

STRUCTURES OF STORY PROBLEMS

JOIN

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Join story problems all have an action that causes an increase. They involve three quantities: the initial amount, the change amount, and the resulting amount.

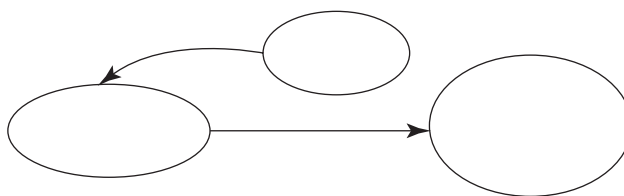
When drawing join problems, teachers should use a consistent format. This format has the three steps described below, but only one final diagram. It is important to note that students may draw a variety of diagrams representing what they do with concrete materials, and these (provided they are logical) should be accepted.

SAMPLE RESULT UNKNOWN

I had 5 pennies and I earned 4 more. How many pennies do I have now?

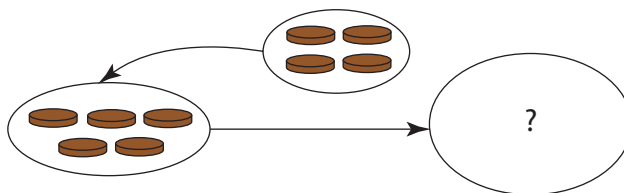
STEP 1:

I start with the template for join problems.



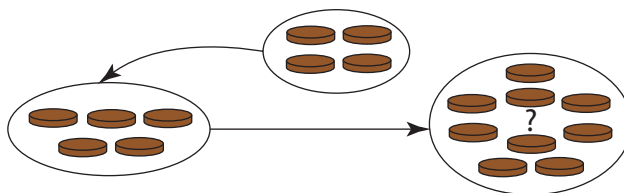
STEP 2:

I fill in what I know and use a question mark (?) to indicate the unknown quantity.



STEP 3:

I fill in the unknown bubble.



Step 3, the final diagram, is all that is seen by the teacher.

NOTE:

The final picture will contain twice as many objects as would be used if modelling with concrete materials. The picture records the object before the action and after the action.

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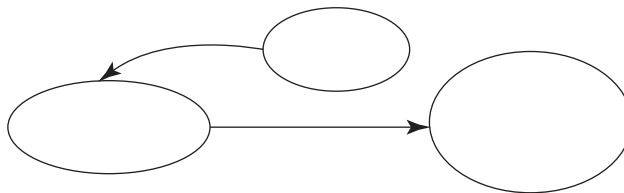
The same process is used with all three types of join questions.

**SAMPLE
CHANGE
UNKNOWN**

I had 5 pennies. I earned some more. Now I have 9 pennies. How many pennies did I earn?

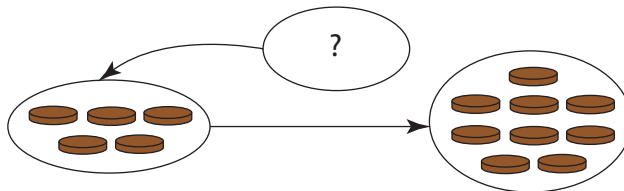
STEP 1:

Start with the template for join problems.



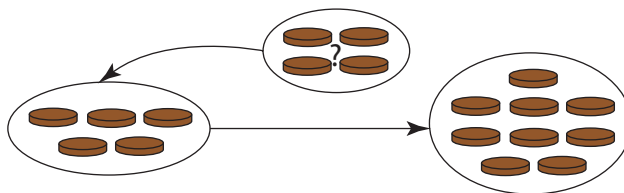
STEP 2:

Fill in what is known and use a question mark (?) to indicate the unknown quantity.



STEP 3:

Fill in the unknown bubble.



