COMMON CORE-ALIGNED TASK
WITH INSTRUCTIONAL SUPPORTS

Mathematics

GRADE 1 MATH: NINA'S NUMBERS

UNIT OVERVIEW

This packet contains a curriculum-embedded CCLS aligned task and instructional supports. The task is embedded in a 2-3 week unit on Number and Operations in Base 10. The mathematics of the unit involves understanding the meaning of base ten and using that understanding to solve number and real life problems. Students will use a variety of tools to help articulate understanding of base ten and to solve problems using addition and subtraction of numbers less than 10, less than 20 and on to less than 100.

TASK DETAILS

Task Name: Nina's Numbers

Grade: 1

Subject: Math

Task Description: This task allows students to demonstrate their understanding of place value. Throughout the task they are required to use operations to solve problems, understand and apply properties of numbers, and compose and decompose numbers in flexible ways.

Standards Assessed:

1.NBT.2 Understand that the two digits of a two-digit number represent amount of tens and ones. Understand the following as special cases:

a) 10 can be thought of as a bundle of ten ones – called a "ten."
b) The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
c) The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

1.OA.6 Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).

Standards for Mathematical Practice:

MP.1 Make sense of problems and persevere in solving them
MP.2 Reason abstractly and quantitatively
MP.3 Construct viable arguments and critique the reasoning of others.
MP.4 Model with mathematics.
MP.7 Look for and make use of structure.

NYC Department of Education
Dennis M. Walcott, Chancellor

TABLE OF CONTENTS

The task and instructional supports in the following pages are designed to help educators understand and implement tasks that are embedded in Common Core-aligned curricula. While the focus for the 2011-2012 Instructional Expectations is on engaging students in Common Core-aligned culminating tasks, it is imperative that the tasks are embedded in units of study that are also aligned to the new standards. Rather than asking teachers to introduce a task into the semester without context, this work is intended to encourage analysis of student and teacher work to understand what alignment looks like. We have learned through the 2010-2011 Common Core pilots that beginning with rigorous assessments drives significant shifts in curriculum and pedagogy. Universal Design for Learning (UDL) support is included to ensure multiple entry points for all learners, including students with disabilities and English language learners.

Acknowledgements: This task and unit outline were developed by the Silicon Valley Mathematics Initiative and SCALE.

GRADE 1 MATH: NINA'S NUMBERS PERFORMANCE TASK

Nina's Numbers

This problem gives you the chance to:

- show you understanding of whole numbers

Nina loves to play the Fill in the Blank games.

1. Write the numbers that belong in each blank.

a) 25, _____, 35, 40, _____, 50

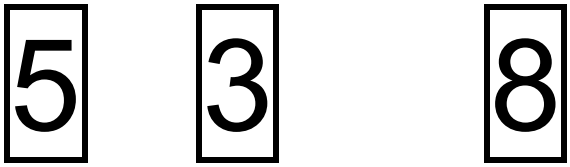
b) 4, 7, _____, 13, _____, 19, _____, 25

2. Fill in the missing number to make this number sentence correct.

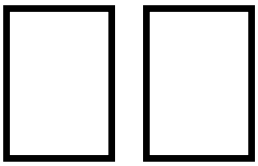
$$58 + \square = 65$$

Show your work using pictures, words, and numbers

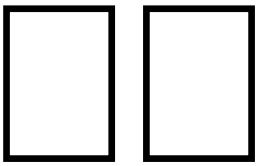
Nina has three number cards.



3. What is the largest two-digit number Nina can make using these cards?
   Write that number in the boxes below.



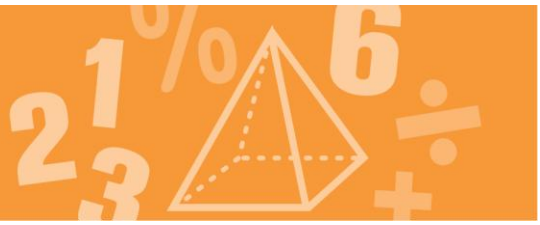
4. Using these same cards, what two-digit number can Nina make that is closest to 45?
   Write that number in the boxes below.



   Show how you figured it out using pictures, words, and numbers.

COMMON CORE-ALIGNED TASK
WITH INSTRUCTIONAL SUPPORTS

Mathematics



GRADE 1 MATH: NINA'S NUMBERS

UNIVERSAL DESIGN FOR LEARNING (UDL) PRINCIPLES

NYC Department of Education
Dennis M. Walcott, Chancellor

Nina's Numbers - Math Grade 1
Common Core Learning Standards/ Universal Design for Learning

The goal of using Common Core Learning Standards (CCLS) is to provide the highest academic standards to all of our students. Universal Design for Learning (UDL) is a set of principles that provides teachers with a structure to develop their instruction to meet the needs of a diversity of learners. UDL is a research-based framework that suggests each student learns in a unique manner. A one-size-fits-all approach is not effective to meet the diverse range of learners in our schools. By creating options for how instruction is presented, how students express their ideas, and how teachers can engage students in their learning, instruction can be customized and adjusted to meet individual student needs. In this manner, we can support our students to succeed in the CCLS.

