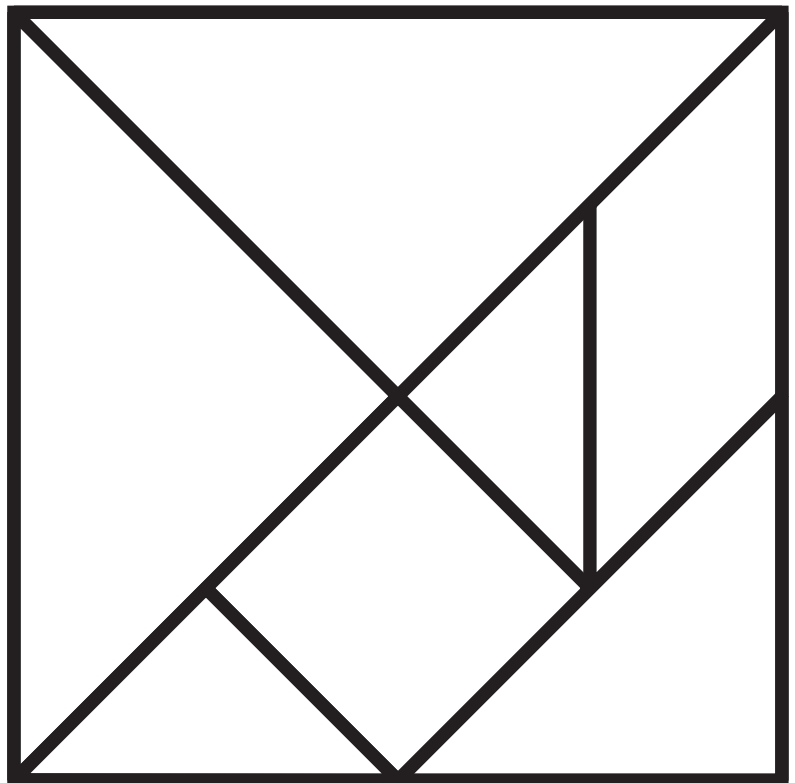
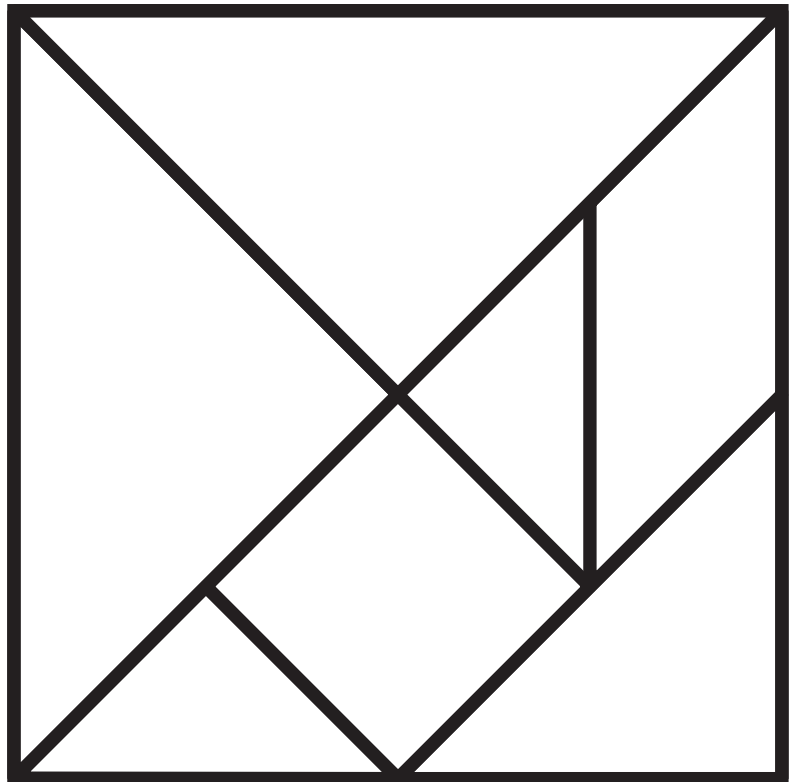
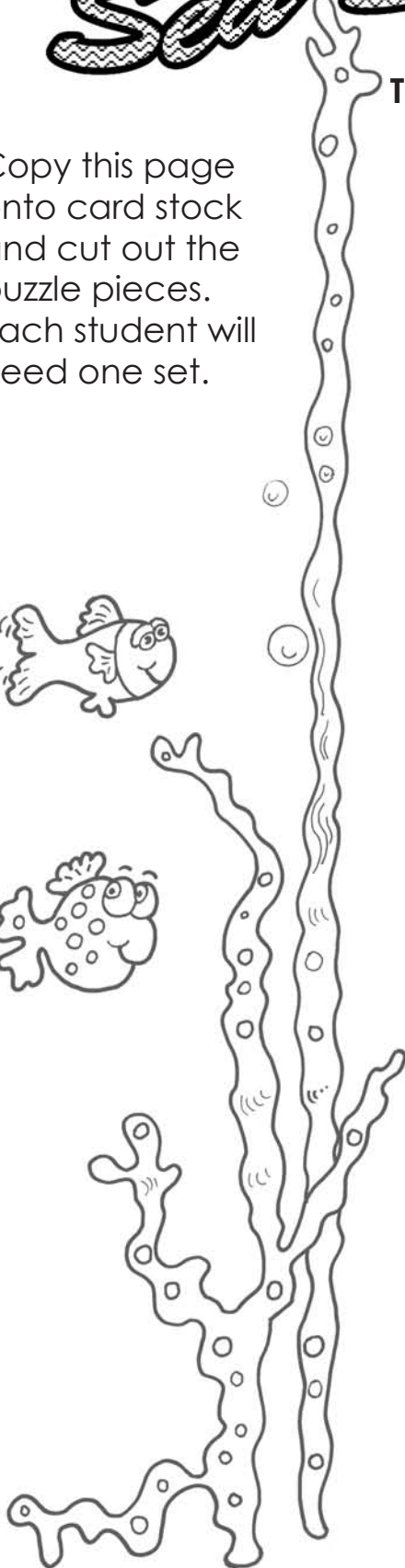
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# Sea Shapes