STRUCTURES OF STORY PROBLEMS

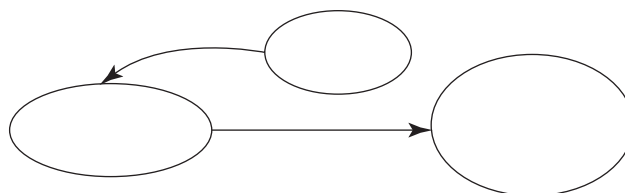
JOIN

**SAMPLE
INITIAL
UNKNOWN**

I had some pennies. I earned 4 more. Now I have 9 pennies. How many pennies did I start with?

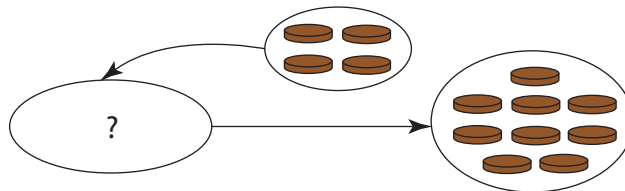
STEP 1:

Start with the template for join problems.



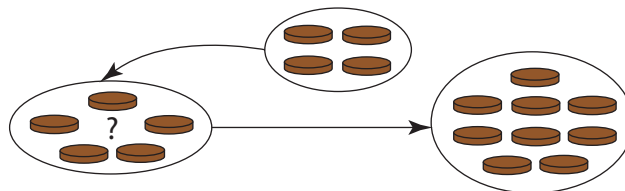
STEP 2:

Fill in what is known and use a question mark (?) to indicate the unknown quantity.



STEP 3:

Fill in the unknown bubble.

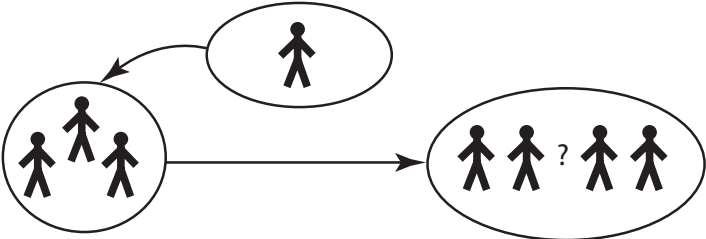
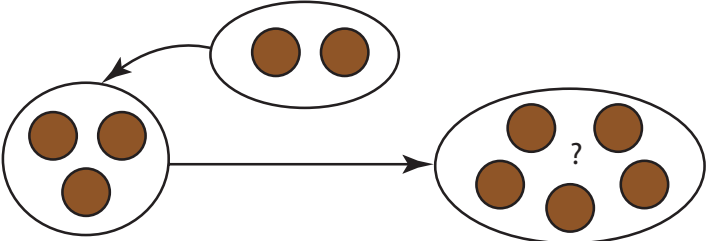


NOTE:

When completed, the pictures for all three types of join problems will look the same except for the location of the question mark.

ADDITION AND SUBTRACTION GRADE PRIMARY

JOIN

<p>STRUCTURES OF ADDITION AND SUBTRACTION</p>	<p>Pictures should describe what students did with the concrete models. The focus for grade primary is to get students comfortable with combining, separating, joining two parts, and comparing. Students will count to get the result. No symbol representations are expected at this level.</p>
<p>RESULT UNKNOWN</p>	<p>Three children are swimming in the pool and one more child joins them. How many children are swimming in the pool in all?</p> <div style="text-align: center;">  </div> <p>Dylan has 3 pennies and his mother gives him 2 more pennies. How many pennies does he have in all?</p> <div style="text-align: center;">  </div>
<p>CHANGE UNKNOWN</p>	
<p>INITIAL UNKNOWN</p>	