Below are some ideas of how this Common Core Task is aligned with the three principles of UDL; providing options in representation, action/expression, and engagement. As UDL calls for multiple options, the possible list is endless. Please use this as a starting point. Think about your own group of students and assess whether these are options you can use.

REPRESENTATION: *The "what" of learning.* How does the task present information and content in different ways? How students gather facts and categorize what they see, hear, and read. How are they identifying letters, words, or an author's style?

In this task, teachers can…

- ✓ **Promote understanding across languages** by making all key information, such as directions for *Nina's Numbers*, also available in first languages for learners with limited-English proficiency and in American Sign Language for learners who are deaf.

ACTION/EXPRESSION: *The "how" of learning.* How does the task differentiate the ways that students can express what they know? How do they plan and perform tasks? How do students organize and express their ideas?

In this task, teachers can…

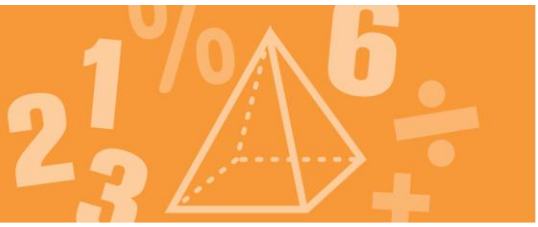
- ✓ **Vary the methods for response and navigation** by providing alternatives for physically responding to performance tasks in *Nina's Numbers* using teacher-made number cards, Smart Board and/or iPad technology to demonstrate understanding.

ENGAGEMENT: *The "why" of learning.* How does the task stimulate interest and motivation for learning? How do students get engaged? How are they challenged, excited, or interested?

In this task, teachers can…

- ✓ **Increase mastery-oriented feedback** by providing feedback that is substantive and informative rather than comparative and competitive.

Visit http://schools.nyc.gov/Academics/CommonCoreLibrary/default.htm to learn more information about UDL.



GRADE 1 MATH: NINA'S NUMBERS RUBRIC

The rubric section contains a scoring guide and performance level descriptions for the Nina's Numbers task.

Scoring Guide: The scoring guide is designed specifically to each small performance task. The points highlight each specific piece of student thinking and explanation required of the task and help teachers see common misconceptions (which errors or incorrect explanations) keep happening across several papers. The scoring guide can then be used to refer back to the performance level descriptions.

Performance Level Descriptions: Performance level descriptions help teachers think about the overall qualities of work for each task by providing information about the expected level of performance for students. Performance level descriptions provide score ranges for each level, which are assessed using the scoring guide.

Nina's Numbers Scoring Guide

	Nina's Numbers Grade 1:	Points	Section Points
	The core elements of the performance required by this task are: • Use operations to solve problems • Understand and apply properties of numbers • Compose and decompose numbers in flexible ways Based on these credit for specific aspects of performance should be assigned as follows		
1	a). Gives correct answers: **30, 45** b) Gives correct answers: **10, 16, 22** All three correct 1 or 2 correct	2x1 2 (1)	4
2	Gives a correct answer: **7** Show correct work such as: 65 – 58 = 7	1 1	2
3.	Gives a correct answer: **85**	1	1
4.	Gives a correct answer: **38** Show correct work such as: Indicates that 38 is closer to 45 than 53, 83 or 85	1 1	2
	Total Points		**9**

Grade 1 Math: Nina's Numbers
Rubric

Performance Level Description and Cut Scores
Performance is reported at four levels: 1 through 4, with 4 as the highest.

Level 1: Demonstrates Minimal Success (0 – 2 points)
The student's response shows few of the elements of performance that the tasks demand as defined by the CCSS. The work shows a minimal attempt on the problem and struggles to make a coherent attack on the problem. Communication is limited and shows minimal reasoning. The student's response rarely uses definitions in their explanations. The student struggles to recognize patterns or the structure of the problem situation.

Level 2: Performance Below Standard (3 – 4 points)
The student's response shows some of the elements of performance that the tasks demand and some signs of a coherent attack on the core of some of the problems as defined by the CCSS. However, the shortcomings are substantial and the evidence suggests that the student would not be able to produce high-quality solutions without significant further instruction. The student might ignore or fail to address some of the constraints of the problem. The student may occasionally make sense of quantities in relationships in the problem, but their use of quantity is limited or not fully developed. The student response may not state assumptions, definitions, and previously established results. While the student makes an attack on the problem it is incomplete. The student may recognize some patterns or structures, but has trouble generalizing or using them to solve the problem.