## Tangram Pieces

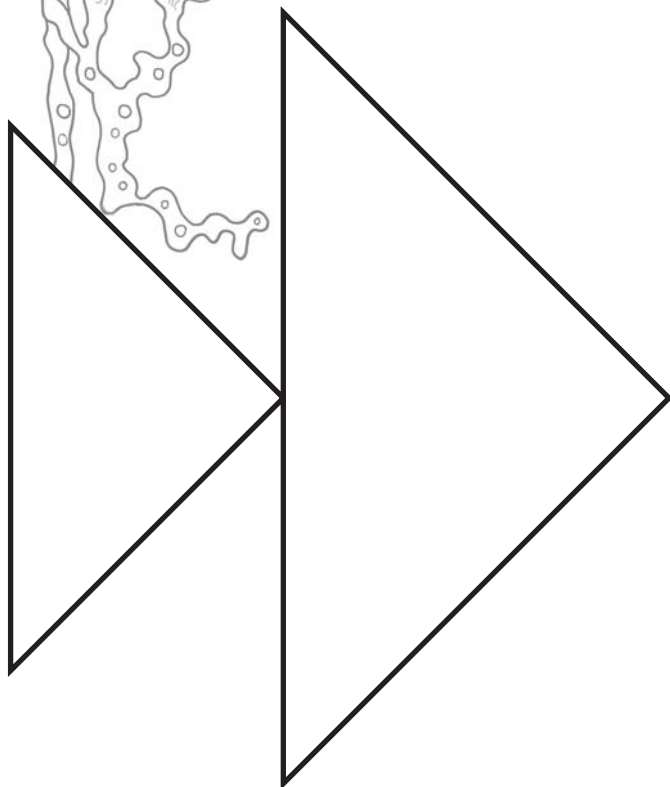
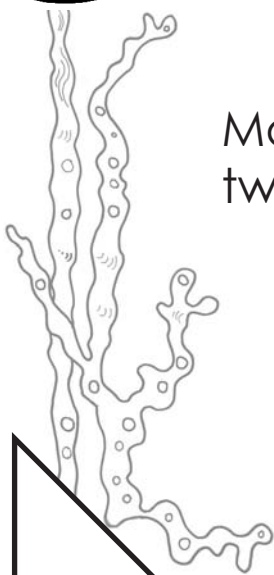
Copy this page onto card stock and cut out the puzzle pieces. Each student will need one set.