ADDITION AND SUBTRACTION GRADE 1

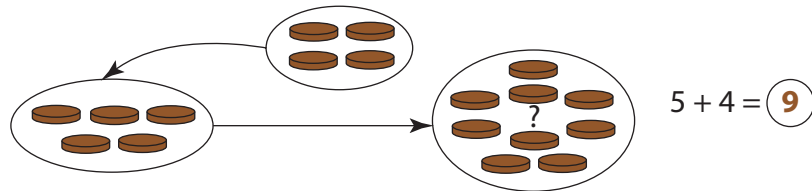
JOIN

STRUCTURES OF ADDITION AND SUBTRACTION

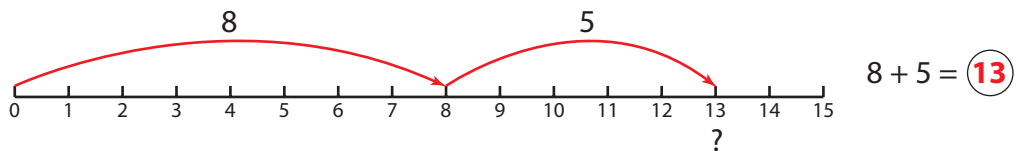
The remaining structures are introduced as students begin to make the connection between addition and subtraction. Students should continue using set models concretely before recording their actions in pictures.

RESULT UNKNOWN

I had 5 pennies and I earned 4 more. How many pennies do I have now?

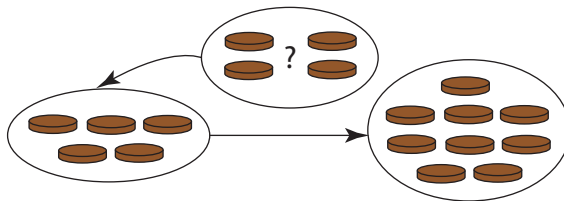


There were 8 students in class and 5 more came in. How many students are in class now?



CHANGE UNKNOWN

I had five pennies. I earned some more pennies. Now I have 9 pennies. How many did I earn?



Think Addition:

$$5 + 4 = 9$$

Start with 5 pennies and add pennies until you get 9, so you earned 4 pennies

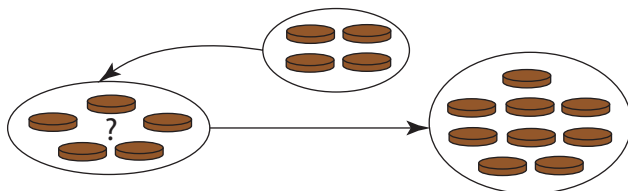
Think Subtraction:

$$9 - 5 = 4$$

Start with 9 pennies, and subtract the 5 pennies you started with, leaving the 4 pennies you must have earned

INITIAL UNKNOWN

I had some pennies. I earned 4 more pennies. Now I have 9 pennies. How many pennies did I start with?



Think Addition:

$$5 + 4 = 9$$

Add pennies to the 4 pennies until you get 9, so you started with 5 pennies

Think Subtraction:

$$9 - 4 = 5$$

Start with 9 pennies, and subtract the 4 earned pennies, so you started with 5 pennies

ADDITION AND SUBTRACTION GRADE 2

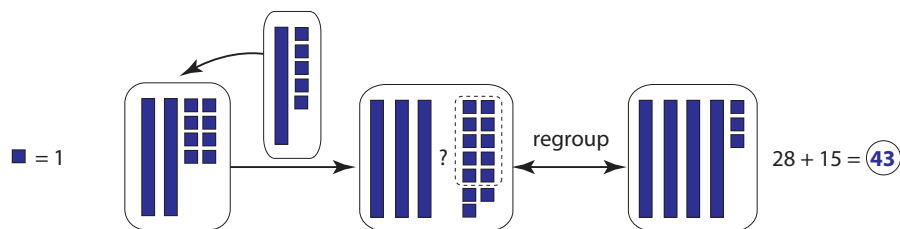
JOIN

STRUCTURES OF ADDITION AND SUBTRACTION

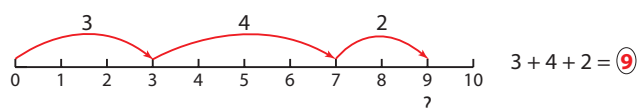
Students will begin using base ten materials for adding two-digit numbers. Number lines should also be introduced. All eleven structures are emphasized and students continue to develop connections between addition and subtraction.