Level 3: Performance at Standard (5 - 7 points)
For most of the task, the student's response shows the main elements of performance that the tasks demand as defined by the CCSS and is organized as a coherent attack on the core of the problem. There are errors or omissions, some of which may be important, but of a kind that the student could well fix, with more time for checking and revision and some limited help. The student explains the problem and identifies constraints. The student makes sense of quantities and their relationships in the problem situations. S/he often use abstractions to represent a problem symbolically or with other mathematical representations. The student response may use assumptions, definitions, and previously established results in constructing arguments. S/he may make conjectures and build a logical progression of statements to explore the truth of their conjectures. The student might discern patterns or structures and make connections between representations.

Level 4: Achieves Standards at a High Level (8 -9 points)
The student's response meets the demands of nearly all of the tasks as defined by the CCSS, with few errors. With some more time for checking and revision, excellent solutions would seem likely. The student response shows understanding and use of stated assumptions, definitions and previously established results in construction arguments. The student is able to make conjectures and build a logical progression of statements to explore the truth of their conjecture. The student response routinely interprets their mathematical results in the context of the situation and reflects on whether the results make sense. The communication is precise, using definitions clearly. The student looks closely to discern a pattern or structure. The body of work looks at the overall situation of the problem and process, while attending to the details.

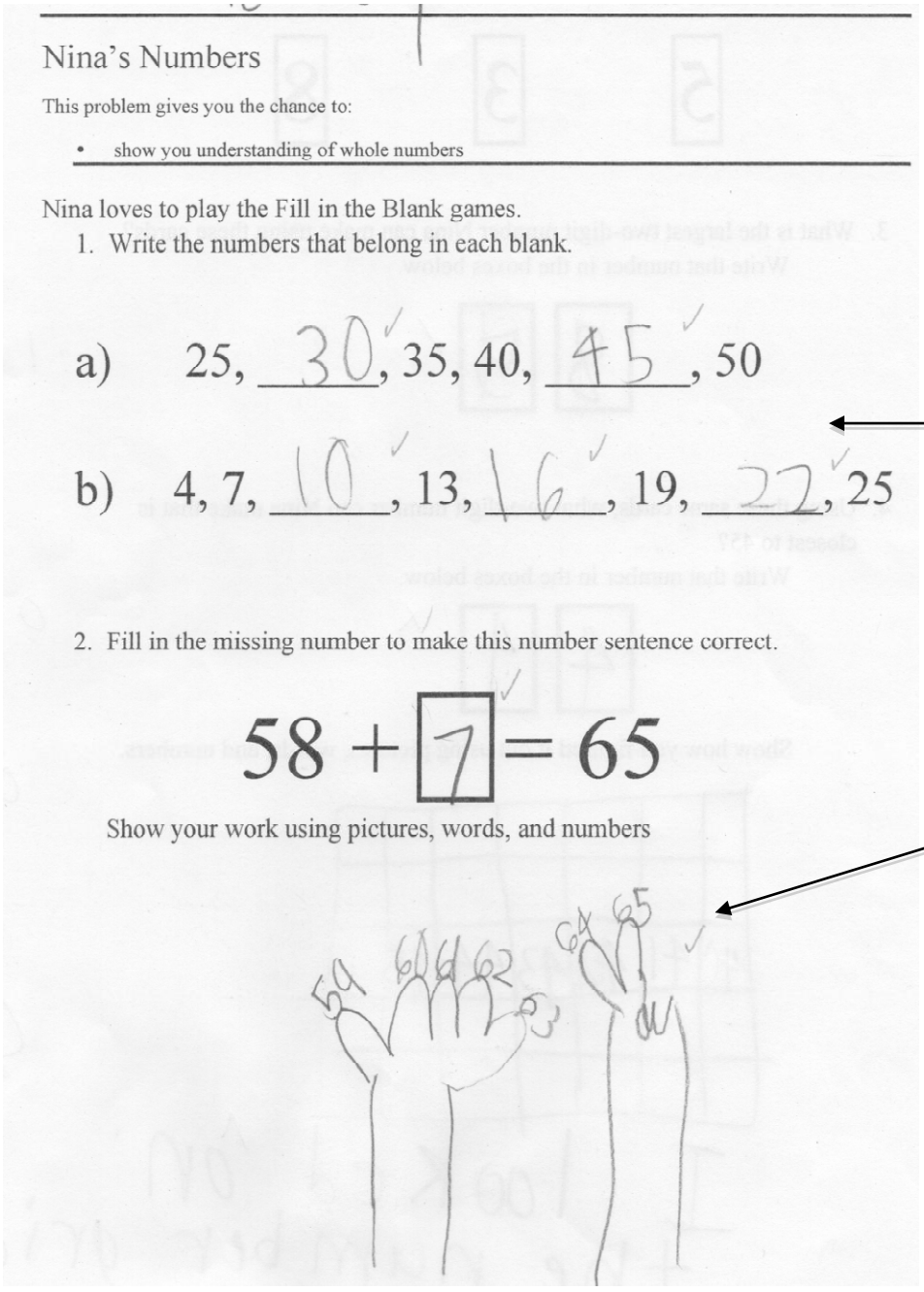
GRADE 1 MATH: NINA'S NUMBERS
ANNOTATED STUDENT WORK

