

## Adding it Up Problem

You may wish to use a manipulative like multilink cubes when considering the following problems.

1. How many ways can you write the number 5 as the sum of positive integers, where different orderings are regarded as different? For example,  $2 + 1 + 2$  and  $1 + 2 + 2$  are regarded as different.
2. How many ways can you write the positive integer  $n$  as the sum of positive integers, where order matters? Show why your answer is correct.
3. How many ways can you write the positive integer  $n$  as the sum of only 1's and 2's, where order matters? Show why your answer is correct.
4. A whole note in music is equal in length to two half notes, as well as to one half note and two quarter notes, etc. How many ways can you create a sequence of eighth notes, quarter notes, half notes, and whole notes, where order matters, to obtain the length of a single whole note? Of two whole notes? What does this problem have to do with the previous ones?