RESULT UNKNOWN

Mike earned \$28 last week selling newspapers. This week he earned \$15. How much money has he earned in all?

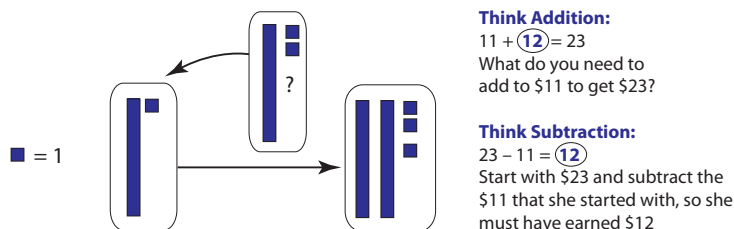


James walked 3 km on Monday, 4 km on Wednesday, and 2 km on Thursday. How many km did he walk in all?



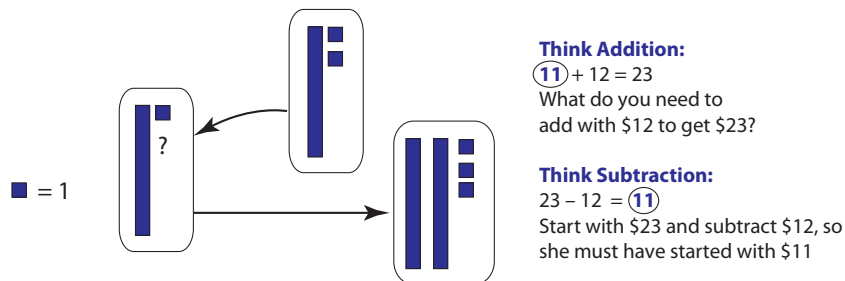
CHANGE UNKNOWN

Michelle had \$11. Her mom gave her some money for doing chores around the house. Now she has \$23. How much money did she earn?



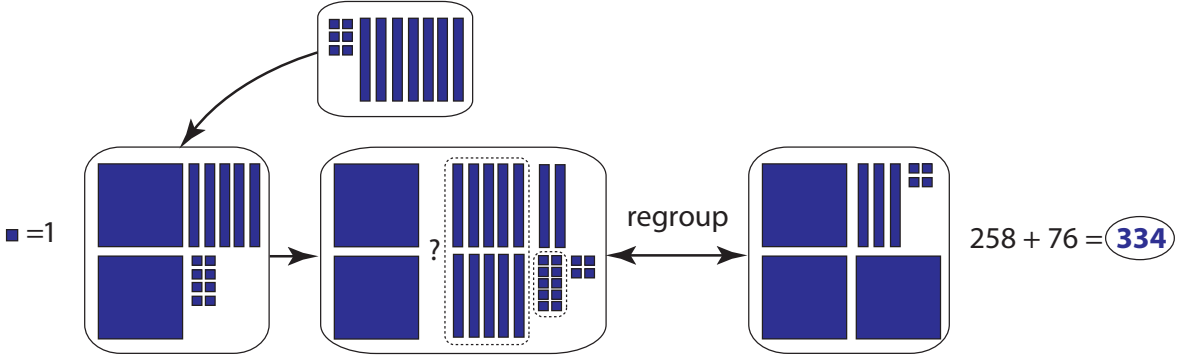
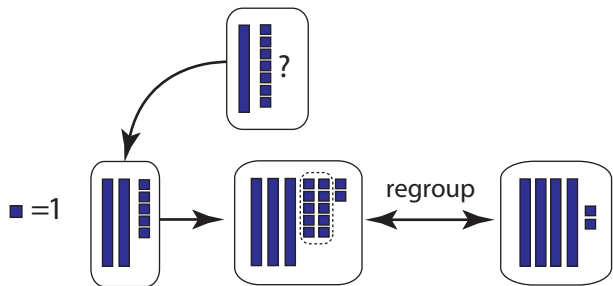
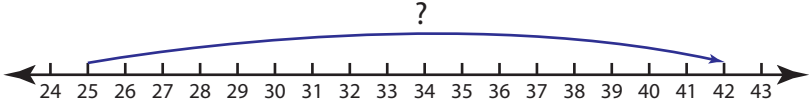
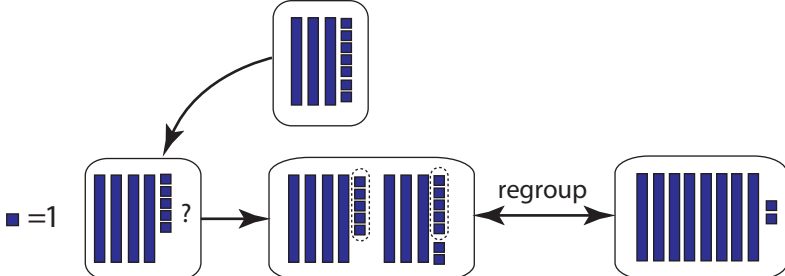
INITIAL UNKNOWN