This section contains annotated student work at a range of score points and implications for instruction for each performance level (excluding the expert level). The student work and annotations are intended to support teachers, showing examples of student understandings and misundertandings of the task. The annotated student work and implications for instruction can be used to understand how to move students to the next performance level.

Level 4: Achieves Standards at a High Level (Score Range 7 - 9)

The student's response meets the demands of nearly the entire task, with few errors. With some more time for checking and revision, excellent solutions would seem likely. The student response shows understanding and use of stated assumptions, definitions and previously established results in constructing arguments. The student is able to make conjectures and build a logical progression of statements to explore the truth of their conjecture. The student response routinely interprets their mathematical results in the context of the situation and reflects on whether the results make sense. The communication is precise, using definitions clearly. The students look closely to discern a pattern or structure. The body of work looks at the overall situation of the problem and process, while attending to the details.

Student A – Level 4 (Score 8)



Nina's Numbers

This problem gives you the chance to:

- show you understanding of whole numbers

Nina loves to play the Fill in the Blank games.

1. Write the numbers that belong in each blank.

a) 25, 30, 35, 40, 45, 50

b) 4, 7, 10, 13, 16, 19, 22, 25

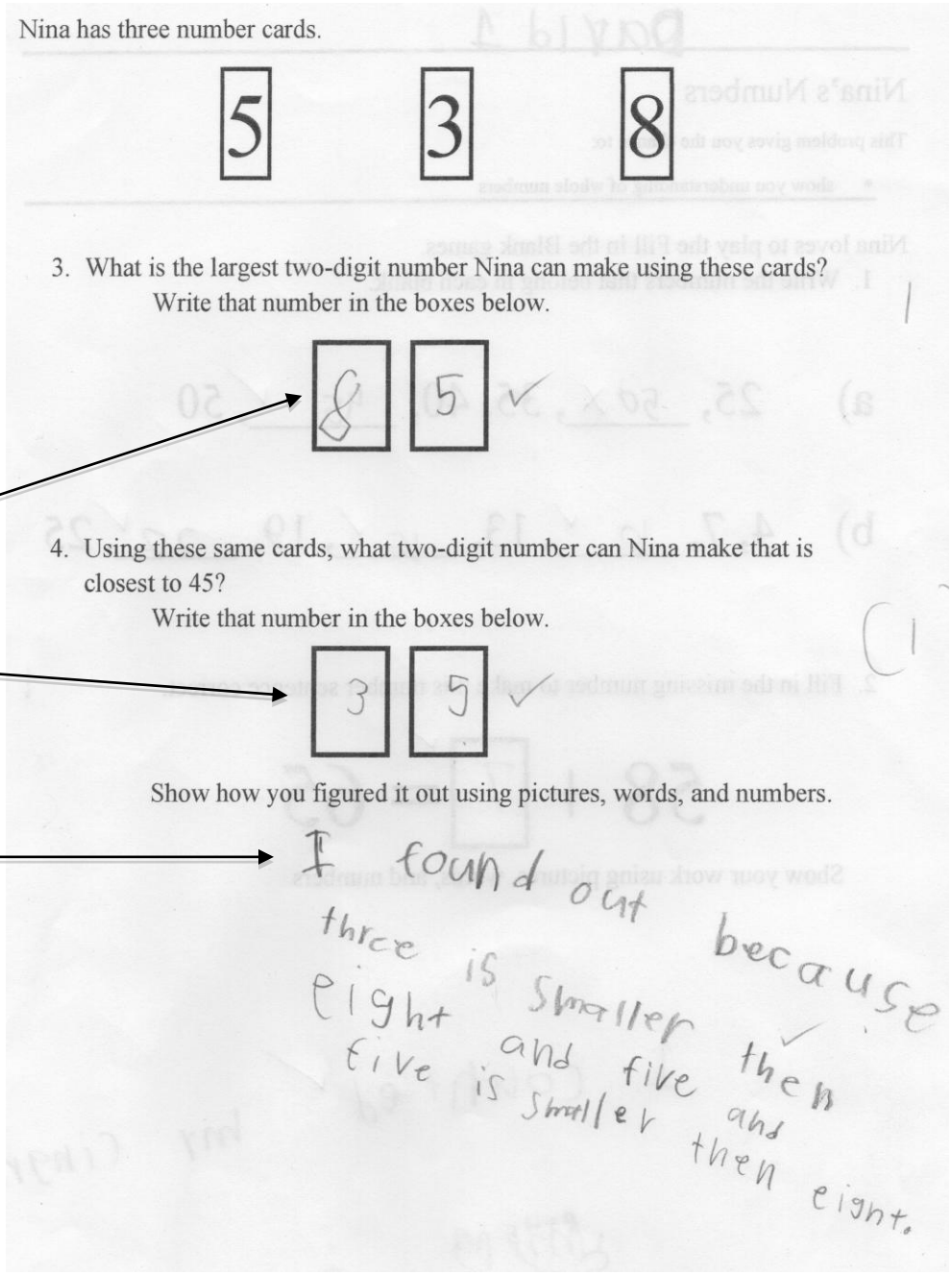
2. Fill in the missing number to make this number sentence correct.

