SUMMATIVE Assessment WORD PROBLEM TYPES

GOALS: To find out:
- which problem types are most easily solved by students at your level and which types of problems are more problematic. Are there any changes from when the baseline was given?
- how accurate students are in solving problems of various types and if the problem type or the method of solving most impact accuracy
- what resources students use to solve the problems
- differences among students within a classroom/course or across grade levels

Attached are 3 Forms (Form A, Form B or Form C) of the summative assessment. Most are quite similar to the Baseline Assessment, just the numbers have changed slightly. You can select the level that best matches the students in your class/course. You may even want to give different forms to different students in your class/course.

> Form A is for beginning learners and all problems are about candy bars.
> Form B is for intermediate learners; all problems are about a school store.
> Form C is for advanced learners who can cope with different contexts.

There are 6problems to give to all students in your classroom/course.
You can give all 6problems on one day or spread across different days.

You may read/reread any problems to students and can have manipulatives or number lines accessible to students.   Try to keep track of students who use fingers, manipulatives or number lines, if possible.   Try to get students to put as much work as possible in the "work space".

You can discuss the format. Following the problem, the "answer" – the unknown - goes in the box and the kind of thing goes on the label line. You can even go over what word would be the right word to write on the label line in problem #1. Tell students to show their work in the "work space" and they can keep working below the problem.

Fill out the recording sheet. Bring your students' work and your recording sheets to the next full day PD session at 287.   It may also be helpful to bring your baseline student work, interviews, and recording sheets.

Name _____   Form A

Solve each problem and <u>show</u> how you got your answer.

1.   Chris put 8 candy bars in a bowl.
      His mom put 7 more candy bars in the bowl.
      How many candy bars are in the bowl now?

      ┌─────┐
      │   │   _____   Work Space
      └─────┘
              label

2.   Chris had 13 candy bars.
      Chris ate 6 candy bars.
      How many candy bars does Chris have left?

      ┌─────┐
      │   │   _____   Work Space
      └─────┘
              label

Name _____   Form A

Solve each problem and <u>show</u> how you got your answer.

3.   Yesterday Allison had 16 candy bars.
     Today Allison bought some more candy bars.
     Now Allison has 23 candy bars.
     How many candy bars did Allison buy today?

     ☐ _____   Work Space
              Label

4.   Chris had 13 candy canes bars.
     Now Chris has 4 candy bars.
     How many candy bars did Chris give away?

     ☐ _____   Work Space
              Label
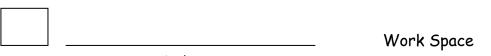
Name _____   Form A

Solve each problem and <u>show</u> how you got your answer.

5.   Yesterday Chris bought some candy bars.
      Today Chris bought 7 more candy bars.
      Now Chris has 12 candy bars.
      How many candy bars did Chris start with yesterday?

      ☐   _____   Work Space
                    Label

6.   Mary has 9 candy bars. Joann has 8 candy bars more
      than Mary.
      How many candy bars does Joann have?

      ☐   _____   Work Space
                    Label

BASELINE ASSESSMENT RECORDING SHEET for Word Problems - *FORM A*

For each way to solve a problem, record the number of students who got the problem correct and the number of students who got the problem incorrect. If students use multiple ways to solve, record the initial solution method (the entry point to solving the problem).

	Students solved this problem with . . .					
1. *PPW-whole unknown* Chris, mom and candy bars in bowl **15 candy bars**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
2. *PPW-part unknown* Chris ate some candy bars **7 candy bars**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
3. *PPW-part unknown* Allison buying candy bars **7 candy bars**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
4. *PPW-part unknown* Chris giving away candy bars **9 candy bars**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
5. *PPW-part unknown* Chris buying candy bars **5 candy bars**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
6. *Comparison – Greater Quantity Unknown* Mary and Joann's candy bars **17 candy bars for Joann**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

Name _____   Form B

Solve each problem and <u>show</u> how you got your answer.

1.   Emily is in charge of the school store that will open in a few weeks. She bought 28 sets of markers last week. Then she bought some more sets of markers this week. There are now 51 sets of markers in the store. How many markers did she buy this week?

☐   _____   Work Space
         Label

2.   The school store had 54 blue pens when it opened. It sold several blue pens. Now there are 37 blue pens left in the store. How many blue pens were sold?

☐   _____   Work Space
         Label

Name _____   Form B

Solve each problem and <u>show</u> how you got your answer.