Michelle had some money. Her mom gave her \$12 for doing chores around the house. Now she has \$23. How much money did she earn?



ADDITION AND SUBTRACTION GRADE 3

JOIN

<p>STRUCTURES OF ADDITION AND SUBTRACTION</p>	<p>Students should be doing a great deal of work with base ten materials as they move to adding and subtracting three-digit numbers. Students should also move towards the more efficient method for solving problems with whole numbers (see below).</p>
<p>RESULT UNKNOWN</p>	<p>Gillian has collected shells for years. She had 258 shells in her collection last year. This year she gathered 76 more. How many shells does Gillian have in her collection now?</p>  <p>$258 + 76 = \textcircled{334}$</p>
<p>CHANGE UNKNOWN</p>	<p>Gillian had 25 shells in her bucket. She collected some more shells. Now she has 42 shells. How many shells did she collect?</p>  <p>Think Addition: $25 + \textcircled{17} = 42$ How many would she have to collect to get 42?</p> <p>Think Subtraction: $42 - 25 = \textcircled{17}$ Start with the total of 42 and subtract the 25 she had initially to get the 17 collected</p> 
<p>INITIAL UNKNOWN</p>	<p>Gillian had some shells in her bucket. She collected 37 more shells. Now she has 82 shells. How many shells did she collect?</p>  <p>Think Subtraction: $82 - 37 = \textcircled{45}$ Start with the total of 82 and subtract the 37 she collected to find the initial quantity of 45</p>

ADDITION AND SUBTRACTION GRADE 4

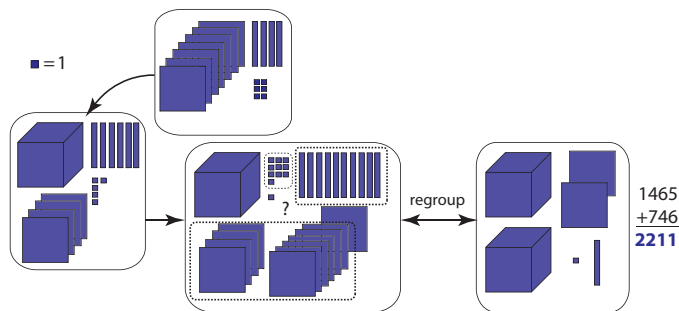
JOIN

STRUCTURES OF ADDITION AND SUBTRACTION

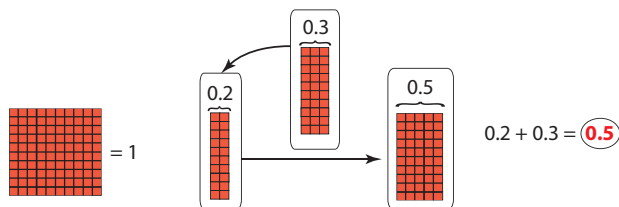
Students continue to use base ten materials for addition and subtraction of whole numbers with up to five digits, and decimal tenths and hundredths. They will also begin adding simple fractions with the same denominators.

