**Grade Level/Course: 1st and 2nd Grade**

**Lesson/Unit Plan Name:** Adding by finding 10's - Hands on to Number Line

**Rationale/Lesson Abstract:** Students will explore adding numbers by decomposing and recomposing to create "tens". Students will start with hands on manipulation of linker cubes, counters and ten frames, and then move to semi concrete models with 10 by 10 arrays and area models. Students will then connect this understanding to addition on an open number line.

**Timeframe:** 1 week

**Common Core Standard:**

1.OA.6      Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$)...

**California State Standards**

1NS 1.3      Represent equivalent forms of the same number through the use of physical models, diagrams, and number expressions (to 20) (e.g., 8 may be represented as $4 + 4, 5 + 3, 2 + 2 + 2 + 2, 10 - 2, 11 - 3$)

2NS1.2      Use words, models, and expanded forms (e.g., $45 = 4$ tens $+ 5$) to represent numbers (to 1,000).

**Instructional Resources/Materials:**
- linker cubes
- 10-Frames
- 2 color counters
- 10 x 10 Grid/Area Model (attached)
- 10 x 10 arrays (attached)
- Sheet protectors (optional)
- 2 dry erase pens in two colors (optional)

**Activity/Lesson:**
**Linker Cube**

Tell a story while students build a linker cube model:

*Leo saw 8 ducks.*  Model building a tower with 8 linker cubes.

*He then saw 6 more.*  Build another tower with 6 linker cubes.

*Leo wants to figure out how many ducks he saw.*

*I want to rearrange these blocks into a way that is easier for me to see how many there are so I am going to make a row of ten.*

*Why might I choose ten?  (easier to count, we have 10 fingers...)*

Break 2 cubes off of the tower of 6 and attach to the tower of 8.

*I have now created 1-ten and I have 4 more.  Now I can easily combine those numbers in my head.*

Write on board: 8+6 = 10 +4

Repeat: 7 + 4

You Try: 8 + 5 record what students did on the board: 8+5 = 10 + 3

**Ten Frames**

Repeat the same problems and stories using a 10-Frame. First explorations should be done with counters so they may easily manipulate the addends.

Have the students build each addend out of a different color, each on it's own 10-Frame.  Guide them to move addends from one ten-frame to the other to make a 10.

Teacher records the changing expression on the board: 8 + 6 = 10 + 4
Students can record their work on 10-frame worksheets.  (See example at end of lesson)

**Semi Concrete Models:**

Create or have students create instant white boards by inserting the two sheets of paper into the plastic sleeve.  One side of the white board will be the grid and the other will have the arrays.

Ask students to observe the 10 x 10 grid (area model) and share what they know about it. (There are rows, columns, each one has 10 squares, there are 100 squares in the grid...)

First Grade Problems:

*Anya had 8 goldfish in her fish tank.*  Model using one color to cross off 8 boxes on the grid paper.  *She added 6 more goldfish.*  Model using another color to cross off 6 more boxes, by completing the column and then filling in 4 more in the next column. *How many goldfish are in the tank?*

*Do you see that we have crossed off all of the boxes in one column?  How many boxes is that?* (10) *How many are crossed off in the next column?* (4)

*So now I can rewrite my expression based on this picture:* 8 + 6 = 10 + 4.  How much is 10 +4?

Yes, 14.  So that means that 8 + 6 also =14.  *We created a 10 and have some more.*

