



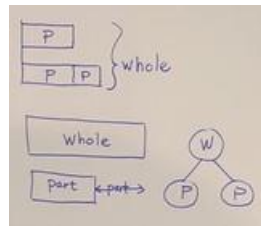
Singapore Math with Dawn Swartz

Lesson 9: Comparison Bar Modeling for Addition and Subtraction

Outline:

Comparison Bar Modeling

- Work through a few problems in advance that you will do with your students in class.
- Singapore math moves from **concrete to pictorial to abstract**.
- Use linking cubes to show the comparison concretely.
- The comparison bar model reflects back to the number bond.
- The comparison model is a picture that is a strategy for problem solving.

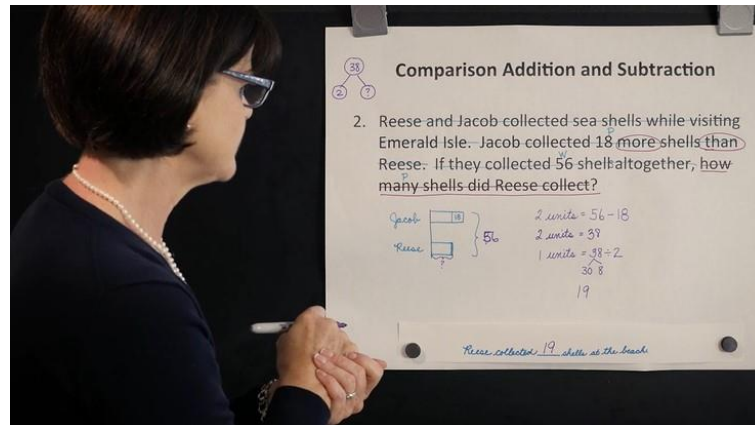


Comparison Addition and Subtraction

- The students would not see the title (as it is shown in the sample questions). The students would need to analyze if they need a part-whole model or a bar model (for comparison).
- Students will need to look for words like: *more than, less than, more, fewer, older than, younger than, eight times as many, four times as many*.
 - Comparison language has been introduced in kindergarten.
- **Question 1 (9:55)**
 - Remember you are teaching the process.
 - Practice sentence writing so you can see what that is like (for your students as they begin). These help the students to check if the answer they have is really what they were looking for.
 - Circle the words that show comparison model. Ask the students whether part-whole or comparison model is needed.
 - For a comparison problem:
 - **Start with a vertical line.**



- Who or what is the problem about? Who or what do we need bars for in the comparison model? **Label the bars.**
- **Draw a small chunk of bar for each group represented in the problem.** Build from there. Beginning with the same size initial chunk shows that the values of these pieces are the same.
- **Write in values for the chunks that you begin with.**
- **Draw the next part in the comparison model and label its value.**
- Have the students stop and determine how to compute the answer.
- Ask students how they could check this.
- Ask further questions that are related to the problem as you have time. Ask if the students see something that they could figure out from the problem.
- Teaching them about parts and wholes leads the students to the operation.
- Train the students to work top to bottom and left to right.
- **Question 2 (24:20)**
 - Reading word problems can be a good opportunity for practicing reading in unison.
 - Teach the children to underline or highlight the question that needs to be rewritten. Check or cross off pieces of information after they have been taken care of. This helps to unravel the problem for the students.
 - Have a conversation with the students to help them understand the problem. **Ask the students: How do you know?** This should be a common question for the students.
 - Talk to your students about how they will manage the space for the problem.
 - Students learn to discern which pieces of the problem are interesting information and which pieces are needed for the bar model. Math is a lot of doing and a lot of business, but you can also enjoy the process with them.
 - Talk to your students about how you will make a mistakes and how the students can help you. *Teach the students about how to use language (questions) to contribute to the conversation about correction. Model this kind of correction for the students.*
 - Help students to solve current problem by thinking about past problems that were similar.
 - Mental math practice with students helps them to hold numbers in their head.



- **Question 3 (44:00)**
 - Example questions: Do we know who is oldest? Do we know who is youngest? Will we use part-whole or comparison to solve this problem? How do we know?
 - The bar doesn't need to get big as the numbers get big.
 - Example questions: What do we know? How do we show with our model that Brynne is 4 years older than Douglas?
 - Working through the problem piece by piece with the students brings them back to a part whole problem.
 - Example questions: Can we find the total of all of their ages.
- **Question 4 (56:33)**
 - Learning how to use bar modelling strategies opens up math confidence and the possibility of looking towards word problems.
 - Students do not need to drag the answer label through the problem if the students are taught to include the label for the answer in the rewritten sentence.
 - Example questions: What else do you know? Does this show us that she spent more on lunch than breakfast? What kind of operation/computation will we use?
 - The picture helps to find the unknown (part or whole).
 - Many problems are written horizontally. Algorithms are not the default. Sometimes the algorithm complicates simple problems. Sometimes algorithms are necessary.
 - Last question: What if she spends \$12.92 on dinner, how much did she spend in the whole day?
- **Question 5 (1:11:00)**
 - Many students love to read their sentences, and they often want to share it. You could listen to two sentences at the beginning with the blank, and then two more at the end with the blank filled in. Encourage students who have been slothful with their sentences.
 - Integrate grammar through practicing it in sentence writing.
 - Example question: What do we need to do to adjust these bars?



- When adding a piece, talk about how much bigger the piece should be.
- If you are going to ask the students questions, you will have to go with the student's answers if they are correct. They may think of the problem differently from you. There can be a variety of comparison models that represent the pieces of the problem correctly.

Some of the essential steps for engaging with a math word problem as a class:

- Read the word problem together and aloud for everyone to hear.
- Turn the question into a statement with a blank for the answer.
- Talk about who, or what, the problem is about and determine what kind of bar model is needed.
- Identify parts and whole.
- Identify “comparison” language.