# Sea Shapes



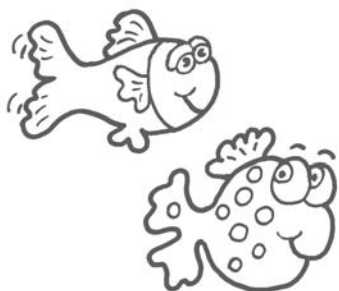
Make this fish using  
two shapes.



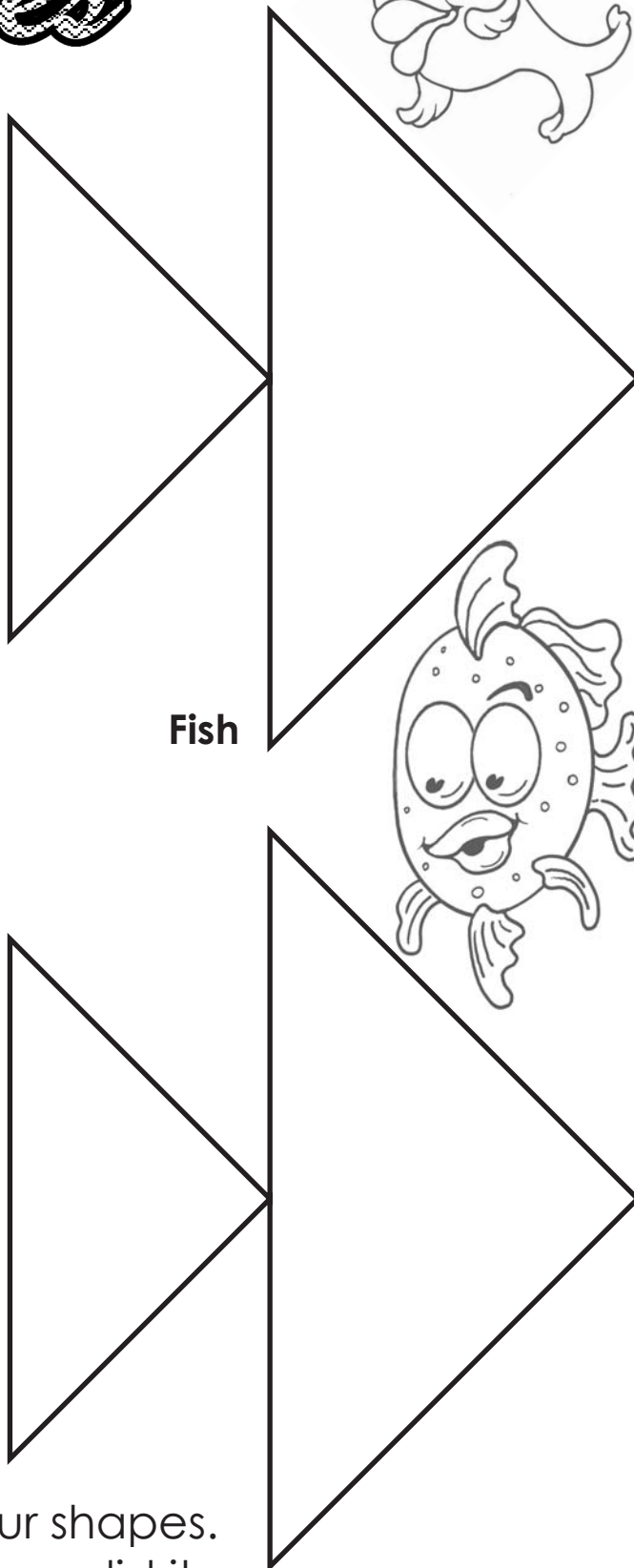
**Fish**



Make the same fish using  
three shapes.  
Show how you did it.