$58 + \boxed{7} = 65$

Show your work using pictures, words, and numbers

Student A correctly determines the values in the sequences of part 1. In part 2 the student correctly determine the missing value 7. The student's explanation is clear showing a counting on strategy, complete with fingers labeled. 1.NBT.E, 1.NBT.U1-3, 1.OA, MP2, MP3

Student A – Level 4 (Score 8) Page 2



Nina has three number cards.

5 3 8

3. What is the largest two-digit number Nina can make using these cards?
Write that number in the boxes below.

8 5 ✓

4. Using these same cards, what two-digit number can Nina make that is closest to 45?
Write that number in the boxes below.

3 5 ✓

Show how you figured it out using pictures, words, and numbers.

I found out because three is smaller then eight and five is smaller and then eight.

The student correctly places the digits to make the largest number possible. S/he selects a number close to 45 even though the there is a closer number. The student explains by comparing the digits, first considering the hundred's place and then the ones place. 1NBT.U.2, MP2, MP3.

Student B – Level 4 (Score 7)

Nina's Numbers

This problem gives you the chance to:

- show you understanding of whole numbers

Nina loves to play the Fill in the Blank games.

1. Write the numbers that belong in each blank.

a) 25, 30 ✓, 35, 40, 45 ✓, 50

b) 4, 7, 10 ✓, 13, 16 ✓, 19, 22 ✓, 25

2. Fill in the missing number to make this number sentence correct.

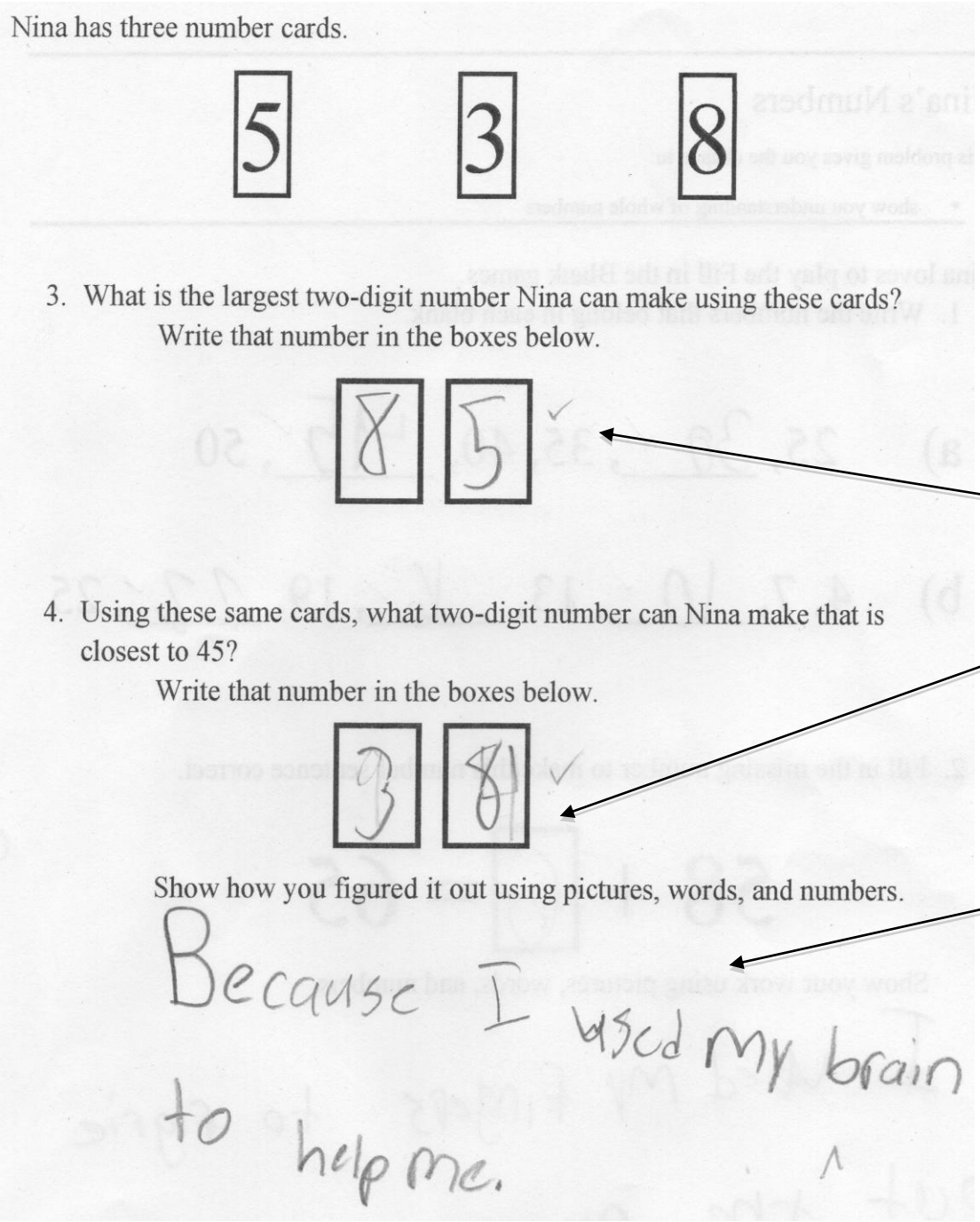
$58 + \boxed{6} = 65$

Show your work using pictures, words, and numbers

I used my fingers to figrie out the number six.

The student correctly complete the two counting sequences. The student's answer for finding the unknown was off by one. The student's explanation is understood but minimal. A more complete explanation would provide more insight into how the student miscounted. 1.NBT.E, 1.NBT.U1-3, MP2

Student B – Level 4 (Score 7) Page 2



Nina has three number cards.

5 3 8

3. What is the largest two-digit number Nina can make using these cards?
Write that number in the boxes below.

8 5

4. Using these same cards, what two-digit number can Nina make that is closest to 45?
Write that number in the boxes below.

3 8

Show how you figured it out using pictures, words, and numbers.

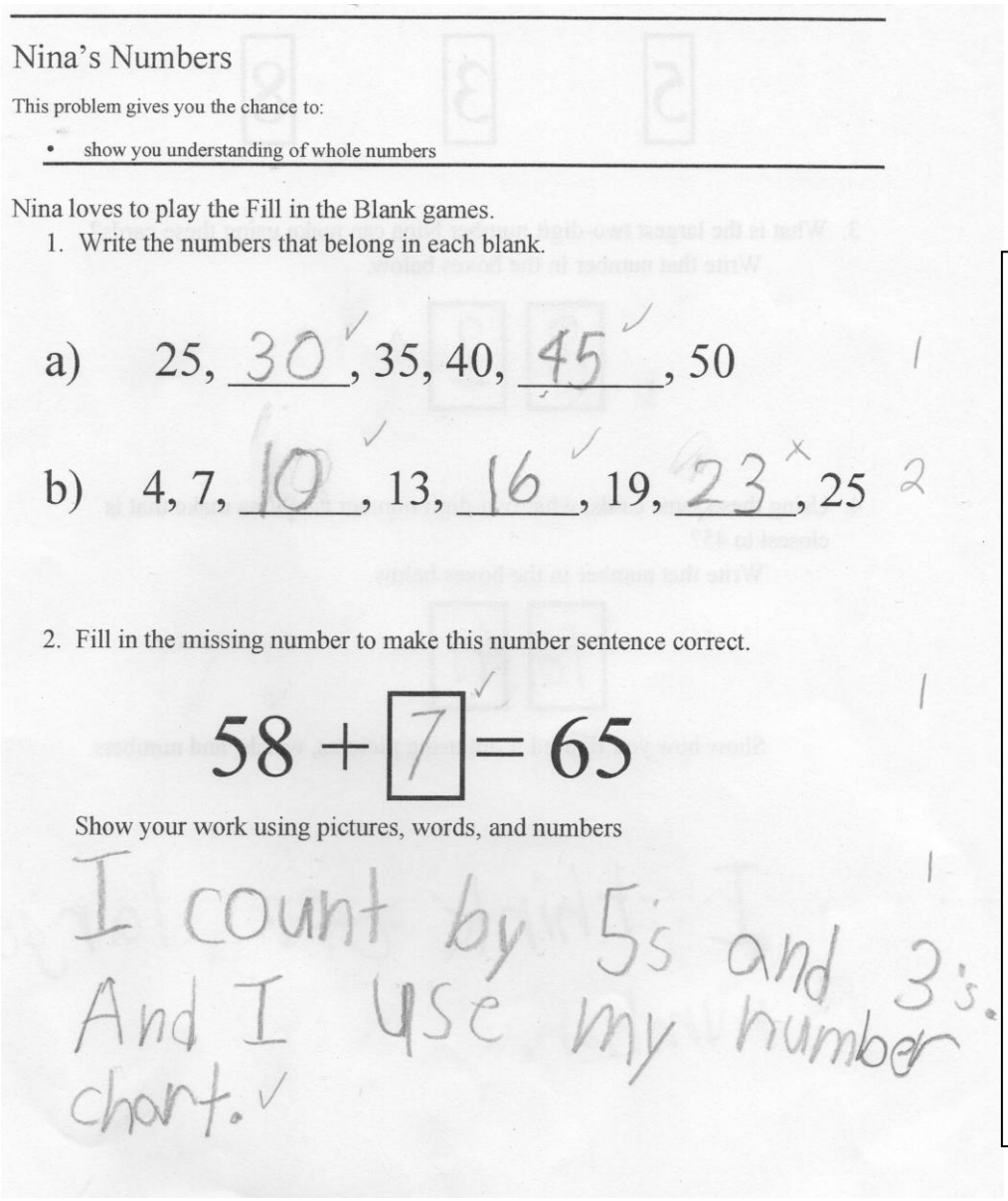
Because I used my brain to help me.