RESULT UNKNOWN

Sam has a huge stamp collection. He had 1465 stamps. His brother gave him 746 more. How many stamps does Sam have now?

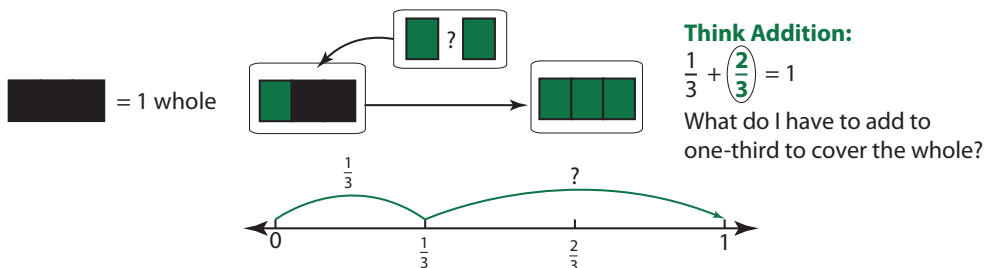


Jessica had 0.2 metres of fabric to make ponytail holders. Her mom gave her 0.3 metres more. How much fabric does Jessica have now?



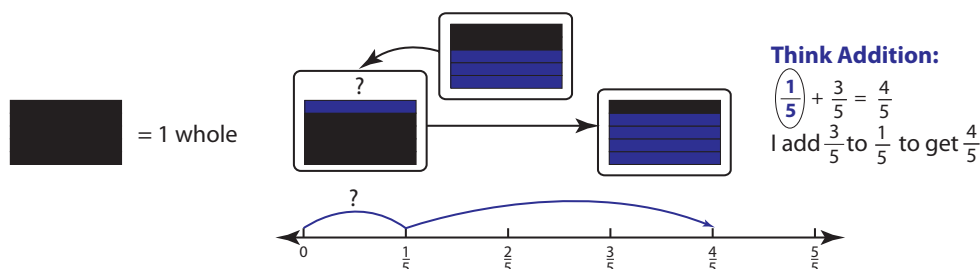
CHANGE UNKNOWN

Matthew has $\frac{1}{3}$ of a jar of candy. His friend James gives him enough candy to fill the jar. How much candy did James give Matthew?



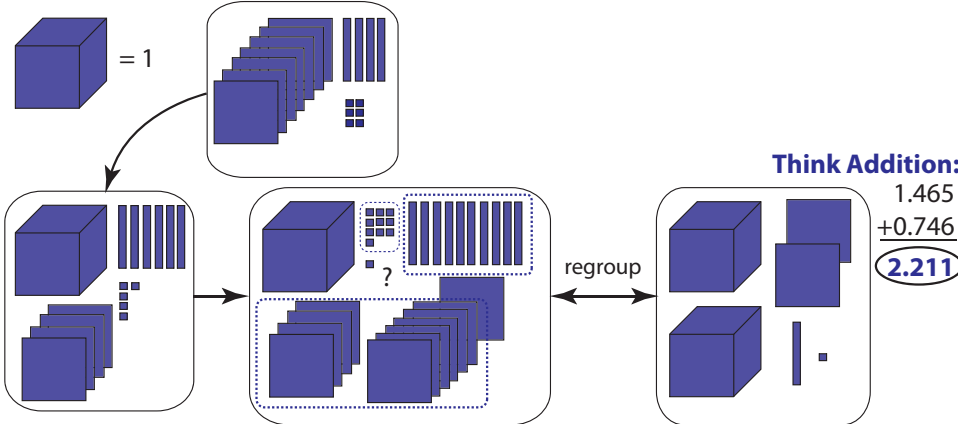
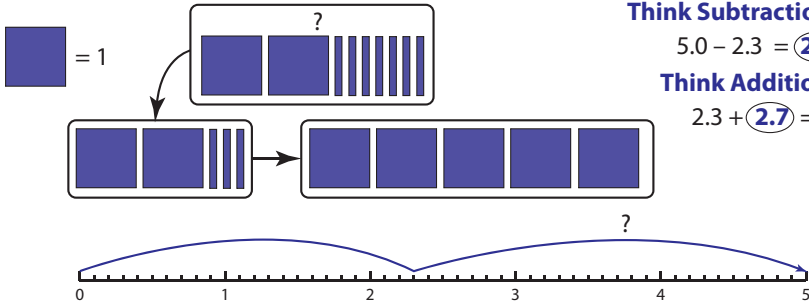
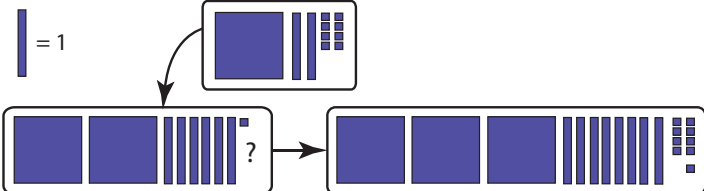
INITIAL UNKNOWN

