Linda had 48 flowers. Chris has 25 more flowers than Linda.
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Try it on your own: On Tuesday, the bakers made 40 loaves of bread. On Wednesday, they make 15 more loaves of bread than they made on Tuesday. How many loaves of bread did the make on Tuesday and Wednesday altogether?

Lindsay had 3 times as much money as Danny. If they had $40 altogether, how much money did Lindsay have?

Try it on your own: Lance and Alex have 70 pencils. Lance has 3 times as many pencils as Alex. How many pencils does Alex have?

Eva had $50. She used 3/5 of it to buy a jacket. How much money does she have left?

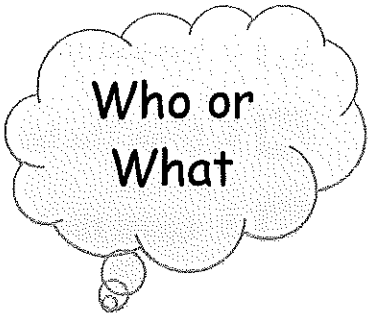
Try it on your own: At the ice skating rink, 5/8 of the skaters were children. If there were 45 children at the skating rink, how many people were at the rink altogether?

Mrs. Sandora has $3,746 to spend on equipment for the school media room. She saves $650 for later purchases. She spends the rest on twelve monitors and some software. The monitors cost $205 each. How much does she spend on software?

Challenge: At Shady Side Academy Junior School, 3/5 of the 570 students were 4th graders, and 2/3 of the remaining students were 5th graders. If the rest were 3rd graders, how many 3rd graders were there?

The Bar Model Steps

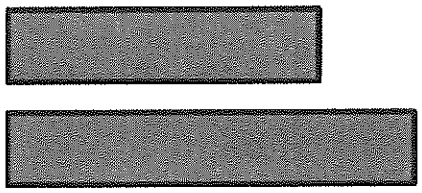
1. Read the problem.



2. Identify and write the who/what.

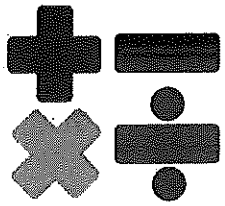
3. Reread the problem.

4. Draw the bar(s).



5. Label the bar(s).

6. Complete the computation.



7. Write the answer in a complete sentence.

The Bar Model Steps

- [ ] 1. Read the problem. 
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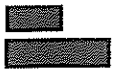
- [ ] 4. Draw the bar(s). 
- [ ] 5. Label the bar(s). 
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The Bar Model Steps

- [ ] 1. Read the problem.
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- [ ] 3. Reread the problem.
- [ ] 4. Draw the bar(s).
- [ ] 5. Label the bar(s).
- [ ] 6. Complete the computation.
- [ ] 7. Write the answer in a complete sentence.

Who or
What

Model Drawing Reference Sheet

If you feel like you need a little extra backup as you do model drawing in class, keep this handy cheat sheet close by. It's like a mini version of the course!

Seven Steps for Model Drawing

1. Read problem.
2. Determine our variables: who and what.
3. Draw unit bar or bars.
4. Chunk information by rereading the problem one sentence at a time, and adjust the unit bar or bars to match the information.
5. Place the question mark.
6. Do the computation.
7. Write a complete and grammatically correct sentence.

Tips for Addition Problems

- With addition problems, it's helpful to draw the unit bars on the smaller side so you can add to them as you adjust the units.
- If you want to introduce a little variety to the classroom, feel free to let younger students (like first-graders) use tiles or pattern blocks to represent units as you draw the problem on the board.

Tips for Subtraction Problems

- Most subtraction problems require you to draw a longer unit bar to begin with.
- It's really helpful to identify the segment of the unit you're subtracting and draw a diagonal slash through the value. This is a great visual reminder.
- We usually place numerical values outside the unit bars with subtraction because we manipulate the inside of the units with sections and slashes.