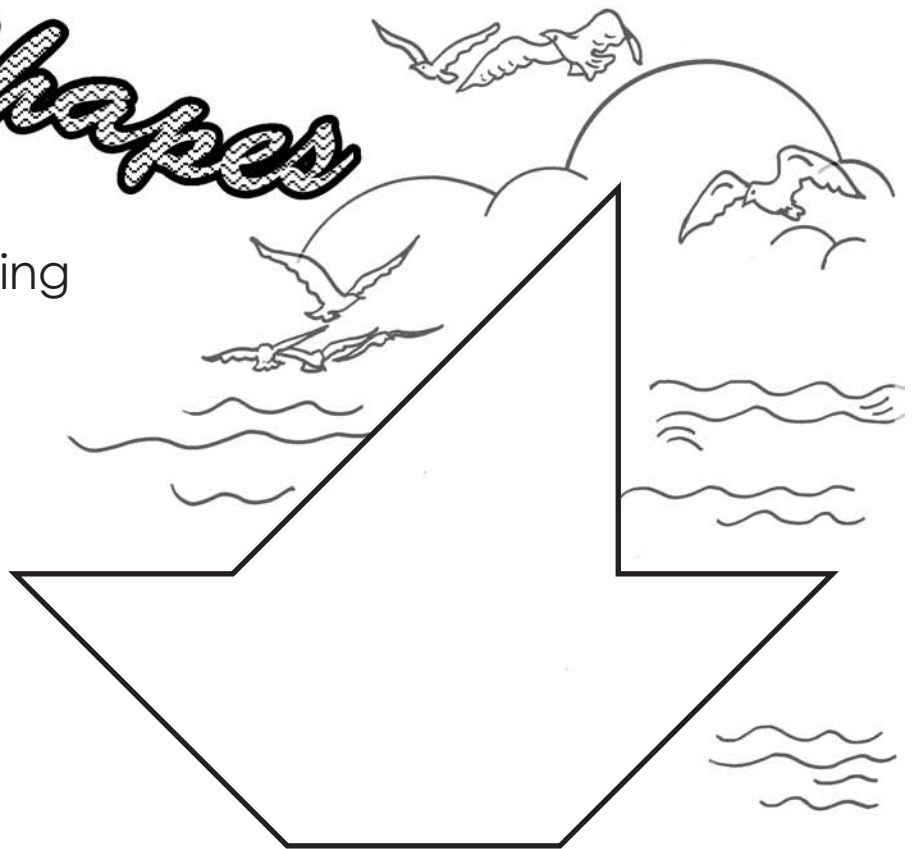
Now use four shapes.  
Show how you did it.



# Sea Shapes

Make this sailboat using four shapes.

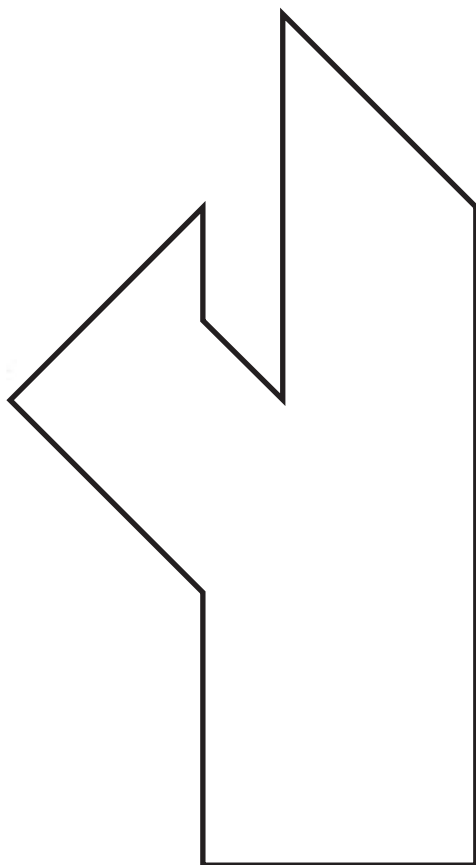
Show how you did it.



