Unusual Figures

1. A Mobius Strip
   a. Directions on how to make a mobius strip
      i. Cut one strip of paper
      ii. Color the two sides of the paper different colors
      iii. Put the two ends of the strip of paper together so you form a circle
      iv. Twist one of the ends of the strip once
      v. Tape the ends of the paper together
      vi. You now have a Mobius Strip.
   b. Questions about the figure:
      i. How many sides does the mobius strip have?
      ii. How many edges does the mobius strip have?
      iii. Cut the mobius strip lengthwise. What happens?
      iv. Cut the new figure lengthwise. What happens?

2. A Klein Bottle
   a. Playdough Version
      i. Directions on how to make a Klein Bottle
         1. Roll the playdough into a tube
         2. At one end of the tube, widen the tube
         3. At the other end of the tube, make the tube narrower
         4. Punch a hole in the side of the tube near the widened end
         5. Push the narrow end of the tube through the hole you just made
         6. Pinch the two ends of the tube together so that you now have just one end part
         7. You now have a Klein Bottle.
      ii. Question: How many sides does the Klein Bottle have?
   b. Paper Version
      i. Directions on how to make a Klein Bottle
         1. Cut two strips of paper one twice as long as the other
         2. Tape the ends of the longer piece together so that there are no twists
         3. Tape one end of the shorter strip to the circle you just made
         4. Attach the other end of the short strip to the opposite side of the circle. You will need to thread the end through the circle before you attach it
         5. You now have a paper version of the Klein Bottle.
      ii. Questions about the figure:
         1. How many sides does the klein bottle have?
         2. How many edges does the klein bottle have?
         3. Cut the klein bottle lengthwise. What happens?