Tips for Multiplication Problems

- When a problem says, "There were _____ times as many," hone in on what that means. Add one unit to your unit bar at a time, and count with students while adding each unit. (I call this the *counting method.* For example, if you have, "There were 4 times as many," say, "Okay, now we start with 1 times as many because our models are equal. Now we add 2 times as many (one unit bar), 3 times as many (another unit bar), and 4 times as many (a third unit bar)" so they can see how each unit makes an "as many."

  If we don't do it this way, students might see "4 times as many" and think they add 4 units to the base unit bar. That will skew the answer.

- The computation is where you can differentiate model drawing, allowing students to get to their answers in whatever way is easiest for them.

- For multiplication problems, it's usually helpful to draw a smaller unit bar to begin with. That way, you can add to it.

- Check to make sure that the model mirrors the sentence. This becomes particularly important as you get into more complex problems.

- Place the value outside the unit. This keeps things cleaner!

Tips for Division Problems

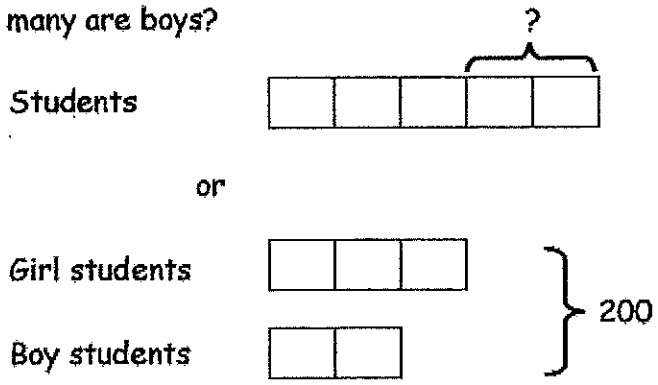
- With these problems, we show our units by dividing one long unit bar into its parts. So for example, if we have one unit that's equal to 10, and the problem asks us to divide it in half, we'll draw a vertical line through the center to show the halves.

- If the question asks for the value of one of the parts of a unit bar, go ahead and place your question mark right inside that section of the bar.

Tips for Fraction Problems

- Fraction problems offer us a unique choice in the way we set up unit bars. One way of doing it is by drawing a long unit bar (like we do in division) and sectioning it off to reflect fractional parts. The other way is to identify two variables (the parts of a whole) and draw separate unit bars for each.

There are 200 students in the school. 3/5 of them are girls. How many are boys?



See what I mean? These choices are great, and they give students the opportunity to do what makes the most sense to them, but they can also cause confusion. The message here is, "Offer a little guidance and a lot of practice!"

- When you see the words *remainder* or *remaining*, draw a long unit bar because you'll be carrying down the remaining part into a new unit bar set.
- With fraction problems, we starting using the word *units* (abbreviated as *u*) in our computation. Then we focus on finding the base unit, or what 1u equals.

Tips for Rate Problems

- With these problems, we need to use a double label because we're comparing units (like miles to hours it takes to travel them or baskets to the minutes it takes to shoot them). One value will go inside the unit, and the other one will go outside the unit, and we do this where it makes the most sense for each problem. We have to be careful to label the values neatly so we can keep them all straight.
- We can use small or large unit bars, depending on the problem's information.

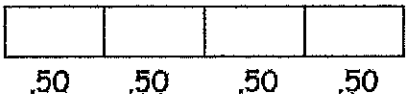
Tips for Ratio Problems

- Since a *ratio* is a comparison of two or more rates, your goal is to find the base unit.
- Generally, we want to keep the unit bars smaller to begin with. That way, we can easily add to them.

Tips for Decimal Problems

- Depending on the type of problem, you can use small or large unit bars to begin with.

- To show additional values in these problems, place the amount below each unit.