**10x10 Grid Paper**
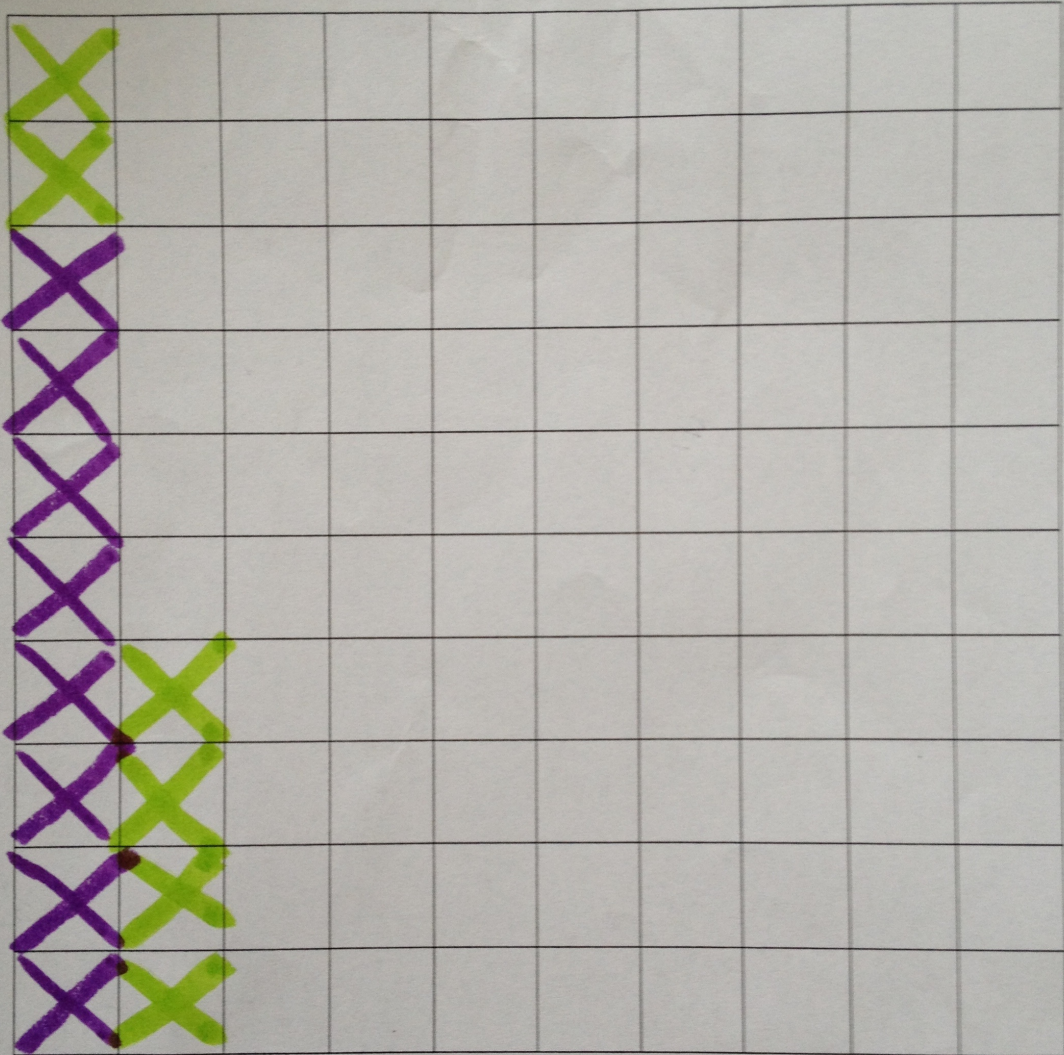


$$8 + 6 = 10 + 4$$

You Try:

7 + 4               7 + 4 = 10 + 1


You Try:

8 + 5               8 + 5 = 10 + 3


*Second Grade:*

26 + 17


Model crossing out 2 columns of 10 and 6 more. Verify with the students that you have crossed out 26 squares. Explain that you need to add 17 more. Have students discuss with partner an efficient way to cross off the 17 boxes - remind them we are looking to create tens. Have them share out.

Use another color to cross off another entire row of 10. Ask how many more boxes need to be crossed off.

*I need to cross off 7 more boxes. I have an incomplete column with 6 squares crossed off and 4 empty squares. Could I cross off the remaining squares in this row as part of the 7 I need to mark? (Yes.) Look I have another 10. How many more squares do I need to mark off? (3)*

*Now I have 4 columns of 10 completely filled in and then I have a column with just 3 squares marked. So that is 4 tens which is? (40 - Choral response) and then I have 3 more. So what is the total number of squares marked off? (43)*

So:

$$26 + 17 = (20 + 6) + (4 + 10 + 3)$$
$$= 40 + 3$$
$$= 43$$


We Try:

$$34 + 18 = (30 + 4) + (6 + 10 + 2)$$
$$= 50 + 2$$
$$= 52$$

You Try:

$$15 + 9 = 20 + 4$$

**Using Arrays to model adding by finding tens:**

Repeat procedures this time using a 10 x 10 array to record the addends and find the tens.



It is important to guide students to create tens. For example with 26 + 17, students may record 10+10+6+10+7. Discuss why this is a representation of the decomposed addends, but ask if it is helping create tens and model breaking the 7 apart to complete a 10.

**Transition to Number Line:**

Finding tens by decomposing and adding on a number line.

