Challenging Standards

- ✓ 0106.2.14 Use composition and decomposition of numbers to identify and discuss patterns.

Unfamiliar Vocabulary/Terminology

0106.2.14 Use composition and decomposition of numbers to identify and discuss patterns.

Composition and decomposition of numbers refers to equivalents, associative, and commutative properties. Students should be able to recognize patterns when using numbers in order to further develop their number sense. "When a primary goal is the development of sound understanding of the number system, students will spend much of their math time putting together and pulling apart different numbers as they explore their relationships among them," *Beyond Arithmetic*

Associative Property
The addition of a set of numbers is the same regardless of how the numbers are grouped. The associative property will usually involve 3 or more numbers, but for first grade two numbers is good practice. The Associative Property is pretty basic to computational strategies.

Addition Example:

When we change the groupings of addends, the sum does not change:
2 + 5 + 4 = 11 or 2 + 5 + 4 = 11
9 + 3 + 4 = 16 or 9 + 3 + 4 = 16
Just remember that when the grouping of addends changes, the sum remains the same.

Using dice and/or dominoes are helpful for students when adding numbers to recognize the associative property. Students use the numbers on the manipulatives the first way, then flip the dice/domino to see that the numbers are switched, but still add up to the same sum.

Commutative Property

Graphic Organizers: (two created below)

Below are organizers that can be modified to fit whatever number you are working with. Please make sure to figure out how many facts are associated with that number. (HINT: The bubbles will be ONE MORE than the number you are working with. For example, four (4) will need five bubbles, five (5) will need six bubbles, and so forth.) Below are

included organizers for 4 and 5, but feel free to modify as necessary. Copy and paste the bubbles to add what you need plus modify the number in the middle to reflect that addition fact that you are working on.

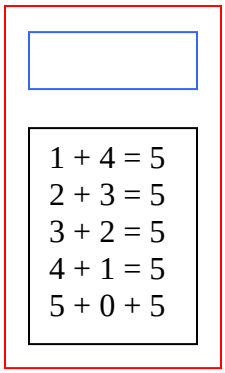
Here is a link to pre-made worksheets:

http://math.about.com/od/addingsubtracting/a/facts.htm

Finding the missing number sentence is another good way for students to recognize patterns. This can be applied to any addition facts.

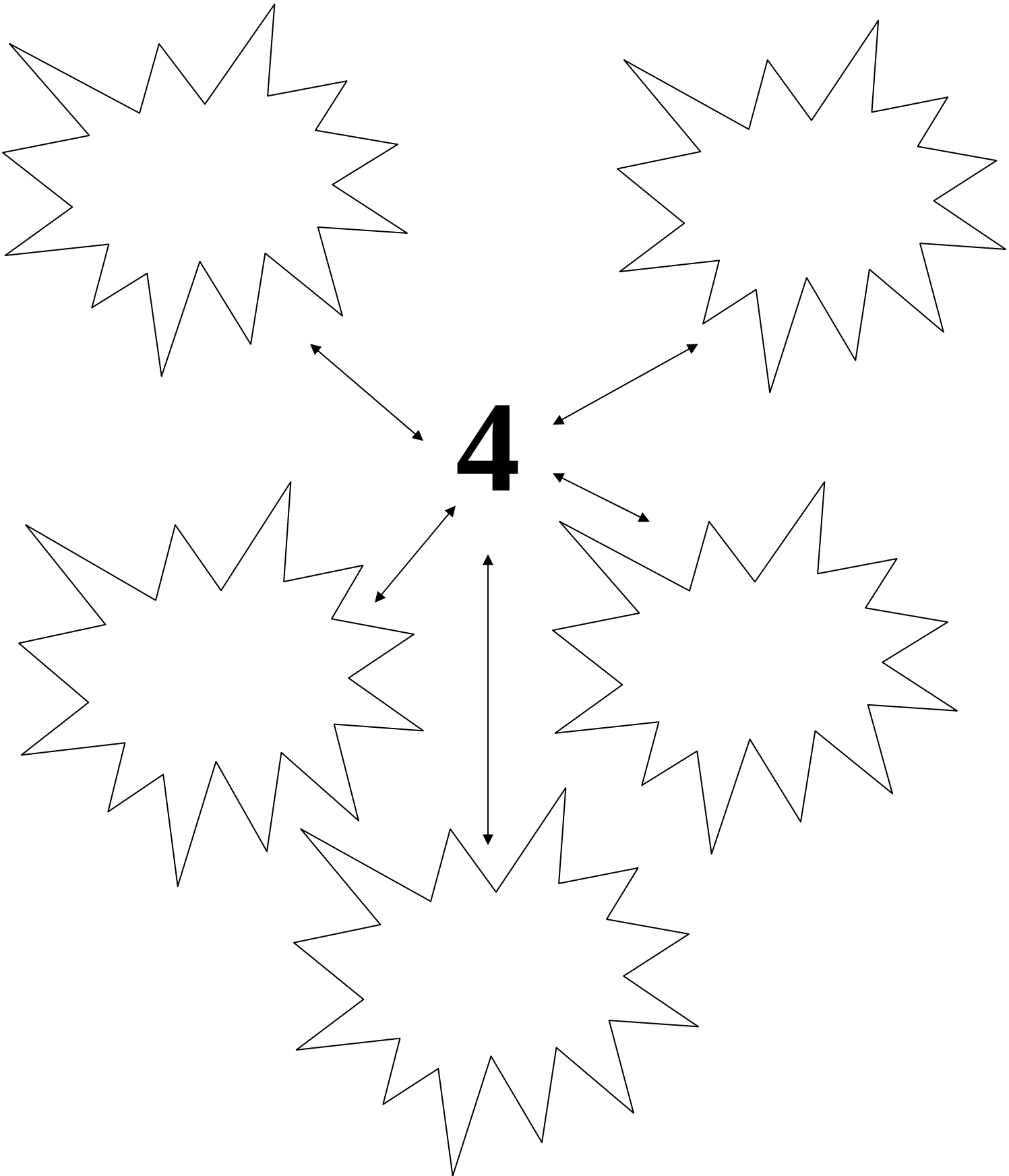
Here are the ways to make 5. Find the pattern and write the missing addition sentence.

(0 + 5 = is the missing sentence.)



Facts That Add to 4

Name_____



Facts That Add to 5

Name_____