### Characteristics of High-Quality Tasks

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Review the descriptions of task demand in p2a.
Bloom’s Taxonomy

- Remembering
- Understanding
- Applying
- Analyzing
- Evaluating
- Creating

Citation Needed
Webb's Depth of Knowledge

Citation Needed
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Lanin, J., Chval, K., Jones, D., and Dougherty, B. *Putting Essential Understanding of Multiplication and Division into Practice*, 3-5. Reston, VA: The National Council of Teachers of Mathematics, 2014 (p 8)
## Levels of Demand

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<th>Lower-level demands (memorization):</th>
<th>Lower-level demands (procedures without connections):</th>
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<td>• reproducing previously learned facts, rules, formulas, definitions or committing them to memory</td>
<td>• are algorithmic</td>
</tr>
<tr>
<td>• cannot be solved with a procedure</td>
<td>• require limited cognitive demand</td>
</tr>
<tr>
<td>• have no connection to concepts or meaning that underlie the facts rules, formulas, or definitions</td>
<td>• have no connection to the concepts or meaning that underlie the procedure</td>
</tr>
<tr>
<td></td>
<td>• focus on producing correct answers instead of understanding</td>
</tr>
<tr>
<td></td>
<td>• require no explanations</td>
</tr>
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<th>Higher-level demands (procedures with connections):</th>
<th>Higher-level demands (doing mathematics):</th>
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<tr>
<td>• use procedure for deeper understanding of concepts</td>
<td>• require complex non-algorithmic thinking</td>
</tr>
<tr>
<td>• broad procedures connected to ideas instead narrow algorithms</td>
<td>• require students to explore and understand the mathematics</td>
</tr>
<tr>
<td>• usually represented in different ways</td>
<td>• demand self-monitoring of one’s cognitive process</td>
</tr>
<tr>
<td>• require some degree of cognitive effort; procedures may be used but not mindlessly</td>
<td>• require considerable cognitive effort and may involve some level of anxiety b/c solution path isn’t clear</td>
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### Task A
Tools available: none

1. Jonathan collects pirate hats. He had 4 pirate hats before he went on vacation. He bought 2 pirate hats when he was on vacation. How many pirate hats does he have now? Represent the situation with a picture.

---

### Task B
Tools available: counters

1. Jonathan collects pirate hats. He had 4 pirate hats before he went on vacation. He bought 2 pirate hats when he was on vacation. How many pirate hats does he have now? Represent the situation with a picture.

---

### Task C
Tools available: none

1. Jonathan collects pirate hats. He had 4 pirate hats before he went on vacation. He bought 2 pirate hats when he was on vacation. How many pirate hats does he have now? Represent the situation with a picture.

---

### Task D
Tools available: base ten blocks, digi-blocks

1. Fill in the blank to make an equal problem.
   1) \(2 + 8 + 3 = 13\)  
   \(2 + \_ = 13\)
   2) \(2 + 9 + 6 = 17\)  
   \(2 + \_ = 17\)
   3) \(14 + 4 + 2 = 20\)  
   \(\_ + 2 = 20\)
   4) \(1 + 2 + 4 = 7\)  
   \(1 + \_ = 7\)

---
**Task E**

Tools available: calculator, multiplication chart

Use the clues to write a number on the line.

Write a number with a 4 in the tens place.  Write a number with a 7 in the ones place.  Write a number with a 6 in the tens place.

_________  __________  __________

1 point each, 3 points total

Local Assessment, Howard County Public School System (2012)

**Task F**

Tools available: base ten blocks, place value chart

Fill in the blank for each of the problems.

1) Count by 100s: 600, 700, 800, _____

2) Count by 5s: 165, 170, 175, 180, 185, 190, __

3) Count by 10s: 700, 710, 720, 730, 740, _____

4) Count by 5s: 435, 440, 445, 450, 455, 460, __

Commoncoresheets.com (2015)

**Task G**

Tools available: none

Write the missing numbers.

Tell how you found the missing numbers.


**Task H**

Tools available: base ten blocks, digi-blocks

1. Put one number in each empty square.
   The sum must be between 70 and 90.
   What is the sum? __________

   + __ __

   ____

Task I
Tools available: calculator

The Clues:
- These pencils belong to Lauren and Maya.
- Maya's pencil is longer than Lauren's pencil.

1. Which pencil is Maya's pencil? __________
2. How long is Maya's pencil? ______ inches
3. How long is Lauren's pencil? ______ inches
4. Explain how you determined the length of Maya's pencil.


Task J
Tools available: base ten blocks, place value chart

The Clues:
1. It is between 25 and 40.
2. The sum of the digits is 8.
3. The mystery number is not 26.
4. Explain how you determined the length of Maya's pencil.

1. The mystery number is ________.
2. Tell how you know. ____________________________________________________________________________


Task K
Tools available: none

Mike ate 10 cookies. Some were chocolate chip. Some were sugar cookies.

Draw a picture to show how many sugar cookies Mike ate.

Write both an addition and a subtraction equation that can be used to solve the problem.

Write a second possible set of chocolate chips cookies and sugar cookies that Mike might have if he has 10 cookies.

Task M
Tools available: none

Make pictures of six things that can hold water.
Color the ones that are bigger than a gallon blue.
Color the ones that are smaller than a gallon red.


