



## Singapore Math with Dawn Swartz

### Lesson 11: Comparison Bar Modeling for Fractions

#### Outline:

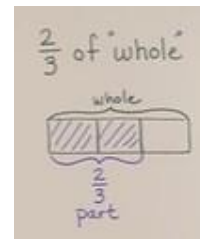
##### Comparison Bar Modeling for Fractions

- What does it look like to solve word problems that involve fractions using bar modelling?
- Fractions can be viewed as a whole divided into equal parts.
- Drawing the bar model for fractions:
  - The number of units comes from the denominator.
  - Represent parts of the whole with shading in the number of parts from the numerator.
  - Use part-whole thinking with fractions.

$$X_{n+1} = X_n + \frac{1}{n}$$
$$n = 1, 2, 3, \dots$$

##### Part-Whole Fractions

- **Question 1** (4:45)
  - Step 1: Read the problem together. Underline the question that you find with the students.
  - Step 2: Rewrite the question as a statement. Check the verb tense in the rewritten sentence. Crossing off what has been used in the problem helps to organize.
  - Step 3: Determine who and/or what is involved in the problem. Label parts and whole in the problem.
  - Step 4: Draw the unit bar(s). Establish consistency across your grammar school for drawing the bar models.
  - Step 5: Adjust the unit bars, and fill in the question mark.
  - Step 6: Correctly compute and solve the problem.
  - Step 7: Write the answer in the sentence, and make sure that the answer makes sense.
  - A larger number of units to the smaller number of units is a division problem. You will know if your students need to see a number bond.
- **Question 2** (16:10)
  - It is sometimes difficult to look at these problems with the strategies of the students.
  - Homework objectives:
    - Can you work on the problem independently?
    - Can you get to the correct answer?





- Have constant conversation with both students and parents about the purpose of homework. Give permission to parents to sign their child's homework if a student has conscientiously tried the homework, and then got stuck.
- Be sure you prepare the explanation of the problems ahead of time.
- **Question 3 (27:00)**
  - Read the words in the question that we need to turn into a statement. Does it sound like she is taking home part or a whole? Are you going to need to fill in two answers in our sentence?
  - It works for some students to think about two separate sentences, and some students will write a compound sentence.
  - If the problem indicates a possessive, you can determine if you will tend to include it when labelling the bar model.
  - Example question: Can we label the last  $\frac{1}{4}$  in any way?
  - Example questions: Where do we start? We start with the units we know. Which unknown piece do you think we will find first?
  - **Teach students to organize the answer to their problems.** For a problem with two questions, students can label left and right sides as "a" and "b" to correspond to the question.
  - Example question: If you can do it in your head, tell what you are thinking.
- **Question 4 (44:00)**
  - Underline the question so the students can turn it into a statement.
  - Example questions: What do we know from the problem? Do we have anything that we are comparing to?
  - Ask the students which denominator to use or if you will need to find a common denominator to use. Into how many units will we divide our bar to represent our lollipops?
  - We cannot move from 6 to 2, we need to move from 6 units to 1 unit. This is based upon what the students know right now.
  - Example question: How many lemon lollipops do we have? How many grape lollipops? Is  $7 + 21 + 14$  equal to 42?
- **Question 5 (57:20)**
  - This problem could be processed as either a part-whole or comparison bar model.
  - Comparison Bar Model:
    - Represent that the pears are  $\frac{3}{5}$  as many as the apples.
  - Part-Whole Bar Model:
    - Label the bar as number of apples. Label the whole number of apples. Shade the equal units of pears.

**Part-Whole Fractions**

3. Mary sold 90 cookies at the bake sale. If she sold  $\frac{3}{4}$  of the total amount of cookies she baked, how many cookies did she bring to sell? How many cookies will she take home after the bake sale?

Mary baked \_\_\_\_\_ cookies for the bake sale, and she had \_\_\_\_\_ left over to take home after



- If you dropped the comparison model for the pears onto the apples, it is the comparison model.
- **Question 6 (1:07:50)**
  - This word problem has two fractions with different denominators.
  - Example questions: Who is this about? What is he doing? What did he buy? Did he spend all of his money on the coat? How do you know? Do we know the total amount of money that he started with?
    - We know that he spent part of his money on his shoes. Tell me about that part.
  - Are we comparing anything? We don't see any comparison words.
  - Remember to begin drawing the bar model in the middle when you draw an odd number of units.
  - We need to show that  $\frac{2}{3}$  of the remainder was spent on the running shoes:
    - What if we take this remainder and drop it out (redraw it as a bar model for the next step)? Let's turn it into thirds.
    - Before we calculate, we need to indicate the unknown quantity.
  - Now that the pieces are in place, it is not hard to start, because you always start with that is known.
  - This is the approach for a fraction of a remainder.