Context is Critical:
K-5th Grade
Three-Act Math Tasks

Lindsey Herlehy, NBCT
ACT 1
WHAT DO YOU NOTICE?
WHAT DO YOU WONDER?
What do you notice?

Please type your comment in the chat.
What is the main question that we want answered?

How many Skittles are in the jar?

Estimate

Too Low estimate

Too High estimate

Place your just right estimate along the number line. Be sure to label!
What information would be useful to know to help you solve this problem? Enter your comments in the chat.
There are 58 packages of skittles in the jar.
Solve.

(And try more than one method.)
ACT 3

Please share your answer in the chat.
What other questions could we investigate?

Please type your comment in the chat.
How do these two problems differ?

Student Experience

Real-World Application

Inquiry

Name: __________________________ Date: ______________

Learning Target: I can multiply two 2-digit numbers in number stories.

1. Read the word problem.
2. Understand the problem.
3. Write an equation with the unknown.
4. Solve the multiplication problem by using an area model.
5. Write the answer.
6. Check your answer by solving the multiplication problem using a different algorithm, like partial products.
7. Write your final answer.

A.

Keith and Jeff were keeping track of the canned goods brought in for the food drive. So far, each classroom had 16 cans collected. There were 24 classrooms in the whole school. How many cans did the whole school collect so far?

Equation with unknown: ________________

Final Answer: ________________ cans

Solve:

Check:

Answer: ________________ cans

Answer: ________________ cans
“IF YOU CAN ASK QUESTIONS ABOUT IT, IT’S IN YOUR REAL WORLD. IF YOU CAN GUESS ABOUT IT, IT’S IN YOUR REAL WORLD. IF YOU ARE ABLE TO ARGUE ABOUT IT, IT’S IN YOUR REAL WORLD.”

- DAN MEYER
Inquiry-based learning experiences are those which promote **analytic thinking**, **knowledge generation and application**, and **construction of meaning** through mindful investigation driven by compelling **questions** that have engaged, or have the potential of engaging, the learner’s **curiosity**.

## Inquiry Skills

<table>
<thead>
<tr>
<th>Planning</th>
<th>Investigation</th>
<th>Analysis</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Questions are posed</td>
<td>• Students gather information</td>
<td>• Identifying relationships in patterns in the information</td>
<td>• Claims and conclusions are published with supporting evidence</td>
</tr>
<tr>
<td>• Background knowledge is identified</td>
<td>• Observations and data are documented</td>
<td>• Evaluating the information in support of the inquiry question</td>
<td>• Students share their investigation with the public</td>
</tr>
<tr>
<td>• Predictions are made</td>
<td>• Appropriate tools are utilized</td>
<td>• Conclusions are drawn and defended</td>
<td>• Time is allotted for self-assessment</td>
</tr>
<tr>
<td>• The investigation is organized</td>
<td></td>
<td>• Arguments are constructed based on information</td>
<td></td>
</tr>
</tbody>
</table>

[IMSA Logo]
“Introduces the central conflict of your story clearly, visually and viscerally, using as few words as possible.”

- Notice and Wonder
- Engage in “Goldilocks guessing”
- Collect data and invite all learners to participate

1. What did you notice?
2. What do you wonder?
3. My Question:
4. Make an estimate.
   - low estimate
   - high estimate
   Place an “X” to represent your estimate on the number line.
5. What information do you need?

***SHOW YOUR THINKING ON THE BACK OF THE PAPER***
**ACT 2**

“The student overcomes obstacles, looks for resources and develops new tools.”

- Investigate the constraints and requirements of the problem
- Identify and collect valuable information needed to solve
- “Mess” with the problem

---

1. What did you notice?

2. What do you wonder?

3. Main Question:

4. Make an estimate:
   - Place an “X” to represent your estimate on the number line.

5. What information do you need?

***SHOW YOUR THINKING ON THE BACK OF THE PAPER***
**ACT 3**

“Resolve the conflict and set up a sequel or extension.”

- Evaluate the reasonableness of the answer and sources of error
- Formalize the content
- Reflect on the skills needed to solve the problem
- Investigate additional questions

---

**1. What did you notice?**

**2. What do you wonder?**

**3. Main Question:**

**4. Make an estimate:**

Place an “X” to represent your estimate on the number line.

**5. What information do you need?**

***SHOW YOUR THINKING ON THE BACK OF THE PAPER***
The Candyman 3-Act Task

Kindergarten Thinking in Action (October)

Task found at www.gfletchy.com
Act 2

- 4-orange
- 2-red
- 2-yellow
- 2-white
- 0-pink
Students A, S2, and S5 have drawn pictures to show their thinking for the following problems.

Student A:
- Problem: Draw a picture to show your thinking.
  - Drawing: Five shapes, possibly squares or rectangles.
- Use numbers to show your thinking: 12342678916

Student S2:
- Problem: Draw a picture to show your thinking.
  - Drawing: A complex arrangement of shapes, possibly flowers or leaves.