The student accurately places the digits to find the largest possible number. In part 4 the student made more than one attempt and came up with the closest number to 45. But the student's explanation does not communicate anything of learning value. Students need to learn to explain what thinking goes on in their head.
1NBT.U.2, MP2, MP3

Level 3: Performance at Standard (Score Range 5 - 6)

For most of the task, the student's response shows the main elements of performance that the tasks demand and is organized as a coherent attack on the core of the problem. There are errors or omissions, some of which may be important, but of a kind that the student could well fix, with more time for checking and revision and some limited help. The student explains the problem and identifies constraints. The student makes sense of quantities and their relationships in the problem situations. They often use abstractions to represent a problem symbolically or with other mathematical representations. The student response may use assumptions, definitions, and previously established results in constructing arguments. They may make conjectures and build a logical progression of statements to explore the truth of their conjectures. The student might discern patterns or structures and make connections between representations.

Student C – Level 3 (Score 5)



Nina's Numbers

This problem gives you the chance to:

- show you understanding of whole numbers

Nina loves to play the Fill in the Blank games.

1. Write the numbers that belong in each blank.

a) 25, 30 ✓, 35, 40, 45 ✓, 50 1

b) 4, 7, 10 ✓, 13, 16 ✓, 19, 23 ✗, 25 2

2. Fill in the missing number to make this number sentence correct.

$58 + \boxed{7} = 65$ ✓ 1

Show your work using pictures, words, and numbers

I count by 5s and 3s. And I use my number chart. ✓ 1

The digits are correctly placed in the first sequence and the second sequence has a minor error, as the correct thinking was revealed in the explanation. The explanation addresses the two sequences, stating the first grew by 5 and the second by 3. The student stated s/he used the number chart which might imply the method for determining the correct unknown. 1.NBT.E, 1.NBT.U1-3, MP2, MP3

Student C – Level 3 (Score 5) Page 2

Nina has three number cards.

5 3 8

3. What is the largest two-digit number Nina can make using these cards?
Write that number in the boxes below.

8 2

4. Using these same cards, what two-digit number can Nina make that is closest to 45?
Write that number in the boxes below.

48 49

Show how you figured it out using pictures, words, and numbers.

I think of a largest number.

5

The student was able to accurately put the largest digit in the tens place but then used 2 for the ones place, which was not one of the card options. There could be different explanations for where the two came from. The student merely found two numbers that were close to 45 in part 4. The student did not understand that there needed be be single digits in the boxes. NBT.2, MP2

