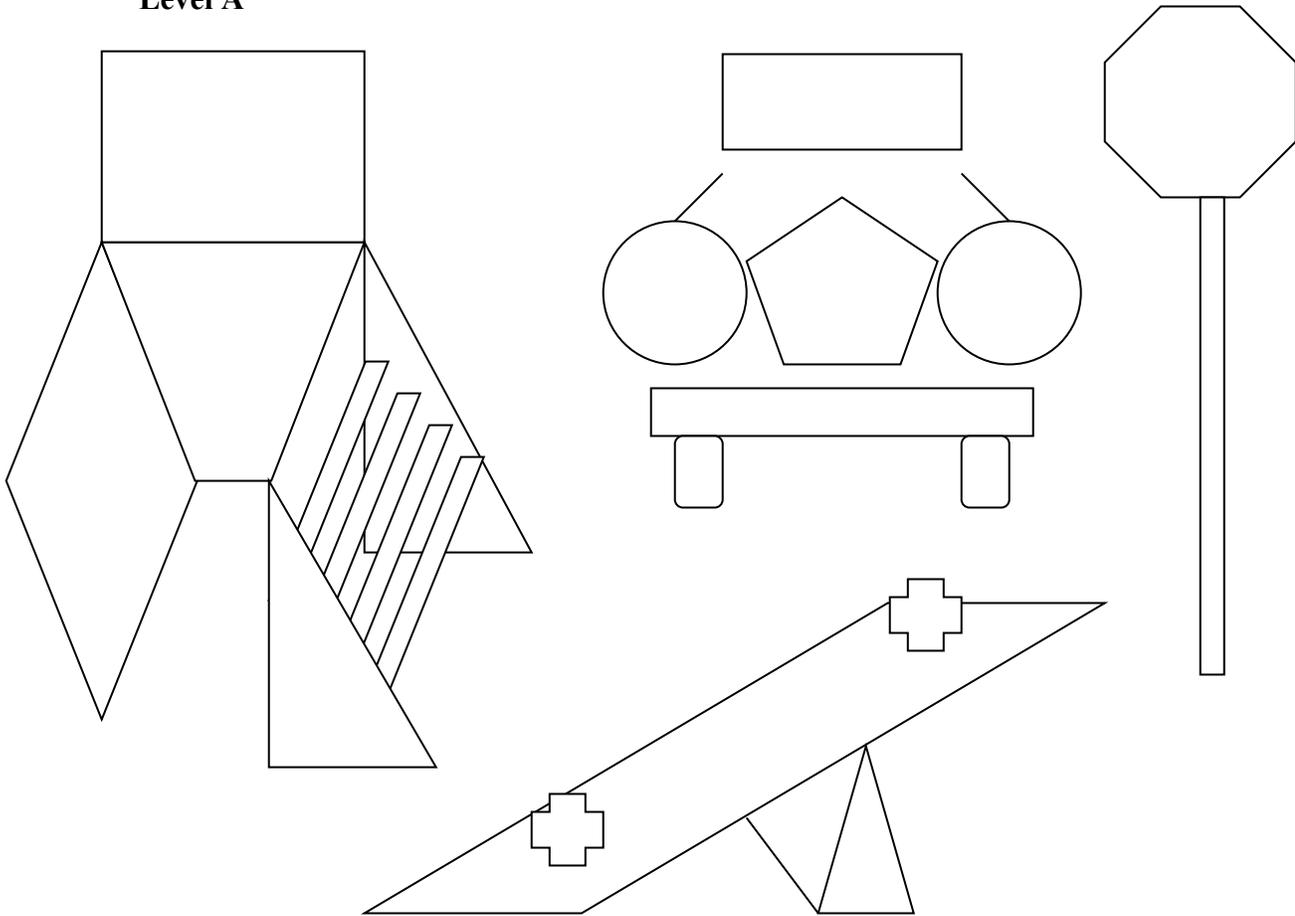


The Problem of the Month

The Shape of Things



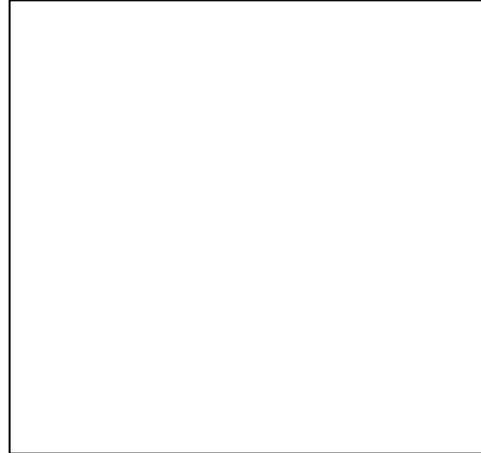
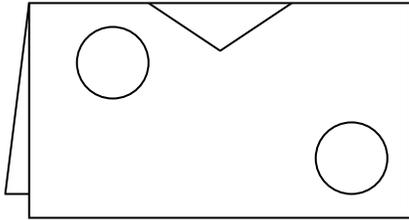
Level A



Examine the scene of the playground above. There are a lot of different shapes that make up the toys and play equipment. Draw, name, and describe clearly all the shapes you can see in the playground picture.