Student S5:
- Problem: Draw a picture to show your thinking.
  - Drawing: The following equation is shown:
    \[4 + 2 + 2 + 2 + 0 = 10\]

IMSA
imsa.edu
Describe the student work in the image:

- The student is asked to estimate the number of items, which is 87.
- They are then asked to draw a picture to show their thinking, with items colored in orange and red.
- Finally, they use numbers to show their thinking, with the answer being 10.

The student appears to be engaged in a counting or math activity, showing their thought process through both visual and numerical representations.
THIS IS ALL GREAT, BUT WHERE DO I START?

www.estimation180.com

WWW.OPENMIDDLE.COM

EQUIVALENT STATEMENTS

Directions: Place numbers 1 through 9 in the boxes to create a true statement. Each number can only be used once.

\[
\text{ } = \text{ } + \text{ } = \text{ } + \text{ } + \text{ } + \text{ }
\]

5 + 5
2 + 8
9 + 1
3 + 9
<table>
<thead>
<tr>
<th>Date Added</th>
<th>Lesson Title</th>
<th>Standard 1</th>
<th>Standard 2</th>
<th>Big Ideas</th>
<th>What do you wonder?</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/17/2014</td>
<td>Peas in a Pod</td>
<td>K.NBT.1</td>
<td>K.CC.4</td>
<td>counting</td>
<td>If all the peas were in one pod, how many peas would there be?</td>
</tr>
<tr>
<td>4/25/2014</td>
<td>Dotty</td>
<td>K.CC.1,2,3</td>
<td>K.CC.4,5</td>
<td>counting and patterns</td>
<td>How many dots will be on the screen after the last bell?</td>
</tr>
<tr>
<td>2/9/2016</td>
<td>the Candyman</td>
<td>K.CC.1,2,3</td>
<td>K.CC.4,5</td>
<td>counting and joining sets</td>
<td>How many candies are in are in his hand?</td>
</tr>
<tr>
<td>12/6/2015</td>
<td>Share the Love</td>
<td>K.CC.1,2,3</td>
<td>K.CC.4,5</td>
<td>sharing quantities within 20</td>
<td>How many M&amp;Ms will each girl get?</td>
</tr>
<tr>
<td>1/16/2015</td>
<td>Counting Squares</td>
<td>K.NBT.1</td>
<td>K.CC.4,5</td>
<td>counting and patterns</td>
<td>How many tiles are in the pile?</td>
</tr>
<tr>
<td>1/16/2015</td>
<td>Stage 5 Series</td>
<td>K.NBT.1</td>
<td>K.CC.4,5</td>
<td>counting and patterns</td>
<td>What will stage 5 look like?</td>
</tr>
<tr>
<td>3/24/2015</td>
<td>Shark Ball</td>
<td>K.NBT.1</td>
<td>K.CC.4,5</td>
<td>counting and joining sets through 20</td>
<td>How long is the worm?</td>
</tr>
<tr>
<td>3/4/2014</td>
<td>LIL' Sister</td>
<td>K.MD.2</td>
<td>K.CC.6</td>
<td>comparing measurements</td>
<td>How much shorter is LIL' Sister than Big Sister?</td>
</tr>
<tr>
<td>9/1/2015</td>
<td>Bag-O-Chips</td>
<td>K.OA.4</td>
<td>K.OA.5</td>
<td>building fluency through 10</td>
<td>How many bags of chips were missing?</td>
</tr>
<tr>
<td>5/8/2014</td>
<td>Balancing Numbers</td>
<td>K.OA.2</td>
<td></td>
<td>number combinations through</td>
<td>What is needed to make both side of the scale equal?</td>
</tr>
<tr>
<td>9/27/2015</td>
<td>Humpty Dumpty</td>
<td>K.OA.1,2,3</td>
<td></td>
<td>addition and subtraction within 20</td>
<td>How many eggs didn't break?</td>
</tr>
<tr>
<td>10/10/2017</td>
<td>Popping Balloons</td>
<td>K.OA.1,2,3</td>
<td></td>
<td>building fluency through 10</td>
<td>How many balloons are left?</td>
</tr>
<tr>
<td>2/15/2015</td>
<td>the Cookie Monster</td>
<td>1.NBT.1</td>
<td>1.NBT.4</td>
<td>addition and subtraction within 50</td>
<td>How many cookies did the cookie monster eat?</td>
</tr>
<tr>
<td>11/7/2016</td>
<td>the Pringle Ringle</td>
<td>1.NBT.1</td>
<td>1.NBT.4</td>
<td>addition and subtraction within 100</td>
<td>How many Pringles did it take to make the Pringle Ringle?</td>
</tr>
<tr>
<td>5/3/2014</td>
<td>the Juggler</td>
<td>1.NBT.1</td>
<td>1.NBT.4</td>
<td>addition and subtraction</td>
<td>How many times will the juggler be able to juggle the ball until it hits the ground?</td>
</tr>
<tr>
<td>11/10/2014</td>
<td>Graham Cracker</td>
<td>1.NBT.1</td>
<td>1.NBT.4</td>
<td>addition and subtraction within 100</td>