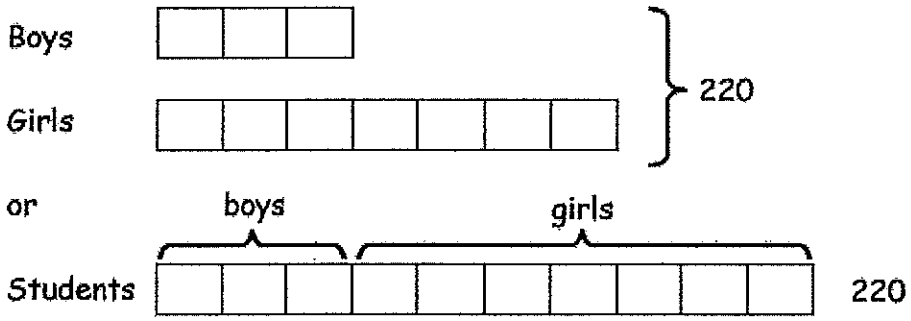


- Use . . . to indicate a value that is repeated multiple times. This is a quick way of showing repetition, and it avoids a nasty hand cramp!

Tips for Percent Problems

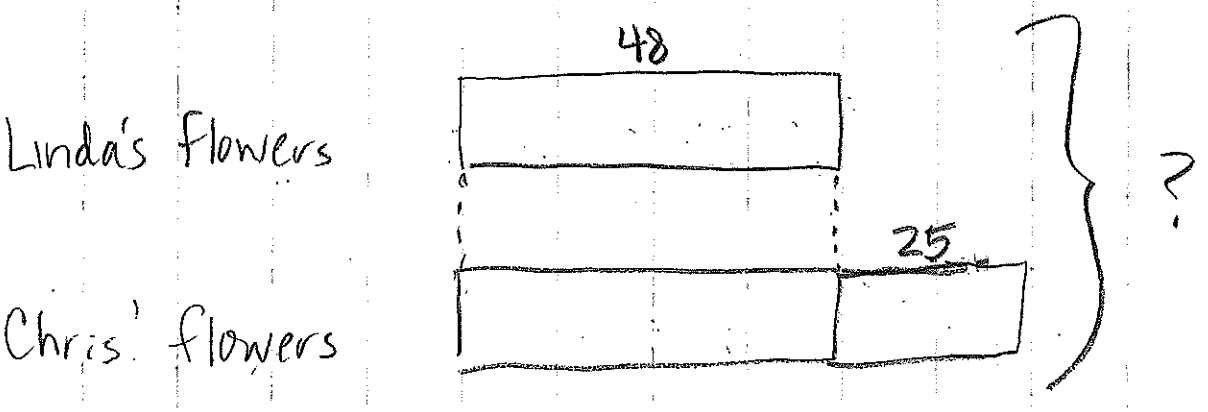
- We divide our unit bars into *percent rulers*, which are long unit bars that can accommodate 100% (or other quantities, depending on the problem) divided up in different ways.

- Percent problems are similar to fraction problems in that you can make either one percent ruler that you divide into parts or multiple percent rulers, one for each quantity represented. For example, if you know that there are 30% boys and 70% girls and a total of 220 students, you could draw the unit bars either way.



Both examples are correct.

Linda had 48 flowers. Chris has 25 more flowers than Linda.
How many flowers do Linda and Chris have altogether?