Monique had some orange juice in a glass. She added $\frac{3}{5}$ of a glass of juice to what she had. Now the glass is $\frac{4}{5}$ full. How much orange juice did Monique start with?



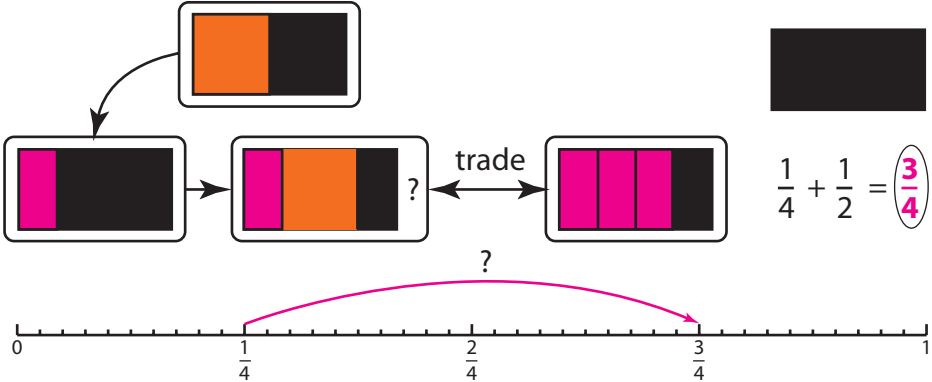
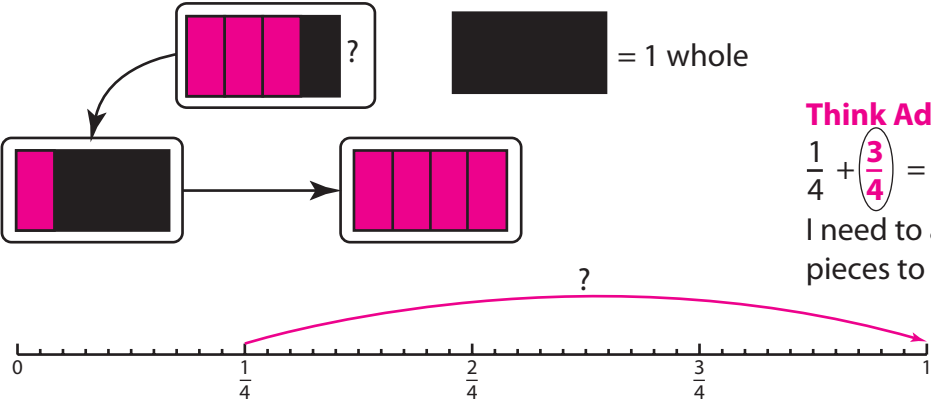
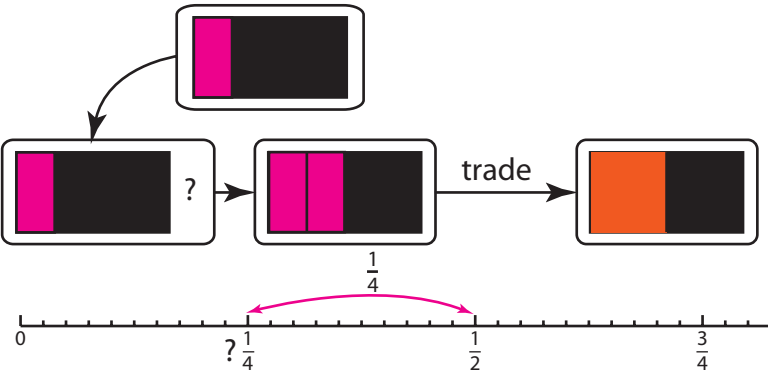
ADDITION AND SUBTRACTION GRADE 5

