

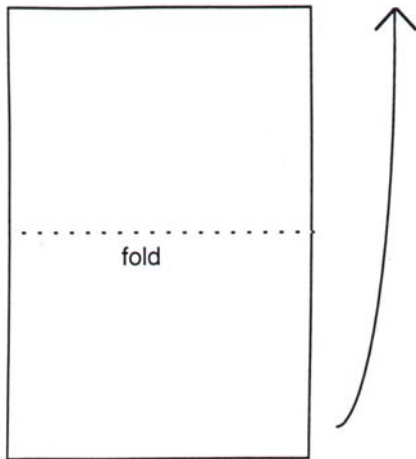
CREATING A FRACTAL CUT

SUPPLIES

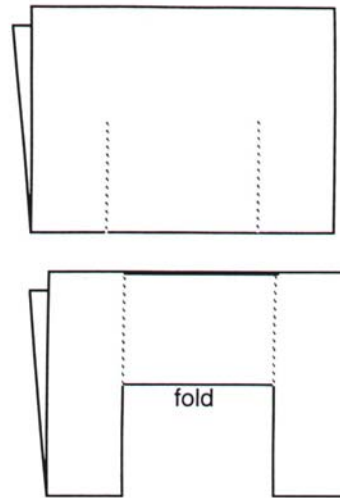
Paper
Scissors
Glue

STEPS

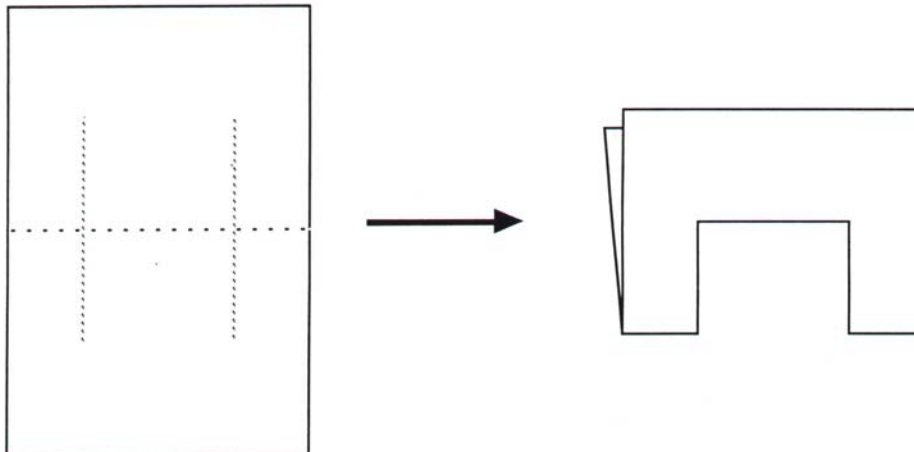
1. Fold a piece of paper in half.
(hamburger fold)



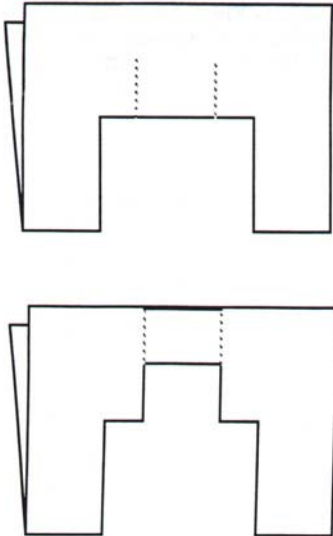
2. Along the folded edge, one-fourth of the way in from both sides, cut half-way up to the top of the paper. Fold the cut portion up so that the folded edge lines up with the top edge.



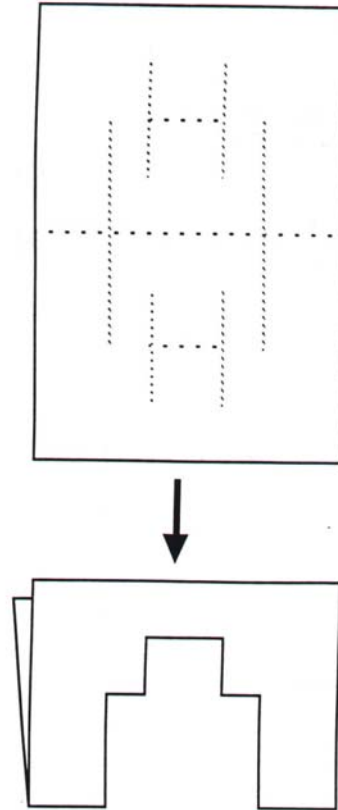
3. Open the paper, push the original fold of the cut area up and refold the paper.



4. One-fourth of the way in from both ends of the fold made in Step 2, cut one-half way to the top of the paper. Fold up the top cut portion so that the folded edge lines up with the top edge. Turn the paper over and fold up the second cut portion to the top edge.



5. Open the paper, push the center fold of the cut areas up and refold the paper.



6. Repeat this process two more times. If the students have difficulty cutting through the progressive folds (due to thickness), they can cut each fold individually.
7. Paste the finished product on to another sheet of folded construction paper. If each fold is heavily creased, the piece will stand better.

Pre-Post Test
Cutting Up in Class

1. $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} =$ _____.
2. $\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} =$ _____.
3. Measure one side of a piece of paper. If you fold a paper in half and then in half again in the other direction, what fraction of the original side is the measure of the new side?
4. In the example above, what are the original and new areas?
5. What are the original and new circumferences?
6. Fold the paper 2 times again, first one way and then the other. What are the new area and the new circumference?
7. Define what a line of symmetry or mirror image means.
8. As you keep folding the paper, can you predict what will happen to the area and the circumference at each fold?

Answers:

1. $\frac{1}{8}$
2. $\frac{1}{64}$
3. $\frac{1}{4}$
4. $\frac{1}{4}$ of the original area
5. $\frac{1}{2}$ of the original circumference
6. $\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$ of the original area and $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$ of the original circumference
7. Mirror image is what you see in a mirror; one side is identical to the other side of the line of symmetry. In tiling, what ever you do to one side will be done to the other.
8. The area will decrease by a factor of 4 and the circumference will decrease by a factor of 2.