

# Mathematical Thinking at Grade 1

## TASKS 1A and 1B (Assessment Master 1)

*(Administer After Investigation 1)*

|                    |  |
|--------------------|--|
| Advanced           | <ul style="list-style-type: none"><li>• Student accurately uses a <i>proficient</i> strategy (e.g., counting on, using known facts, writing a number sentence).</li><li>• Student is able to explain his or her reasoning.</li><li>• Student's work shows evidence of organization.</li></ul>                                  |
| Proficient         | <ul style="list-style-type: none"><li>• Student accurately uses a strategy (other than trial and error) to add on to 14 to make 20.</li><li>• Student has a correct response to both parts of the task.</li></ul>  |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student accurately represents 14.</li><li>• Student accurately counts (maintains 1-to-1 correspondence; uses counting sequence correctly).</li><li>• Student attempts to add on to 14 (using a strategy).</li><li>• Student has incorrect response but answer is reasonable.</li></ul> |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student has an inaccurate representation (drawing).</li><li>• Student inaccurately counts (no 1-to-1 correspondence; does not rote count accurately).</li><li>• Student's response is incorrect and unreasonable.</li></ul>  |

## TASK 2 (Assessment Master 2)

*Administer After Investigation 2*

|                    |  |
|--------------------|--|
| Advanced           | <ul style="list-style-type: none"><li>• Student shows all combinations of 9.</li><li>• Student has a systematic plan for making 9 (e.g., labeled T-chart or number sentences).</li></ul>   |
| Proficient         | <ul style="list-style-type: none"><li>• Student has more than one correct combination for 9.</li><li>• Student uses numbers and pictures to designate groups (e.g., 6 [circles] and 3[squares]).</li><li>• Student's work shows evidence of organization.</li></ul>                |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student has one correct combination for 9.</li><li>• Student's work shows no strategy used (other than trial and error).</li><li>• Student uses only pictures to show 9 (e.g., **** ooooo); uses no numbers to represent groups.</li></ul> |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student has an inaccurate representation (using manipulatives and/or drawings).</li></ul>  |

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# Mathematical Thinking at Grade 1

## **TASK 3 (Assessment Master 3)**

*Administer After Investigation 4*

|                    |   |
|--------------------|---|
| Advanced           | <ul style="list-style-type: none"><li>• Student uses an equation.</li><li>• Student uses known number combinations.</li><li>• Student explains his or her reasoning.</li></ul>  |
| Proficient         | <ul style="list-style-type: none"><li>• Student's answer is correct.</li><li>• Student correctly represents each animal.</li><li>• Student uses counting strategies (counting all or counting on) to solve the problem.</li></ul> |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student's answer may be incorrect but is reasonable.</li><li>• Student attempts to represent each animal (e.g., with pictures, tallies, cubes).</li></ul>                                 |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student's answer is incorrect and unreasonable.</li></ul>   |

## **TASKS 4A and 4B (Assessment Master 4)**

*Administer After Investigation 3*

|                    |   |
|--------------------|---|
| Advanced           | <ul style="list-style-type: none"><li>• Student creates a complex pattern using more than one attribute.</li><li>• Student describes a complex pattern.</li></ul> |
| Proficient         | <ul style="list-style-type: none"><li>• Student accurately continues the pattern.</li><li>• Student creates his or her own pattern.</li></ul>                     |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student creates his or her own pattern.</li><li>• Student is unable to continue an established pattern.</li></ul>         |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student is unable to continue or create a pattern.</li></ul>  |

## **TASK 5 (Assessment Master 5)**

*Administer After Investigation 5*

|                    |   |
|--------------------|---|
| Advanced           |   |
| Proficient         | <ul style="list-style-type: none"><li>• Student's representation clearly shows categories and the number of people in each.</li><li>• Student writes the total (25) numerically on sheet.</li><li>• Student has accurate pictorial representation (tallies, pictures).</li><li>• Student's work includes a title.</li></ul> |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student attempts to represent each category.</li><li>• Student's representation may be incorrect but is reasonable.</li></ul>   |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student's representation is incorrect and unreasonable.</li></ul>   |