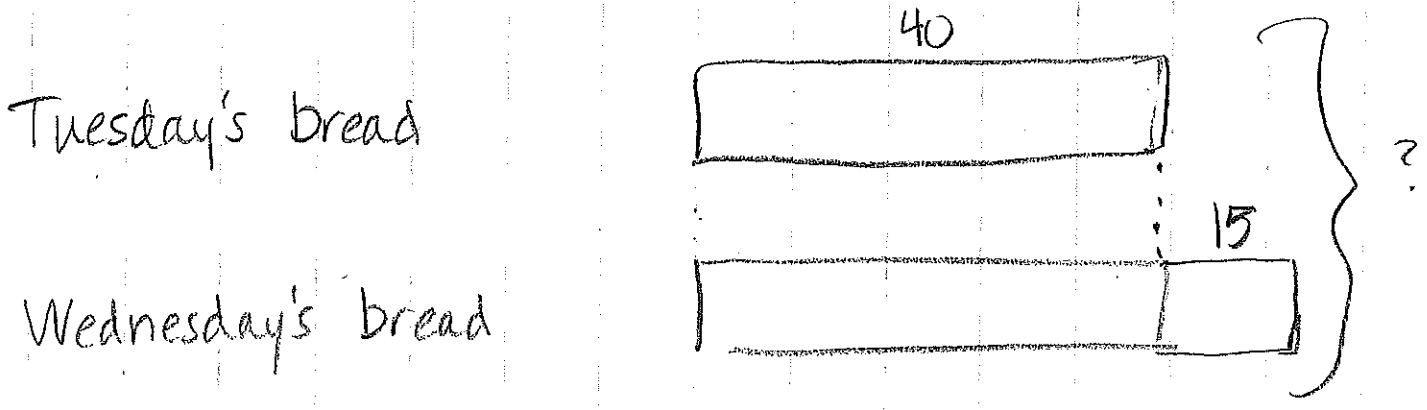
① Chris' flowers:
$$\begin{array}{r} {\scriptstyle 1} \\ 48 \\ +\ 25 \\ \hline 73 \end{array}$$

② Total flowers:
$$\begin{array}{r} {\scriptstyle 1} \\ 73 \\ +\ 48 \\ \hline 121 \end{array}$$ (Linda's flowers)

Linda and Chris have 121 flowers altogether.

2nd grade

Try it on your own: On Tuesday, the bakers made 40 loaves of bread. On Wednesday, they make 15 more loaves of bread than they made on Tuesday. How many loaves of bread did the make on Tuesday and Wednesday altogether?



Wednesday's bread

$$\begin{array}{r} 40 \\ +\ 15 \\ \hline 55 \end{array}$$ loaves

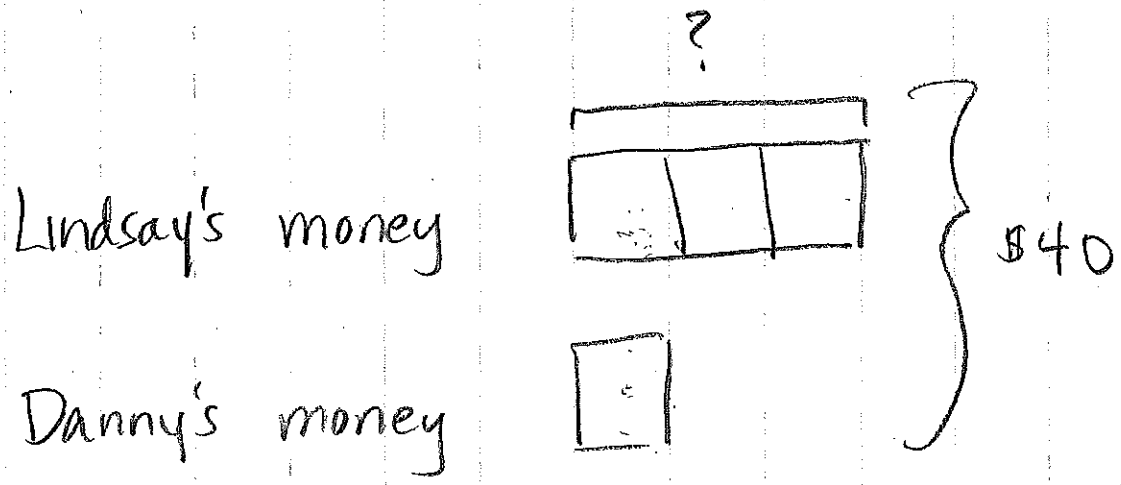
Total bread

$$\begin{array}{r} 55 \\ +\ 40 \\ \hline 95 \end{array}$$

The bakers made 95 loaves of bread on Tuesday and Wednesday.

2nd grade

Lindsay had 3 times as much money as Danny. If they had $40 altogether, how much money did Lindsay have?



A) 1 unit = ?