Task N
Tools available: counters and a hundred chart

Write a story to go with this number sentence. Make a picture to match. Then give the answer.

6 + _____ = 10


Task O
Tools available: none

Color the boxes that add up to 18:

<table>
<thead>
<tr>
<th>11</th>
<th>12</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>10</td>
<td>8</td>
</tr>
</tbody>
</table>

Write about the pattern that you see in the combinations with sums of 18.

Task P
Tools available: base ten blocks, digi-blocks

Solve each problem. Make a diagram and write an equation for each story problem. How are the story problems different from each other? How are the story problems related to each other?

32 balls were in the basket. 14 are red and the rest are green. How many balls are green?

14 pears are in the basket. 18 more pears are put in the basket. How many pears are in the basket now?

K5learning.com (2015)
Task Q
Tools available: hundred chart

Count the number of boxes in the first box. Then draw a group of boxes that has more.

![Diagram showing four yellow boxes in a row]

Kidslearningstation.com (2015)

Task R
Tools available: base ten blocks, place value chart

Choose a number that will make the equation true. Answers will vary.

1) 31 > ___________
2) 20 > ___________
3) 29 > ___________
4) __________ > 10

Commoncoresheets.com (2015)

Task S
Tools available: none

Determine if the equation shown is 'true' or 'false'.

1) 5 + 5 = 20 - 11  ___________
2) 13 - 7 = 6  ___________
3) 10 = 7 + 2  ___________

Explain and make a diagram that shows how you know two of the sentences are true.

Commoncoresheets.com (2015)

Task T
Tools available: base ten blocks, digi-blocks

e. A number is shown on the number line.

![Number line from 700 to 750]

- Write it as a three-digit number.
- Write it as a sum of 100's, 10's, and 1's.
- Write its name in words.
- Draw a picture to represent the number.

Illustrativemathematicsproject.org (2015)
Task U
Tools available: none

1. Who was at the park longer? ____________
2. How much longer? ________ minutes
3. Write how you know. ____________


Task V
Tools available: base ten blocks, place value chart

Count the total number of small blocks.

1)  
2)  
3)  
4)  

Commoncoresheets.com (2017)

Task X
Tools available: hundred chart

Which subtraction sentence does this model show? Explain how you know your answer makes sense.

-1 -1 -1 -1 -1

8 – 6 = 2
8 – 7 = 1
10 – 6 = 4
2 + __ = 8

ixl.com (2017)
Task Y
Tools available: hundred chart

Count the pretzels.

Which group has one less?

Task Z
Tools available: none

688 is the middle for each number line but each number line has different endpoints. What numbers could the ? represent on each number line?

? 688 ?

? 688 ?

Tell how you found the numbers for one of the number lines.

Comparing Elementary Tasks

**TASK A.1**

Manipulatives/Tools Available: None

1) Count by 100’s: 600, 700, 800, _____

2) Count by 5s: 165, 170, 175, 180, _____

3) Count by 10s: 700, 710, 720, 730, _____

4) Count by 5s: 435, 340, 445, 450, _____

**Task A.2**

Manipulatives/Tools Available: None

Analyze each sequence of numbers and write the next number in the sequence.

1) 600, 700, 800, 900, _____

2) 165, 170, 175, 180, 185, _____

3) 700, 710, 720, 730, 740, _____

4) 435, 340, 445, 450, 455, _____
TASK B.1

Manipulatives/Tools Available: Base-ten blocks

Identify the place value for each of the underlined digits

a) 35\_7
b) 46

c) 4,7\_69

TASK B.2

Manipulatives/Tools Available: None

Use the clues to write a number on the line.

Write a number with a 4 in the tens place. Write a number with a 7 in the ones place. Write a number with a 6 in the tens place.

__________ ___________ __________
Comparing Elementary Tasks

**TASK C.1**

Manipulatives/Tools Available: None

Solve each problem.

1. 32 balls were in the basket. 14 are red and the rest are green. How many balls are green?

2. 14 pears are in the basket. Eighteen more pears are put in the basket. How many pears are in the basket now?

**TASK C.2**

Manipulatives/Tools Available: None

Solve each problem. Make a diagram and write an equation for each story problem. How are the story problems different from each other? How are they related to each other?

1. 32 balls were in the basket. 14 are red and the rest are green. How many balls are green?

2. 14 pears are in the basket. Eighteen more pears are put in the basket. How many pears are in the basket now?
Strategies for Modifying Tasks

Increasing the cognitive demands of tasks...

- Ask students to create real-world stories for “naked number” problems.
- Include a prompt that asks students to represent the information another way (with a picture, in a table, a graph, an equation, with a context).
- Use a task “out of sequence” before students have memorized a rule or have practiced a procedure that can be routinely applied.
- Eliminate components of the task that confine student thinking or provide too much scaffolding.
- Create opportunities for repeated reasoning or pattern finding.
- Create a prompt that asks students to write about the meaning of the mathematics concept.
- Add a prompt that asks students to make note of a pattern or to make a mathematical conjecture and to test their conjecture.
- Include a prompt that requires students to make a generalization.
- Include a prompt that requires students to compare solution paths or mathematical relationships and write about the relationship between strategies or concepts.
- Select numbers carefully so students are more inclined to note relationships between quantities (e.g., two tables can be used to think about the solutions to the four, six, or eight tables).