

Folding Paper Lab - Chapter 5

In this lab, you will investigate the thickness of a sheet of paper by folding it many times.

Materials

To do this lab, you will need the following materials:

1. an $8\frac{1}{2}$ -inch by 11-inch peice of paper
2. a ruler

Preparation

Very carefully fold the piece of paper in half six times, each time without unfolding.

Recording the Data

Use the ruler to measure the thickness of the folded paper.

Analyzing the Data

1. What is the thickness of the folded paper (after 6 folds)? Include units.
2. Use your answer to Part 1 to estimate the thickness of the paper when it is unfolded. Include units.
3. Let $f(n)$ be the thickness of the paper if it has been folded n times. Find an equation of f . What are the units of $f(n)$?
4. Can you fold the paper a seventh time? If not, use f to predict the thickness if it could be folded seven times. If you can, keep folding the paper until you cannot fold it anymore, and predict the thickness if it could be folded one more time.
5. How thick would the folded paper be if you could fold it 15 times? Would the folded paper be taller or shorter than you are?
6. After how many folds would the folded paper be at least as tall as a football field is long (that is, 120 yards long if you include the end zones)?
7. After how many folds would the thickness of the folded paper match the distance to the Moon? (The average distance to the Moon is approximately 238,857 miles. There are 5280 feet in 1 mile.)
8. The above situation is limited by your inability to fold the paper many times. Instead of folding a piece of paper, you could cut a piece of paper in half, then stack the two halves. Next, you could cut the stack of papers and restack the two piles of papers. Cutting the stack in two each time and then restacking achieves the same thickness as folding the paper in two. By cutting and stacking, can the result described in Part 7 be achieved? Explain.