1 unit = $40 ÷ 4 = $10

B) 3 units = $10 × 3 = $30

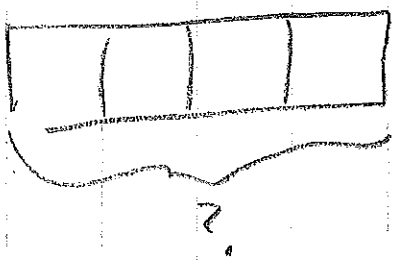
Lindsay has $30.

3rd grade

Try it on your own: Mrs. Budd drove 98 miles on her vacation this year. She drove 4 times that distance last year. How far did Mrs. Budd drive on her vacation last year?

Vacation miles this year

Vacation miles last year

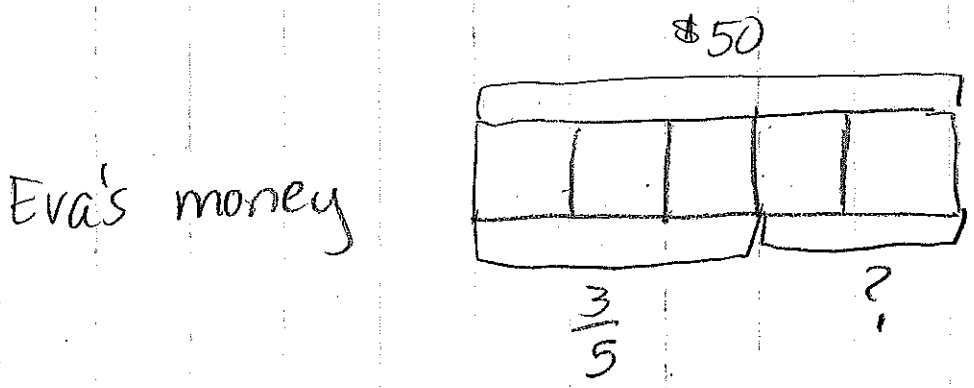


1 unit = 98 miles

4 units = $98 \times 4 = 392$ miles

Mrs. Budd drove 392 miles on her vacation last year.

Eva had $50. She used 3/5 of it to buy a jacket. How much money does she have left?



5 units = $50

1 unit = $50 ÷ 5 = $10

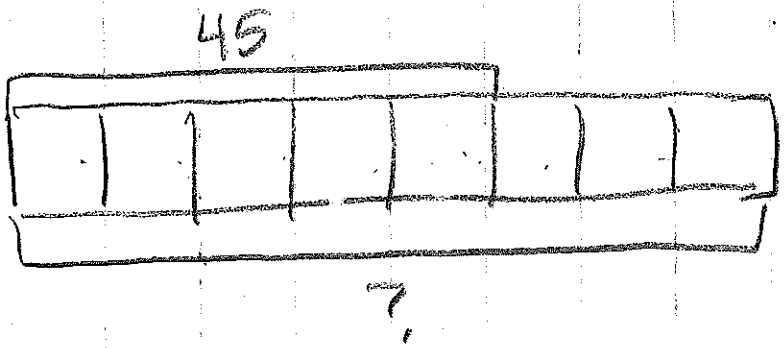
2 units = $10 × 2 = $20

Eva has $20 left

4th

Try it on your own: At the ice skating rink, 5/8 of the skaters were children. If there were 45 children at the skating rink, how many people were at the rink altogether?

Skating Rink
people

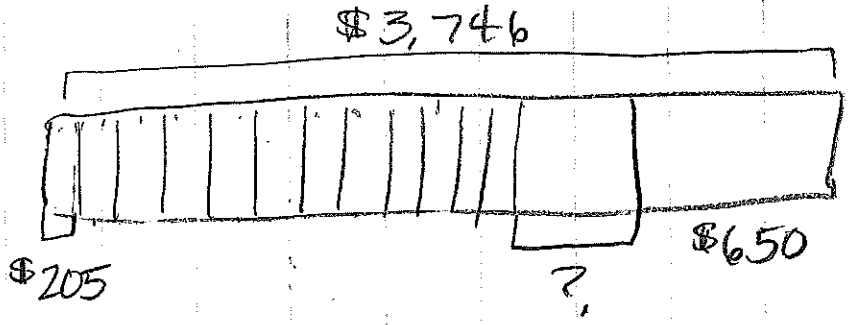


5 units = 45
1 unit = 45 ÷ 5 = 9
8 units = 9 × 8 = 72

There 72 people at the rink altogether.