## Building Number Sense

### TASK 1 (Assessment Master 7)

*Administer After Investigation 3*

|                    |   |
|--------------------|---|
| Advanced           |   |
| Proficient         | <ul style="list-style-type: none"><li>• Student accurately continues numbers in sequence.</li></ul>                             |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student reverses digits (e.g., 91 for 19).</li><li>• Student omits a numeral.</li></ul> |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student is unable to continue/extend written sequence of numbers.</li></ul>             |

### TASK 2 (Assessment Master 8)

*Administer After Investigation 2*

|                    |  |
|--------------------|--|
| Advanced           | <ul style="list-style-type: none"><li>• Student shows all combinations for 13.</li><li>• Student's work shows a systematic plan.</li><li>• Student's explanation shows an understanding of relationships (How do you know all the combinations are listed?).</li></ul> |
| Proficient         | <ul style="list-style-type: none"><li>• Student shows 3 or more correct combinations for 13.</li><li>• Student uses numbers and pictures to designate groups (e.g., 6 pictures of a car).</li><li>• Student's work shows evidence of organization.</li></ul>           |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student has 1–3 correct combinations for 13.</li><li>• Student uses only pictures to show 13.</li><li>• Student uses no numbers to represent groups.</li></ul>   |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student has no correct answers for 13.</li><li>• Student attempts to draw groups but is inaccurate.</li></ul>  |

### TASK 3 (Assessment Master 9)

*Administer After Investigation 3*

|                    |   |
|--------------------|---|
| Advanced           | <ul style="list-style-type: none"><li>• Student uses proficient strategy to solve (doubles + 1; 10 as a landmark).</li><li>• Student explains his or her strategy.</li></ul>                            |
| Proficient         | <ul style="list-style-type: none"><li>• Student counts on from one of the numbers.</li><li>• Student understands "greater total."</li></ul>   |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student's answer is correct.</li><li>• Student counts all to solve.</li></ul>   |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student counts objects on individual card to figure out the number on the card.</li><li>• Student is unable to identify numerals on individual cards.</li></ul> |

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## Building Number Sense

### **TASK 4 (Assessment Master 10)**

*Administer After Investigation 4*

|                    |   |
|--------------------|---|
| Advanced           | <ul style="list-style-type: none"><li>• Student solves the problems using number relationships (e.g., doubles + 1 and – 1; decomposing).</li><li>• Student uses one or more number sentences.</li></ul>                     |
| Proficient         | <ul style="list-style-type: none"><li>• Student clearly and accurately records his or her thinking using pictures, numbers, or words.</li><li>• Student explains strategy used.</li></ul>                                   |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student attempts to solve using a strategy.</li><li>• Student’s answers are incorrect but reasonable.</li><li>• Student is unable to explain the strategy he or she used.</li></ul> |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student has no strategy for solving the problems.</li><li>• Student has one or more inaccurate answers.</li></ul>   |

## Survey Questions and Secret Rules

### **TASKS 1A and 1B (Assessment Master 12)**

*Administer After Investigation 1*

|                    |  |
|--------------------|--|
| Advanced           |  |
| Proficient         | <ul style="list-style-type: none"><li>• Student accurately identifies the “sorting rule” and accurately adds buttons to the category based on this rule.</li></ul>   |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student correctly identifies the sorting rule but inaccurately sorts (adds or leaves out) buttons that match the sorting rule.</li><li>• Student accurately writes the sorting rule.</li></ul> |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student is unable to identify the sorting rule or accurately sort the buttons.</li></ul>   |

### **TASK 2 (Assessment Masters 13 and 14)**

*Administer After Investigation 2*

|                    |   |
|--------------------|---|
| Advanced           | <ul style="list-style-type: none"><li>• Student uses more than one attribute to sort shapes into distinct categories (e.g., small shapes with four corners).</li></ul>  |
| Proficient         | <ul style="list-style-type: none"><li>• Student uses all 12 shapes and sorts them into two distinct categories.</li><li>• Student accurately labels each group.</li></ul>   |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student chooses two distinct categories.</li><li>• Student may be able to correctly sort only some of the 12 shapes.</li><li>• Student attempts to label each distinct group.</li></ul> |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student is unable to identify two categories.</li><li>• Student is unable to label attributes of sorted categories.</li></ul>   |