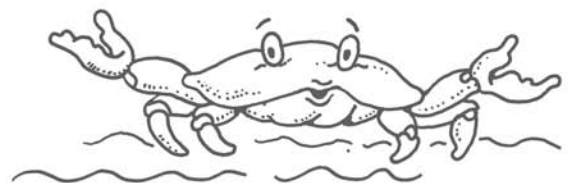
**Sailboat**

Make this crab claw using four shapes.

Show how you did it.



**Crab Claw**

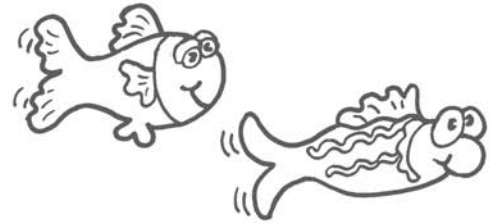




# Sea Shapes



Fish



Make this fish using five shapes.

Show how you did it.

Make this seagull using six shapes.

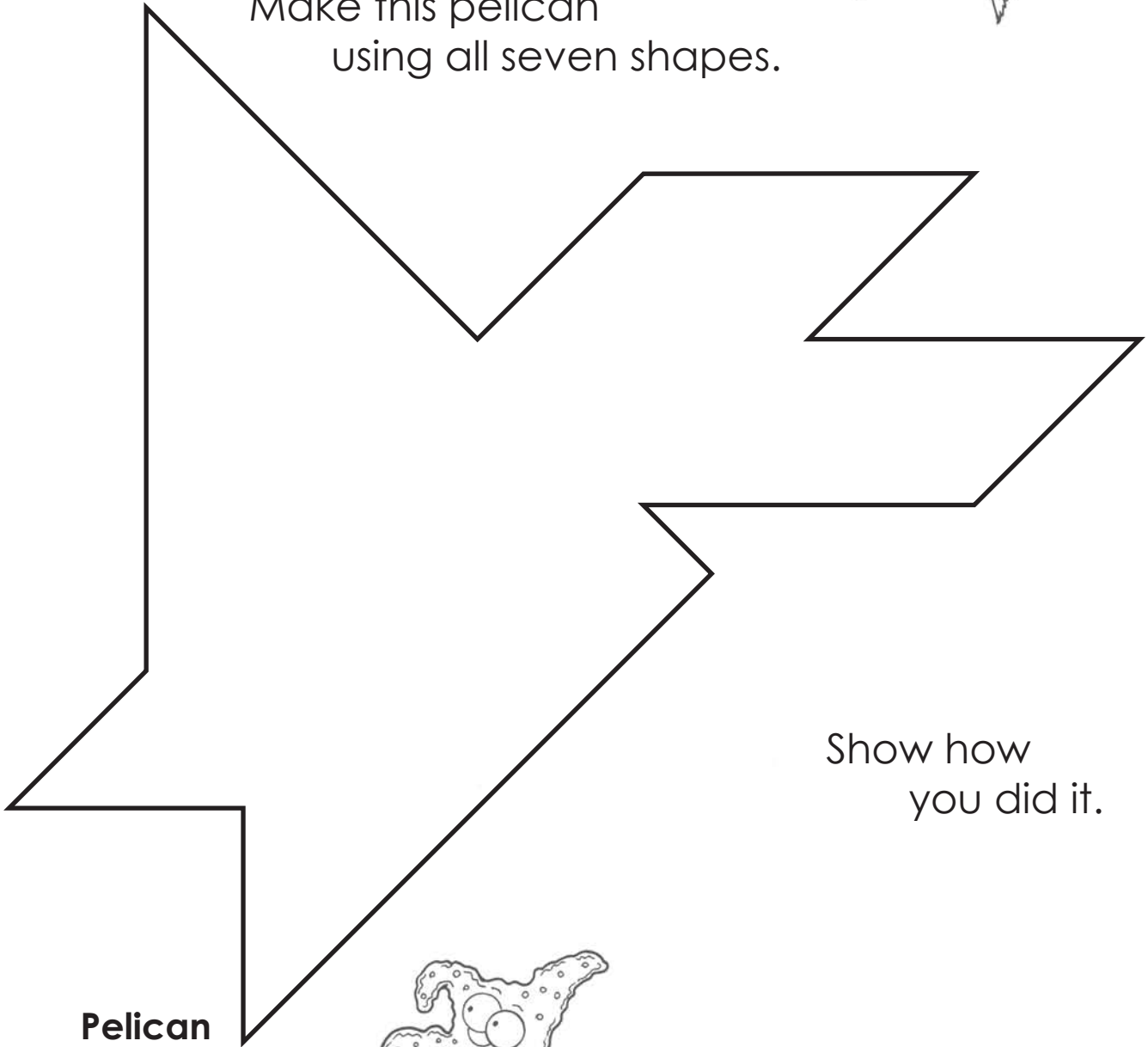
Show how you did it.