JOIN

<p>STRUCTURES OF ADDITION AND SUBTRACTION</p>	<p>Students continue to use base ten materials for addition and subtraction, extending decimal work to the thousandths.</p>
<p>RESULT UNKNOWN</p>	<p>I have 1.465 kg of hamburger in the fridge. I bought 0.746 kg more. How much hamburger do I have?</p>  <p>Think Addition:</p> $\begin{array}{r} 1.465 \\ +0.746 \\ \hline 2.211 \end{array}$
<p>CHANGE UNKNOWN</p>	<p>Bob ran 2.3 km today. His goal for the week is to run 5.0 km. How much more will he need to run this week to reach his goal?</p>  <p>Think Subtraction:</p> $5.0 - 2.3 = 2.7$ <p>Think Addition:</p> $2.3 + 2.7 = 5$
<p>INITIAL UNKNOWN</p>	<p>Bob ran every day from Monday to Friday. He ran an additional 12.8 km over the weekend. The odometer on his treadmill read 38.9 km for the week. How far did he run Monday–Friday?</p>  <p>Think Addition:</p> $26.1 + 12.8 = 38.9$ <p>Not effective for these numbers</p> <p>Think Subtraction:</p> $38.9 - 12.8 = 26.1$ <p>Start with the final odometer reading of 38.9 km and subtract 12.8 to get the initial reading</p>

ADDITION AND SUBTRACTION GRADE 6

JOIN

<p>STRUCTURES OF ADDITION AND SUBTRACTION</p>	<p>Students will add and subtract fractions, always using concrete materials. The pictures they draw should record what they have done with the concrete models.</p>
<p>RESULT UNKNOWN</p>	<p>Donna had $\frac{1}{4}$ of a bag of candy. Her friend Peggy gave her $\frac{1}{2}$ bag more. How much candy does Donna have now?</p>  <p>$\frac{1}{4} + \frac{1}{2} = \frac{3}{4}$</p>
<p>CHANGE UNKNOWN</p>	<p>Donna had $\frac{1}{4}$ of a bag of candy. Her friend Peggy gave her some more candy. Now Donna has a whole bag of candy. How much candy did Peggy give Donna?</p>  <p>Think Addition: $\frac{1}{4} + \frac{3}{4} = 1$ (whole) I need to add 3 more $\frac{1}{4}$ pieces to make a whole</p>
<p>INITIAL UNKNOWN</p>	<p>Donna had some candy. Her friend Peggy gave her $\frac{1}{4}$ of a bag of candy. Now Donna has $\frac{1}{2}$ a bag of candy. How much candy did Donna start with?</p>  <p>Think Addition: $\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$ I would need to have started with $\frac{1}{4}$ to get after adding $\frac{1}{4}$</p> <p>Think Subtraction: $\frac{1}{2} - \frac{1}{4} = \frac{1}{4}$</p>