3.   Emily bought 15 boxes of pencils for the school store. There were 9 pencils in each box. Emily took the pencils out of each box and put all the pencils in a big jar on the counter. How many pencils does the store have for sale in the big jar?

☐   _____   Work Space

            Label

4.   Emily needs to buy 84 pens for the school store. If each package has 12 pens, how many packages should she buy?

☐   _____   Work Space

            Label

Name _____   Form B

Solve each problem and <u>show</u> how you got your answer.

5.   The school store has 46 yellow highlighters and 29 pink highlighters. How many more yellow highlighters does it have than pink highlighters?

☐   _____   Work Space
              Label

6.   The school store has some large glue sticks. It has 17 small size glue sticks which are 1/3 as many as the number of large glue sticks. How many large glue sticks are there?

☐   _____   Work Space
              Label

BASELINE ASSESSMENT RECORDING SHEET for Word Problems - *FORM B*

For each way to solve a problem, record the number of students who got the problem correct and the number of students who got the problem incorrect. If students use multiple ways to solve, record the initial solution method (the entry point to solving the problem).

1. *PPW-part unknown* Emily & sets of markers **23 sets of markers**	Students solved this problem with . . .					
	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

2. *PPW-part unknown* Blue pens sold **17 blue pens**	Students solved this problem with . . .					
	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
3. *Equal Groups – Product Unknown* Emily buying boxes of pencils **135 pencils**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
4. *Equal Groups – Factor Unknown (partitive division - # OF groups)* Emily buying pens **7 packages**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
5. *Comparison – Difference Unknown* Yellow & Pink Highlighters **17 yellow highlighters**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
6. *Multiplicative Comparison – Greater Quantity Unknown* Large and small glue sticks **51 large glue sticks**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

Name _____   Form C

Solve each problem and show how you got your answer.

1.   Amy has 13 boxes. She wants to put 4 cookies in each box. How many cookies does Amy need to make to fill all the boxes?

[ ] _____   Work Space
            Label

2.   Amy has 21 boxes. She and her friends made 63 cookies. How many cookies will go in each box if the boxes are filled all the same?

[ ] _____   Work Space
            Label

Name _____   Form C

Solve each problem and <u>show</u> how you got your answer.

3.   Amy made 28 cupcakes for her cousins. She will give 4 cupcakes
     to each cousin. How many cousins does Amy have?

     ☐ _____   Work Space
              Label

4.   The gym needs to be set up for a concert. There are 54 chairs
     for the band players. If the chairs are put in 3 identical rows,
     how many chairs can go in each row?

     ☐ _____   Work Space
              Label

Name _____   Form C

Solve each problem and <u>show</u> how you got your answer.

5.   Zach and Callen collect baseball cards. Zach has $4\frac{1}{4}$ boxes of
        cards. Callen has 3 times as many boxes as Zach. How many
        boxes of cards does Callen have?

        ☐   _____   Work Space
                      label

7.   Clara, Eddy, and Bill collect cans to recycle. Eddy has 6 cans.
        Clara has 3 times as many cans as Eddy. Bill has 4 times as many
        cans as Clara. How many cans does Bill have?

        ☐   _____   Work Space
                      label

BASELINE ASSESSMENT RECORDING SHEET for Word Problems – *FORM C*

For each way to solve a problem, record the number of students who got the problem correct and the number of students who got the problem incorrect. If students use multiple ways to solve, record the initial solution method (the entry point to solving the problem).

	Students solved this problem with . . .					
1. *Equal Groups – Product unknown* Amy making cookies **52 cookies**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
2. *Equal Groups – Factor Unknown (Partitive Division – know # OF parts* Amy putting cookies in boxes **3 cookies**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
3. *Equal Groups – Factor Unknown (Measurement Division – know # IN A part or the number to "measure" out* Amy giving cupcakes to cousins **7 cousins**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
4. *Array or Equal Shares – Array dimension or Factor Unknown (partitive divison – know number of parts (rows))* Band chairs **18 chairs** in a row	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model or Array	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
5. *Multiplicative Comparison – Greater Quantity Unknown* Boxes of baseball cards **12¾ boxes**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect

	Students solved this problem with . . .					
6. *Multiplicative Comparison – Greater Quantity Unknown* Recycling cans **72 cans**	Realistic Pictures		Representative Drawings (e.g. circles, tallies)		Bar Model or Inverted V model	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect
	Equation only		No work shown, observed use of manipulatives, fingers, number line, etc.		No work shown, assume mental math	
	# sts correct	# sts incorrect	# sts correct	# sts incorrect	# sts correct	# sts incorrect