Level B

Laura and Jacob are drawing pictures to give to friends. Laura made a drawing using some shapes and a line of symmetry. She used the folded edge as the line of symmetry. Draw a picture of what the paper will look like when it is unfolded.



Jacob made a drawing with 5 shapes in all. When it was finished he noticed that

- his drawing had one line of symmetry
- he drew 4 shapes that had 4 corners
- he drew 1 shape that had 3 corners

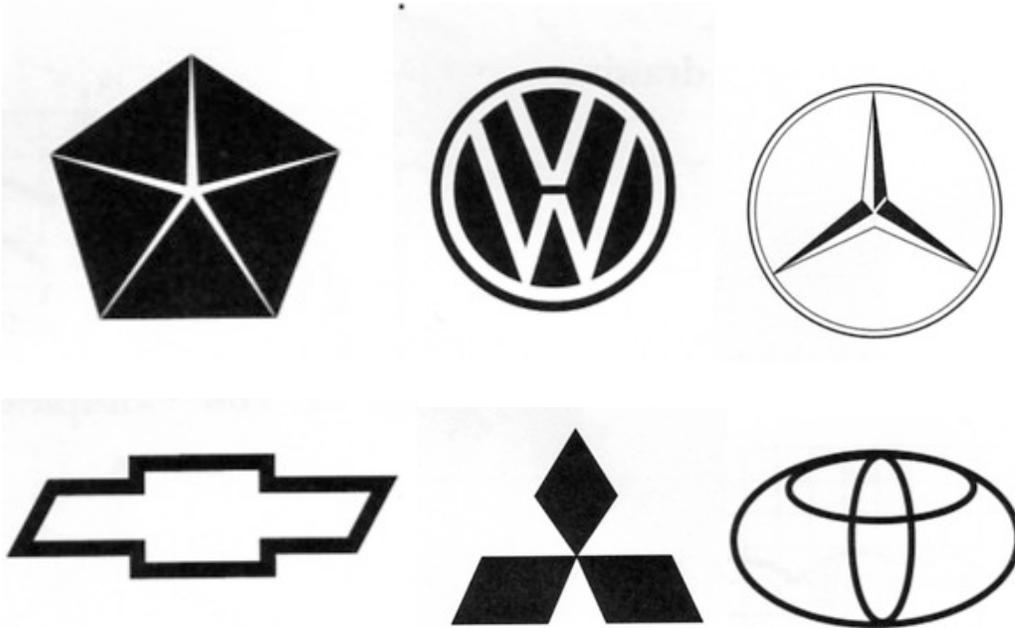
Show what Jacob's drawing could have looked like.



Explain why you drew the drawing you did.

Level C

You work for a company in its marketing department. It is your job to create a new company logo. You have heard that having a logo with rotational symmetry is attractive and useful for potential customers. You look through a page of company logos. Which of the logos below have rotational symmetry? Explain your findings.



Explain why a logo with rotational symmetry is attractive and useful for potential customers.

Create a new logo with rotational symmetry for your company.

Illustrate all the line symmetries (if any) of your logo. Justify why your logo has rotational symmetry.

Level D

Jake and Mark are making a kite. They have a long stick. “We need to cut the stick so we have two sticks, and then we will lash them together,” Mark said. “But, what shape will the kite be?” says Jake. “It depends on the size of each of these sticks and how they are lashed together,” Mark replied. What does Mark mean? Explore the types of kites you can make using two sticks. List the different types of kites you can make. Explain using geometry how the sticks affect the shapes of the kites.

Level E

Laurie and Kristina wanted to share a cake equally. The cake was in the shape of a regular hexagon. Kristina said, “There are two ways to cut the cake to make equal-sized pieces. Either cut from one vertex to the opposite vertex or cut from the midpoint of one side to the midpoint of the opposite side. Those are the only two ways to make one straight cut and have two equal-sized cakes.” Laurie said, “No, there are other ways besides your two ways to make one straight cut and share the cake equally.” Who is right?

Prove your findings. If Kristina is correct prove why the two ways work and why there are only those two ways. If Laurie is right, state the method(s) for cutting the cake equally and prove your conjecture.

Explore other regular polygon-shaped cakes. Does the method(s) used to cut a regular hexagon-shaped cake work for cutting cakes of different regular shapes? State some conjectures and justify your findings.