Session 1: Making Sense of Addition and Subtraction

1.1 Analyze: Ruth's Story

Use the organizer below to record the thoughts you have made regarding Ruth's story.

What does Ruth know about operations?	What does she know about computations?

What does she not yet know?

As an educator, where would you want to go next with Ruth?

1.2a Key Words Strategies in Problem Solving

Consider:
- What are your experiences with teaching students to use 'keywords' in math problem solving?
- Are keywords a helpful strategy for building operation sense in students?

When it comes to keywords...

INITIAL THINKING ABOUT KEYWORDS

Read the excerpt from John Van de Walle about keywords. Then add your wonderings and insights to the chart below.

WONDERINGS & INSIGHTS **AFTER THE READING**

1.2b Reflections on Analysis Student Solution

Record you and/or your team's reflections on the analysis of student solutions.

How might the use of this trajectory inform your work with your own students?	What are you still wondering about?

1.3 Addition and Subtraction Problem Structures

	Semantic Structure		
Problem Type	**Result Unknown**	**Start Unknown**	**Change Unknown**
Change: Join In Join problems the change is "added" to the start amount. **(Note:** there is an **action** suggested in the situation**)**	James has 14 marbles in his collection. He bought 3 more. How many candies does James now have in his collection?	James has a marble collection. He bought 3 more marbles. Now he has 17 marbles in his collection. How many marbles did James start with?	James had 14 marbles in his marble collection. He decided to buy more special marbles. Now he has 17 marbles in his collection. How many marbles did James buy?

	Semantic Structure		
Problem Type	**Result Unknown**	**Start Unknown**	**Change Unknown**
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)	Ana had 17 dollars. She gave 7 dollars to her sister. How many dollars does Ana have left?	Ana has some birthday money from Grandma in her purse . She decided to share 7 dollars with her sister, and now only has 10 dollars left. How many dollars did Ana start out with?	Ana has 17 dollars. She gave some of her money to her sister Tabitha. She now has 10 dollars in her purse. How many dollars did she give away?

	Semantic Structure		
Problem Type	**Difference Unknown**	**Larger Unknown**	**Smaller Unknown**
Compare Compare problems involve the comparison of two quantities. The third quantity	James has 5 pretzels and Ana has 2. How many more pretzels does James have than Ana?	James has 3 more pretzels than Ana. Ana has 2 pretzels. How many pretzels does James have?	James has 5 pretzels. Ana has 3 fewer pretzels than James. How many pretzels does Ana have?

represents the difference. (Note: there is **no action** suggested in the situation)				5

	Semantic Structure	
Problem Type	**Part Unknown**	**Whole Unknown**
Part-Part-Whole Part-part-whole problems contain 2 parts, which are combined into a whole. (**Note:** there is **no action** suggested in the situation	James has 5 blue smarties, and 9 yellow smarties left. How many smarties does he have together?	James has 14 smarties left. 9 are yellow and the rest are blue. How many blue smarties does James have?