Baseline Assessment STORY 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
- 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 or across grade levels

Attached are 3 Forms (Form A, Form B or Form C) of the baseline assessment. 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 apples.
Form B is for intermediate learners and all problems are about a school store.
Form C is for advanced learners who can cope with different contexts.

There are 6 problems to give to all students in your classroom/course.
You can give all 6 problems 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 that apples 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.

Option: Before you start, you can talk about the context used in the problems. You can ask students what they know about that context or what they have done with things like those in the context given in the problems. e.g what do they do with apples, have they been in a school with a school store and what happened there.

Fill out the recording sheet. Bring your students' work and your recording sheets to the PLC meeting. Also, save the problems and recording sheets for our next professional development day.

Name _____ Form A

Solve each problem and show how you got your answer.

1. Chris picked 9 apples. His mom picked 7 apples.
   How many apples do they have together?

   ☐ _____ Work Space
   label

Name _____ Form A

Solve each problem and show how you got your answer.

2. Chris had 15 apples.
   Chris ate 6 apples.
   How many apples does Chris have now?

   ☐ _____ Work Space
   label

Name _____ Form A

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

3. Yesterday Allison had 18 apples.
   Today Allison bought some more apples.
   Now Allison has 26 apples.
   How many apples did Allison buy today?

   ☐ _____ Work Space

   Label

Name _____ Form A

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

4. Chris had 19 apples. He gave away some apples.
   Now Chris has 12 apples.
   How many apples did Chris give away?

   ☐ _____ Work Space

   Label

Name _____ Form A

Solve each problem and show how you got your answer.

5. Yesterday Chris bought some apples.
Today Chris bought 7 more apples.
Now Chris has 13 apples.
How many apples did Chris start with yesterday?

☐ _____ Work Space

Label

Name _____ Form A

Solve each problem and show how you got your answer.

6. Mary has 16 apples. Joann has 7 apples more than Mary.
How many apples 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 and mom picking apples **16 apples**	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 apples **9 apples**	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 apples **8 apples**	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 apples **8 apples**	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 apples **6 apples**	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 apples **23 apples 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 show how you got your answer.

1. Emily is in charge of the school store that will open in a few weeks. She bought 25 sets of markers last week. Then she bought some more sets of markers this week. There are now 53 sets of markers in the store. How many markers did she buy this week?

☐ _____ Work Space

Label

Name _____ Form B

Solve each problem and show how you got your answer.

2. The school store had 75 red pens when it opened. It sold several red pens. Now there are 48 red pens left in the store. How many red pens were sold?

☐ _____ Work Space

Label

Name _____ Form B

Solve each problem and show how you got your answer.

3. Emily bought 25 boxes of pencils for the school store. There were 8 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

Name _____ Form B

Solve each problem and show how you got your answer.

4. Emily needs to buy 120 pens for the school store. If each package has 6 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 52 yellow highlighters and 27 pink highlighters. How many more yellow highlighters does it have than pink highlighters?

☐ _____ Work Space

Label

Name _____ Form B

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

6. The school store has some large glue sticks. It has 23 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).

	Students solved this problem with . . .					
1. *PPW-part unknown* Emily & sets of markers **28 sets of markers**	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* Red pens sold **27 red pens**	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 **200 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 Shares – Factor Unknown (# OF groups)* Emily buying pens **20 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 **25 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 **69 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 <u>show</u> how you got your answer.

1. Amy has 16 boxes. She wants to put 3 cookies in each box. How many cookies does Amy need to make to fill all the boxes?

☐ _____ Work Space
Label

2. Amy has 24 boxes. She and her friends made 96 cookies. How many cookoies 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 48 cupcakes for her cousins. She will give 3 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 96 chairs for the band players. If the chairs are put in 4 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 $6\frac{1}{2}$ boxes of cards. Callen has 3 times as many boxes as Zach. How many boxes of cards does Callen have?

☐ _____ Work Space

label

6. Clara, Eddy, and Bill collect cans to recycle. Eddy has 12 cans. Clara has 3 times as many cans as Eddy. Bill has 2 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 **48 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 **4 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 **16 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 **24 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 **19 ½ 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