Seagull

# Sea Shapes

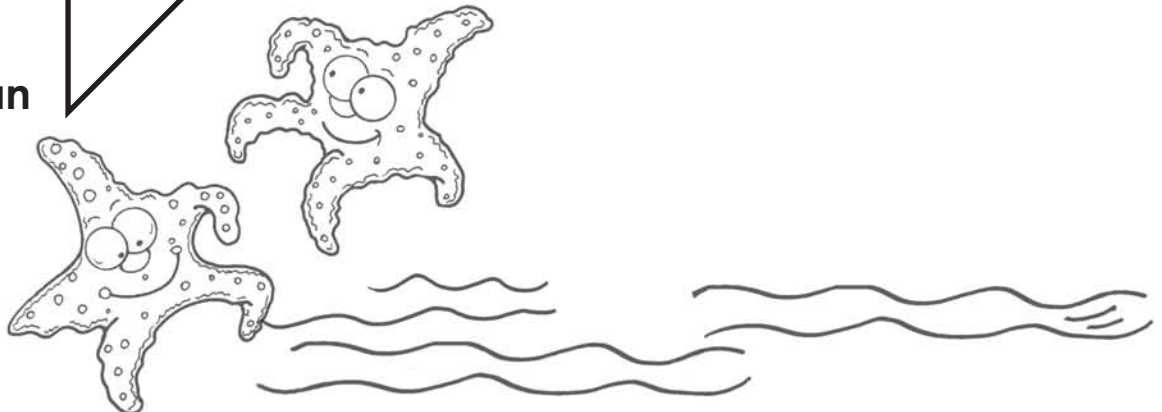


Make this pelican  
using all seven shapes.



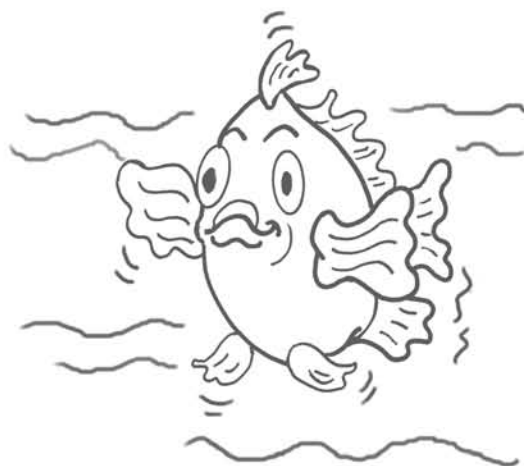
Show how  
you did it.