Mrs. Sandora has $3,746 to spend on equipment for the school media room. She saves $650 for later purchases. She spends the rest on twelve monitors and some software. The monitors cost $205 each. How much does she spend on software?

Mrs. Sandora's money



A) $3,746 − $650 = $3,096 for monitors/softwar

B) $205 × 12 = $2,460 cost of monitors

C) $3,096 − $2,460 = $636 cost of softwar

Mrs. Sandora spends $636 on softwave.

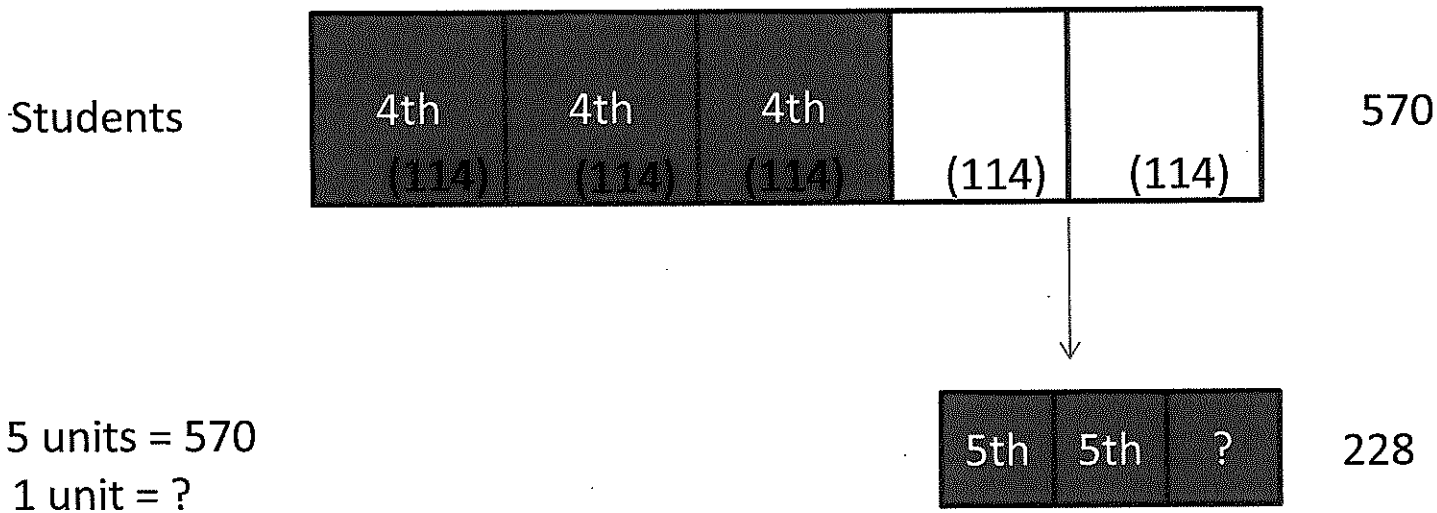
4th / 5th

Challenge: At Shady Side Academy Junior School, 3/5 of the 570 students were 4th graders, and 2/3 of the remaining students were 5th graders. If the rest were 3rd graders, how many 3rd graders were there?

See next page - answer key

4/5th grade

At Shady Side Academy Junior School, 3/5 of the 570 students were 4th graders, and 2/3 of the remaining students were 5th graders. If the rest were 3rd graders, how many 3rd graders were there?



A. 5 units = 570
1 unit = ?
570 ÷5 = 114

B. 1 unit = 114
2 units= ?
114 x 2 = 228
2 units= 228

C. 2 units = 228 = 3 units (1/3 S)
= 228
3 units = 228
1 unit = ?
228 ÷3= 76

There were 76 third graders.