Origami

Origami is a form of traditional Japanese art that began in the 1600s. It involves folding a material, such as paper or fabric, to create a three-dimensional object without cutting or gluing, like this praying mantis.

Suppose that you use a sheet of paper to create an origami sculpture. You notice that when you make one fold, you have two layers of paper. You make another fold and count the number of layers. You repeat this process one more time.

? How are the number of folds and the number of layers of paper related?

A. Copy and complete the second column of this table.

Number of Folds	Number of Layers Created	
0	1	
1	2	
2		
3		

B. Choose any two numbers under "Number of Layers Created." Determine the product of the two numbers. Write the two numbers and their product as powers of 2.

C. Repeat part B two more times with a different pair of numbers.

D. Is there a pattern that relates the exponents of the powers you multiplied to the exponent of the product? Explain.

E. What exponent law does your answer to part D show?

F. In the blank column in the table, summarize your findings using powers of 2. Label the column "Number of Layers as a Power of 2."

G. Choose any two numbers under "Number of Layers Created." Divide the greater number by the lesser number. Write the two numbers and the quotient as powers of 2. Repeat with a different pair of numbers.

H. Examine the exponents of the numbers you wrote in part G. What exponent law do they show?

I. Explain how you can predict the number of layers created given the number of folds made.

J. Suppose that you continued to fold the sheet of paper and count the number of layers you created. Would the pattern you observed continue forever? Explain.

WHAT DO You Think?

Decide whether you agree or disagree with each statement. Explain your decision.

1. When you analyze data, it is useful to rewrite the numbers as powers to see a pattern.

2. When you see a pattern in a data set, you know that the pattern continues forever.

3. During an experiment, Tim measured and recorded the dependent variable. He noticed a rapid increase from one recorded value to the next. Tim claimed that exponents can be used to model his data.

4. It is difficult to analyze data when the magnitudes of the numbers are very different.