<td>How many crackers will fit inside the Graham Cracker box?</td>
</tr>
<tr>
<td>5/16/2016</td>
<td>Bright Idea</td>
<td>1.NBT.1</td>
<td>1.NBT.4</td>
<td>addition and subtraction within 100</td>
<td>How many Skittles fit inside the light bulb?</td>
</tr>
<tr>
<td>9/4/2017</td>
<td>Snack Machine</td>
<td>1.NBT.6</td>
<td></td>
<td>addition and subtraction within 100</td>
<td>How much did the Munchos cost?</td>
</tr>
<tr>
<td>3/30/2017</td>
<td>Silly Dog</td>
<td>1.G.3</td>
<td>4.NF.4</td>
<td>working with quarters and wholes</td>
<td>How many orange wedges are in the bowl?</td>
</tr>
<tr>
<td>2/9/2016</td>
<td>the Whopper Jar</td>
<td>2.NBT.5</td>
<td>1.NBT.4</td>
<td>addition and subtraction within 100</td>
<td>How many Whoppers are inside the jar?</td>
</tr>
<tr>
<td>3/7/2015</td>
<td>It All Adds Up</td>
<td>2.NBT.5</td>
<td></td>
<td>adding and subtracting money</td>
<td>What coins are in the bank?</td>
</tr>
<tr>
<td>9/9/2015</td>
<td>Let It Fly</td>
<td>2.NBT.7</td>
<td></td>
<td>adding and subtracting within 1000</td>
<td>How far did he throw the disc?</td>
</tr>
<tr>
<td>2/11/2016</td>
<td>Downsizing Tomatoes</td>
<td>2.NBT.7</td>
<td></td>
<td>adding and subtracting within 1000</td>
<td>How many little ketchup bottles will fill the big bottle up?</td>
</tr>
<tr>
<td>11/21/2014</td>
<td>the Race</td>
<td>2.MD.6</td>
<td></td>
<td>adding and subtracting within 1000</td>
<td>Which sister won the race?</td>
</tr>
<tr>
<td>2/15/2015</td>
<td>the Water Boy</td>
<td>3.NBT.2</td>
<td>5.NBT.7</td>
<td>adding and subtracting within 1000</td>
<td>How much water was consumed?</td>
</tr>
<tr>
<td>11/13/2014</td>
<td>Paper Cut</td>
<td>3.MD.5,6,7</td>
<td>3.OA.3</td>
<td>area</td>
<td>Which piece is bigger? Which piece has the greater area?</td>
</tr>
<tr>
<td>2/2/2014</td>
<td>the Orange</td>
<td>3.MD.2</td>
<td></td>
<td>multiplication and division within 100</td>
<td>How many cubes will it take to balance the scale?</td>
</tr>
<tr>
<td>5/1/2017</td>
<td>Seesaw</td>
<td>3.OA.3</td>
<td>2.NBT.5</td>
<td>multiplication and division within 100</td>
<td>How many bricks will it take to balance out the seesaw?</td>
</tr>
<tr>
<td>3/30/2017</td>
<td>Fruit &amp; Nuts</td>
<td>3.OA.3</td>
<td></td>
<td>multiplication and division within 100</td>
<td>How many pieces of chocolate in the whole bar?</td>
</tr>
<tr>
<td>9/21/2016</td>
<td>Knotty Rope</td>
<td>3.OA.7,8</td>
<td></td>
<td>multiplication and division within 100</td>
<td>How many knots will fit on the rope?</td>
</tr>
<tr>
<td>3/2/2015</td>
<td>All Aboard</td>
<td>3.NBT.3</td>
<td>3.MD.1</td>
<td>elapsed time</td>
<td>How long will it take for the train to pass?</td>
</tr>
<tr>
<td>12/10/2013</td>
<td>Piles of Tiles</td>
<td>3.MD.5,6,7</td>
<td></td>
<td>area</td>
<td>Are there enough tiles to cover the entire table?</td>
</tr>
<tr>
<td>3/3/2014</td>
<td>Cover the Floor</td>
<td>3.MD.5,6,7</td>
<td></td>
<td>building arrays within 100</td>
<td>How many blue squares will it take to cover the yellow square?</td>
</tr>
</tbody>
</table>
K-2

**COUNTING & CARDINALITY**
*Share the Love - Sharing Quantities within 20*

**OPERATIONS & ALGEBRAIC THINKING**
*Humpty Dumpty – Addition and Subtraction within 20*

**NUMBER & OPERATIONS IN BASE TEN**
*Downsizing Tomatoes – Addition and Subtraction within 100*

**GEOMETRY**
*Sliced Up – Working with Quarters and Wholes*
**OPERATIONS & ALGEBRAIC THINKING**

Knotty Rope – Multiplication and Division within 100

**MEASUREMENT & DATA**

Cover the Floor – Building Arrays within 100

**NUMBER & OPERATIONS IN BASE TEN**

Where’s the Beef – Multiplication and Division within 100

**NUMBER & OPERATIONS – FRACTIONS**

The Big Pad – Area with Unit Fractions
THANK YOU!

Lindsey Herlehy
Curriculum and Professional Development Specialist
Illinois Mathematics and Science Academy

lherlehy@imsa.edu