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## Survey Questions and Secret Rules

### TASKS 3A and 3B (Assessment Master 15)

*Administer After Investigation 3*

|                    |  |
|--------------------|--|
| Advanced           | <ul style="list-style-type: none"><li>• Student is able to analyze data across various categories (least and most; how many more or less).</li></ul>   |
| Proficient         | <ul style="list-style-type: none"><li>• Student accurately writes 3 statements about the data.</li><li>• Student's representation clearly shows categories and the number of people in each.</li><li>• Student writes the total numerically.</li><li>• Student is able to accurately keep track of the number of pieces of data in each group.</li><li>• Student accurately represents survey data (using tallies, pictures, etc.).</li><li>• Student's work includes a title.</li></ul> |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student sorts and categories data.</li><li>• Student's representation is reasonable, but may be incorrect.</li><li>• Student writes 1 or 2 statements about the data, based on his or her representation.</li></ul>  |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student is unable to represent data.</li><li>• Student is unable to interpret data.</li></ul>  |

## Quilt Squares and Block Towns

### TASK 1A (Assessment Master 17)

*Administer After Investigation 1*

|                    |   |
|--------------------|---|
| Advanced           |   |
| Proficient         | <ul style="list-style-type: none"><li>• Student fills the shape accurately.</li><li>• Student accurately counts and records number of blocks used.</li></ul>                          |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student accurately fills space.</li><li>• Student may inaccurately count or record number of blocks used, but answer is reasonable.</li></ul> |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student is unable to fill space accurately.</li></ul>   |

### TASKS 1B and 1C (Assessment Master 18)

*Administer After Investigation 1*

|                    |   |
|--------------------|---|
| Advanced           | <ul style="list-style-type: none"><li>• Student uses 20 blocks to fill in Outline 1B.</li><li>• Student visualizes combinations of shapes to complete the design.</li><li>• Student explains relationships among shapes (decomposing, composing).</li></ul>   |
| Proficient         | <ul style="list-style-type: none"><li>• Student uses at least 19 blocks to fill in Outline 1B.</li><li>• Student uses 6 blocks to fill in Outline 1C.</li><li>• Student accurately counts and records total number of blocks used.</li><li>• Student uses knowledge of equivalent shapes to complete each design.</li></ul> |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student accurately fills spaces in two different ways.</li><li>• Student may inaccurately count and record number of blocks used, but answer is reasonable.</li><li>• Student notices relationships among shapes, using trial-and-error approach.</li></ul>                         |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student is unable to fill space accurately.</li><li>• Student lacks understanding of equivalent shapes.</li><li>• Student lacks understanding of “greatest” number and “least” number.</li><li>• Student is unable to count and record number of blocks used.</li></ul>             |

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## Quilt Squares and Block Towns

### TASK 2 (Assessment Masters 19 and 20)

*Administer After Investigation 2*

|                    |  |
|--------------------|--|
| Advanced           | <ul style="list-style-type: none"><li>• Student sorts shapes into three or more categories.</li><li>• Student sorts by attributes such as number of sides, straight/curved sides, number of corners.</li><li>• Student is able to flexibly regroup shapes.</li></ul> |
| Proficient         | <ul style="list-style-type: none"><li>• Student uses all shapes and sorts them into distinct categories.</li><li>• Student accurately labels each category.</li></ul>  |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student may be unable to use all 9 shapes, but is able to sort some shapes into distinct groups.</li></ul>   |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student is unable to use all 9 shapes.</li><li>• Student is unable to sort shapes into distinct groups.</li><li>• Student is unable to label or identify one or more attributes.</li></ul>                                   |