Work through the same problems on an open number line.
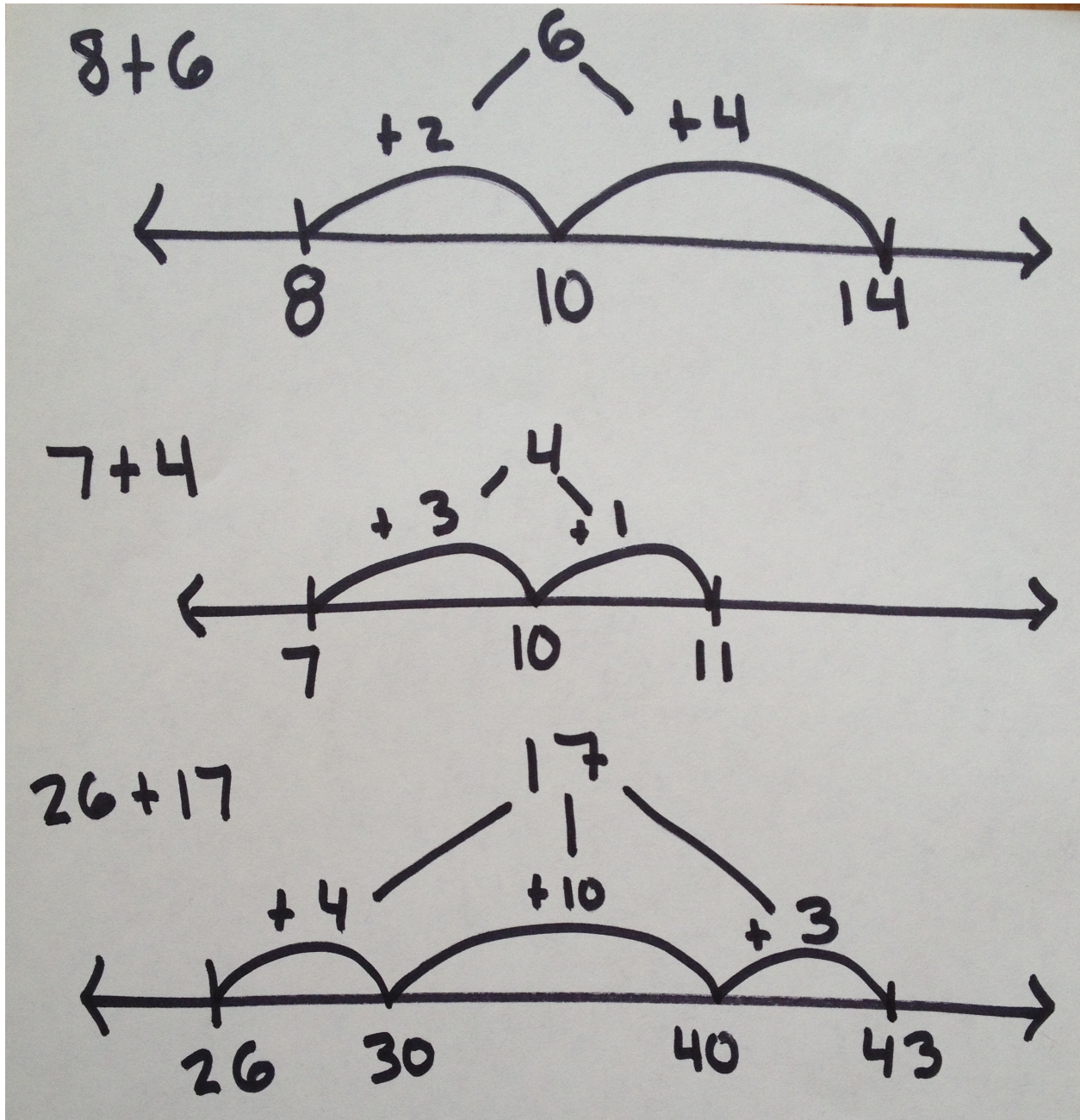


Progress Monitoring: Checking the "You Trys" and having students explain how they did the work and know their answer is correct.

Exit Ticket for Number Line:

Represent the expression 18 + 15 on an open number line.

**Assessment/Review:**

Have students create a poster of an addition problem showing the multiple representations.
Sample:

**Assessment:**

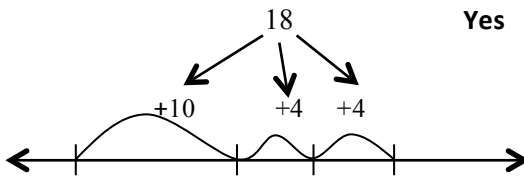Which of the following represent the expression 26 + 18?

A. 10 + 10 + 6 + 10 + 8      **Yes  No**

B. 10 + 10 + 10 + 10 + 4      **Yes  No**

C.
$$\begin{array}{r} 26 \\ +\ 18 \\ \hline 14 \\ +\ 30 \\ \hline \end{array}$$
     **Yes  No**

D.
$$\begin{array}{r} 26 \\ +\ 18 \\ \hline 34 \end{array}$$
     **Yes  No**

E. X X O O      **Yes  No**
  X X O O
  X X O O
  X X O O
  X X X O O
  X X X O O
  X X X O O
  X X X O O
  X X X O O
  X X X O O

F.      **Yes  No**

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