Pelican



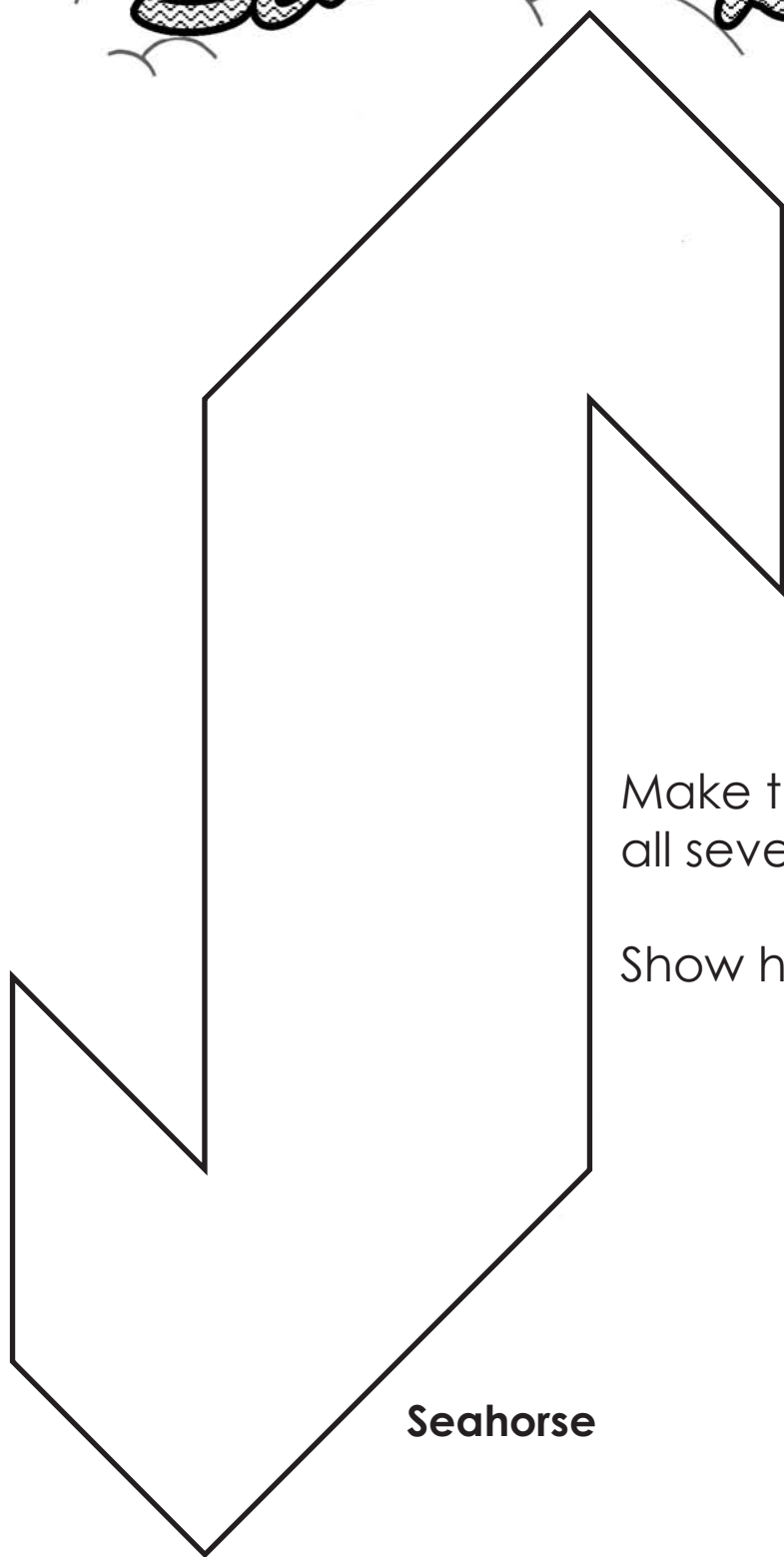


# Sea Shapes



Make this seahorse using  
all seven shapes.

Show how you did it.



Seahorse