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**Bill Marion\*** (Bill.Marion@valpo.edu), Dept. of Mathematics and Computer Science,  
Valparaiso University, Valparaiso, IN 46383. *Using the Pile Splitting Puzzle to Enhance Student  
Learning of Mathematics.*

Pile Splitting Puzzle: Split a pile of  $N$  objects into two smaller piles. Continue until there are  $N$  piles of size 1. At each splitting multiply the sizes of the two split piles. Then, add the  $N-1$  products. The result will always be the same no matter how the piles are split and will be a function of  $N$ . The author first became acquainted with this puzzle in an article by James Tanton in the September 2004 issue of Math Horizons. Subsequently, he found the puzzle presented as an exercise in Kenneth Rosen's 5th edition (2003) of his discrete math text. Though their solutions were the same, each used a different argument to prove the solution correct. (Tanton, also, described a number of variants, each involving different computations.) In this paper the author will describe and illustrate the puzzle using a pile of beads and present the solution along with both proofs. More importantly, he will discuss ways in which he has used this puzzle and its many variants to help students find patterns, make conjectures and develop coherent proofs\*as an in-class activity, an out-of class group project, a computer programming project and an undergraduate research project. (Received June 08, 2008)