Review the concepts of finding probability. You are going to make a working model of Pascal's Triangle out of wood or plastic in order to demonstrate the probability of one marble ending up in a designated groove of the model.

This arrangement of numbers was known long before Pascal wrote about it. It was used by Omar Khayyam about the year 1100. Another early reference to Pascal's Triangle appears in a Chinese manuscript by Chu Shih-Chieh in the year 1303. The mathematicians of Europe worked with the triangle for over one hundred years before Pascal, during the development of algebra. Pascal's treatise on the arithmetic triangle contained many new properties. He was able to generalize earlier treatments using new methods, such as mathematical induction. Pascal also applied the triangle to probability theory. The triangle contains many interesting numerical relationships. Examine Pascal's Triangle.

Make a wooden or plastic model of the first six rows of Pascal's Triangle. The objective is to roll marbles freely from the single hexagon at the top, along grooves cut to correspond with the inside edges of each hexagon, to the bottom. The bottom row of the model must allow more than 10 marbles to rest in each column.

Obtain 32 marbles and mark one of them. Note the sum of the digits in the bottom row equals the total marbles needed.

What is the probability that the marked marble will end up in the groove marked 1? 5? 10?

Pascal's Triangle
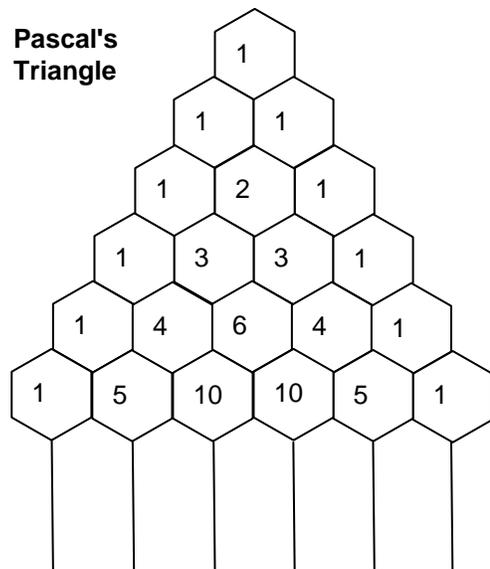
Tilting the model, allow each marble to roll down the grooves. Observe and record at which position the marked marble comes to rest. Repeat the experiment as many times as necessary to form a clear pattern.

Analyze and explain the reason for the pattern observed. Using the theory of probability, write an explanation of the pattern.

Share the model with the class and explain your findings.