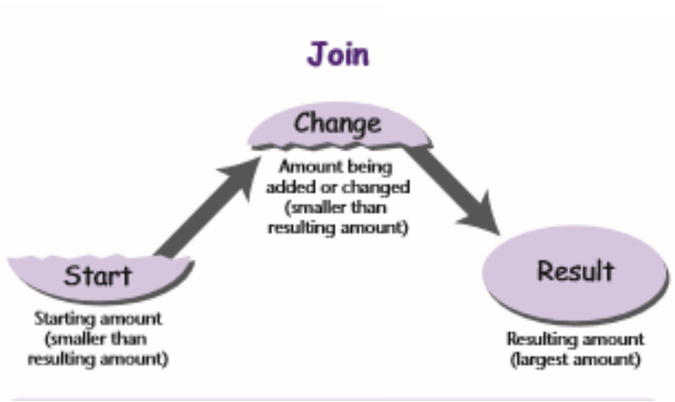
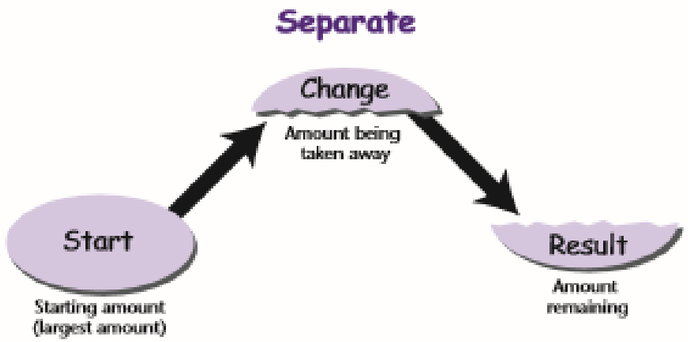
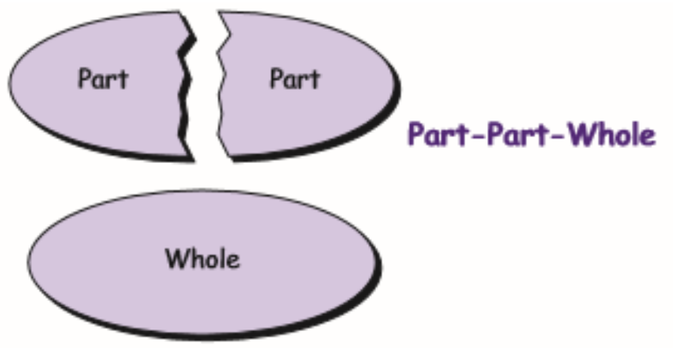
Addition & Subtraction Problem Types/Structures

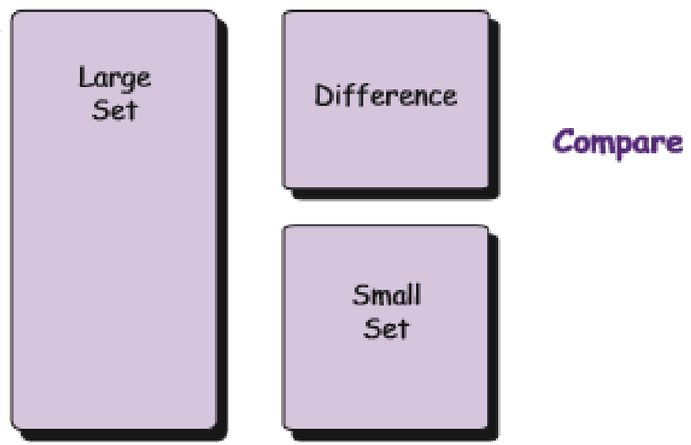
Students develop a strong understanding of operations (addition and subtraction) and of number relationships by solving problems. The types of problems shown next (with examples) can help students to envision addition and subtraction facts in various ways: as **joining**, **separating**, **"part-part-whole"**, and **comparing**. Using problems to introduce the basic facts (and multi-digit computations using addition and subtraction) compels students to use reasoning to find solutions and to make a solid connection between the facts and the various problem-solving scenarios the
Research suggests by helping students 'see' and recognize these structures they are better able to:

- Represent the action with a model
- Identify the potential operation(s) involved in the action
- See the inverse relationship between addition and subtraction
- Write a number sentence that helps solve the problem

Although the examples shown here include only single-digit facts, the same structures can be modified to include multi-digit computations or other number systems such as fractions or integers.

	Semantic Structure			
Problem Type	**Result Unknown**	**Start Unknown**	**Change Unknown**	**Graphic**
Change: *Join* In *Join* problems the change is 'added' to the start amount. (Note: there is an **action** suggested in the situation)	Jason had 6 candies. He bought 5 more. How many candies does Jason have now?	Jason had some candies. He bought 5 more. Now he has 11. How many candies did Jason start with?	Jason had 6 candies. He bought some more candies. Now he has 11. How many candies did Jason start with?	
Change: *Separate* In *Separate* problems, the change is 'taken away' or 'removed' from the start amount. (Note: there is an **action** suggested in the situation)	Nidhi had 15 dollars. She gave 5 dollars to her brother. How many dollars does Nidhi have now?	Nidhi had some money. She gave 5 dollars to her brother. Now she has 10 dollars. How many dollars did Nidhi start with?	Nidhi had 15 dollars. She gave some to her brother. Now she has 10 dollars. How many dollars did Nidhi give to her brother?	

	Semantic Structure		
Problem Type	**Whole Unknown**	**Either Part Unknown**	**Graphic**
Combine (Part-Part-Whole) *Combine* or *Part-Part-Whole* problems contain two parts, which are combined into a whole (Note: there is **no action** suggested in the situation)	Sana has 3 red crayons and 5 blue crayons. How many crayons does Sana have?	Sana has 8 crayons. Three crayons are red. The rest are blue. How many blue crayons does Sana have?	

	Semantic Structure			
Problem Type	**Difference Unknown**	**Larger Unknown**	**Smaller Unknown**	**Graphic**
Compare *Compare* problems involve the comparison of two quantities. The third quantity represents the difference. (Note: there is **no action** suggested in the situation)	Judith has 7 dollars and Jean has 3 dollars. How many more dollars does Judith have than Jean? ***OR*** Judith has 7 dollars and Jean has 3 dollars. How many fewer dollars does Jean have than Judith?	Judith has 4 more dollars than Jean. Jean has 3 dollars. How many dollars does Judith have? ***OR*** Jean has 4 fewer dollars than Judith. Jea has 3 dollars. How many dollars does Judith have?	Judith has 7 dollars and Jean has 4 dollars fewer than Judith. How many dollars does Jean have? ***OR*** Jean has 4 fewer dollars than Judith. Judith has 7 dollars. How many dollars does Jean have?	

Adapted from: A Guide to Effective Math Instruction: Teaching Basic Facts and Multidigit Computations, Vol 5, pgs 9-10.