### TASK 3 (Assessment Master 21)

*Administer After Investigation 3*

|                    |   |
|--------------------|---|
| Advanced           | <ul style="list-style-type: none"><li>• Student accurately creates a 2-D representation of the 3-D shapes used in his or her Geoblock structure.</li></ul>  |
| Proficient         | <ul style="list-style-type: none"><li>• Student attempts to show size and thickness in representation.</li><li>• Student is able to describe characteristics of Geoblocks.</li></ul>  |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student uses 3 or 4 Geoblocks.</li><li>• Student represents each block in the structure by drawing only 1 face of that block (2-D).</li><li>• Student effectively shows how many blocks are arranged.</li></ul>         |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student uses incorrect number of Geoblocks.</li><li>• Student does not distinguish individual blocks and may draw outline of whole construction.</li><li>• Student is unable to show how blocks are arranged.</li></ul> |

## Number Games and Story Problems

### **TASK 1 (Assessment Master 24)**

*Administer After Investigation 1*

|                    |  |
|--------------------|--|
| Advanced           | <ul style="list-style-type: none"><li>• Student shows all combinations (6 possible).</li><li>• Student has systematic plan.</li><li>• Student's explanation shows understanding of relationships between combinations.</li></ul> |
| Proficient         | <ul style="list-style-type: none"><li>• Student shows 3 or more correct combinations (labeled).</li><li>• Student's work shows evidence of organization.</li></ul>   |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student shows 1–3 correct combinations (labeled).</li><li>• Student's work shows only pictures to solve problem.</li></ul>   |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student has no correct combinations.</li><li>• Student attempts to draw groups, but work is inaccurate.</li></ul>  |

### **TASK 2 (Assessment Master 25)**

*Administer After Investigation 2*

|                    |   |
|--------------------|---|
| Advanced           | <ul style="list-style-type: none"><li>• Student uses known combinations or doubles.</li><li>• Student explains his or her mental reasoning.</li></ul>   |
| Proficient         | <ul style="list-style-type: none"><li>• Student has accurate answer.</li><li>• Student's work shows evidence of counting by numbers other than 1's.</li><li>• Student's recording method accurately and clearly reflects his or her thinking.</li></ul> |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student's answer may be incorrect but is reasonable.</li><li>• Student uses pictures to solve problem.</li><li>• Student's work shows some evidence of grouping to aid in counting.</li></ul>                   |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student has inaccurate answer.</li><li>• Student's work shows no evidence of problem-solving strategies.</li></ul>  |

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## Number Games and Story Problems

### **TASKS 3 and 4 (Assessment Masters 26 and 27)**

*Administer After Investigation 3*

|                    |   |
|--------------------|---|
| Advanced           | <ul style="list-style-type: none"><li>• Student uses numbers and equations as part of explanation.</li><li>• Student uses 10 as landmark in his or her strategies.</li><li>• Student shows evidence of flexibility of number sense.</li></ul>         |
| Proficient         | <ul style="list-style-type: none"><li>• Student uses mathematical reasoning (using known number combinations and doubles).</li><li>• Student's work is clear; student accurately records his or her thinking in numbers or words.</li></ul>           |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student's answers are inaccurate, but he or she correctly identifies combining and separating.</li><li>• Student models with pictures/objects.</li><li>• Student uses counting strategies to solve.</li></ul> |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student's answers are inaccurate.</li><li>• Student's work shows no strategies, or strategies are incorrect.</li></ul>  |

### **ADDITIONAL ASSESSMENT: Money Interview (Administer After Investigation 2)**

|                    |   |
|--------------------|---|
| Advanced           | <ul style="list-style-type: none"><li>• Student uses least number of coins to show specific amount.</li><li>• Student flexibly trades coins, combining to maintain a specific amount (e.g., 2 nickels = 1 dime; 10 pennies = 1 dime).</li></ul> |
| Proficient         | <ul style="list-style-type: none"><li>• Student accurately uses coins to show specific amount.</li><li>• Student shows flexibility in counting the coins.</li></ul>   |
| Nearing Proficient | <ul style="list-style-type: none"><li>• Student can identify coin names (<i>penny, nickel, dime</i>).</li><li>• Student can identify coin values (1 cent, 5 cents, 10 cents).</li><li>• Student counts some combinations accurately.</li></ul>  |
| Needs Improvement  | <ul style="list-style-type: none"><li>• Student identifies some coin names and values (p, n, d).</li></ul>  |