Level 3 Implications for Instruction

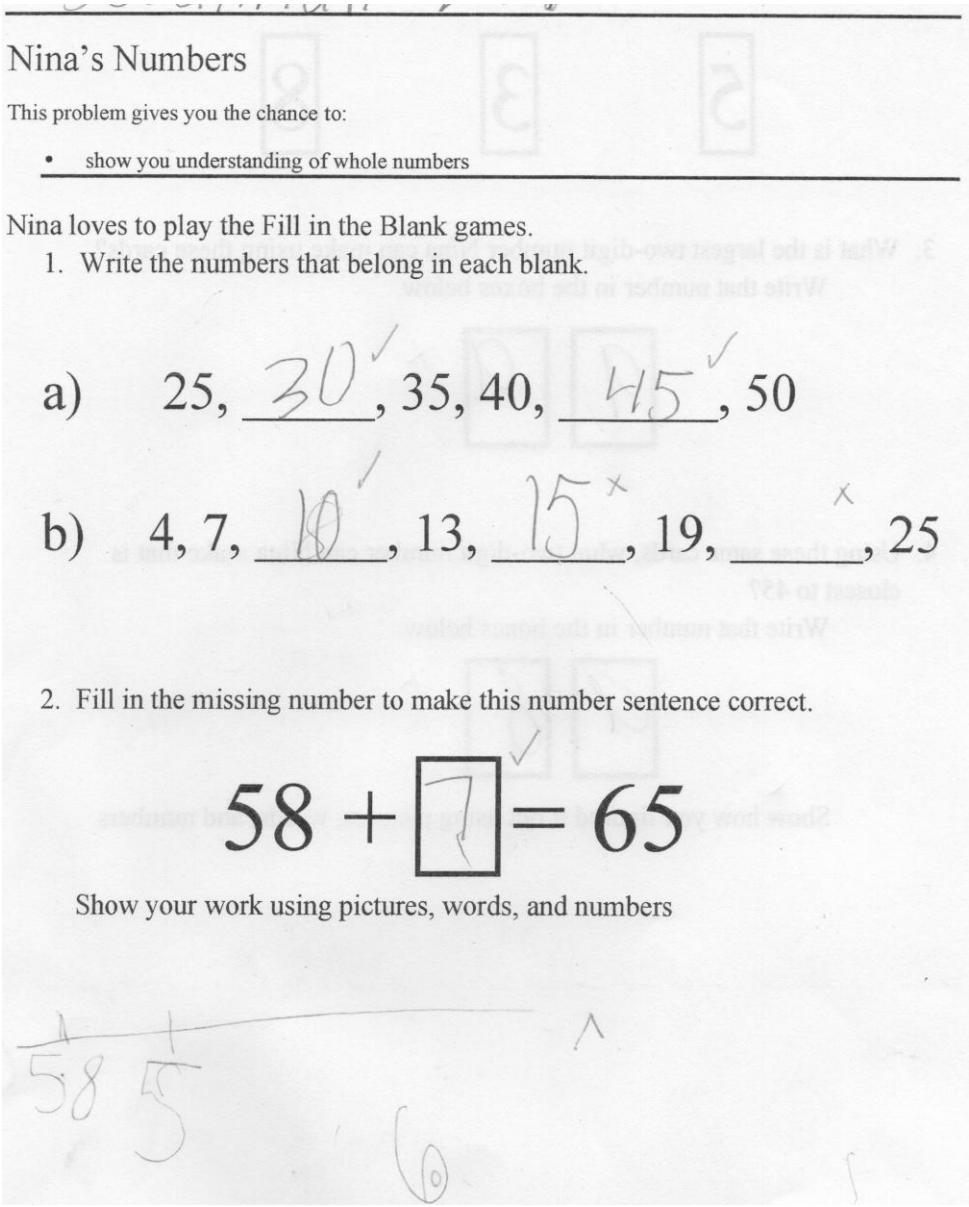
Students who met standard on the task can still improve their performance by being attentive to precession and by making complete explanations. Students need more experiences with explaining. Many of the students who met level 3 failed to correctly find the largest possible number from the three digits. Even more difficult was determining the number closet to 45. This requires student to have quantitative reasoning of two digit numbers.

Therefore, students need more practice with finding lengths on the number line, especially two digit numbers. Student should locate numbers on an open number line, learning to make relative judgements base on benchmark amounts. Students will benefit from engaging in number line math talks and measuring along a number line when working with numbers.

Level 2: Performance below Standard (Score Range 2 - 4)

The student's response shows some of the elements of performance that the tasks demand and some signs of a coherent attack on the core of some of the problems. However, the shortcomings are substantial, and the evidence suggests that the student would not be able to produce high-quality solutions without significant further instruction. The student might ignore or fail to address some of the constraints. The student may occasionally make sense of quantities in relationships in the problem, but their use of quantity is limited or not fully developed. The student response may not state assumptions, definitions, and previously established results. While the student makes an attack on the problem it is incomplete. The student may recognize some patterns or structures, but has trouble generalizing or using them to solve the problem.

Student D – Level 2 (Score 4)



Nina's Numbers

This problem gives you the chance to:

- show you understanding of whole numbers

Nina loves to play the Fill in the Blank games.

1. Write the numbers that belong in each blank.

a) 25, 30, 35, 40, 45, 50

b) 4, 7, 10, 13, 15, ____, 25

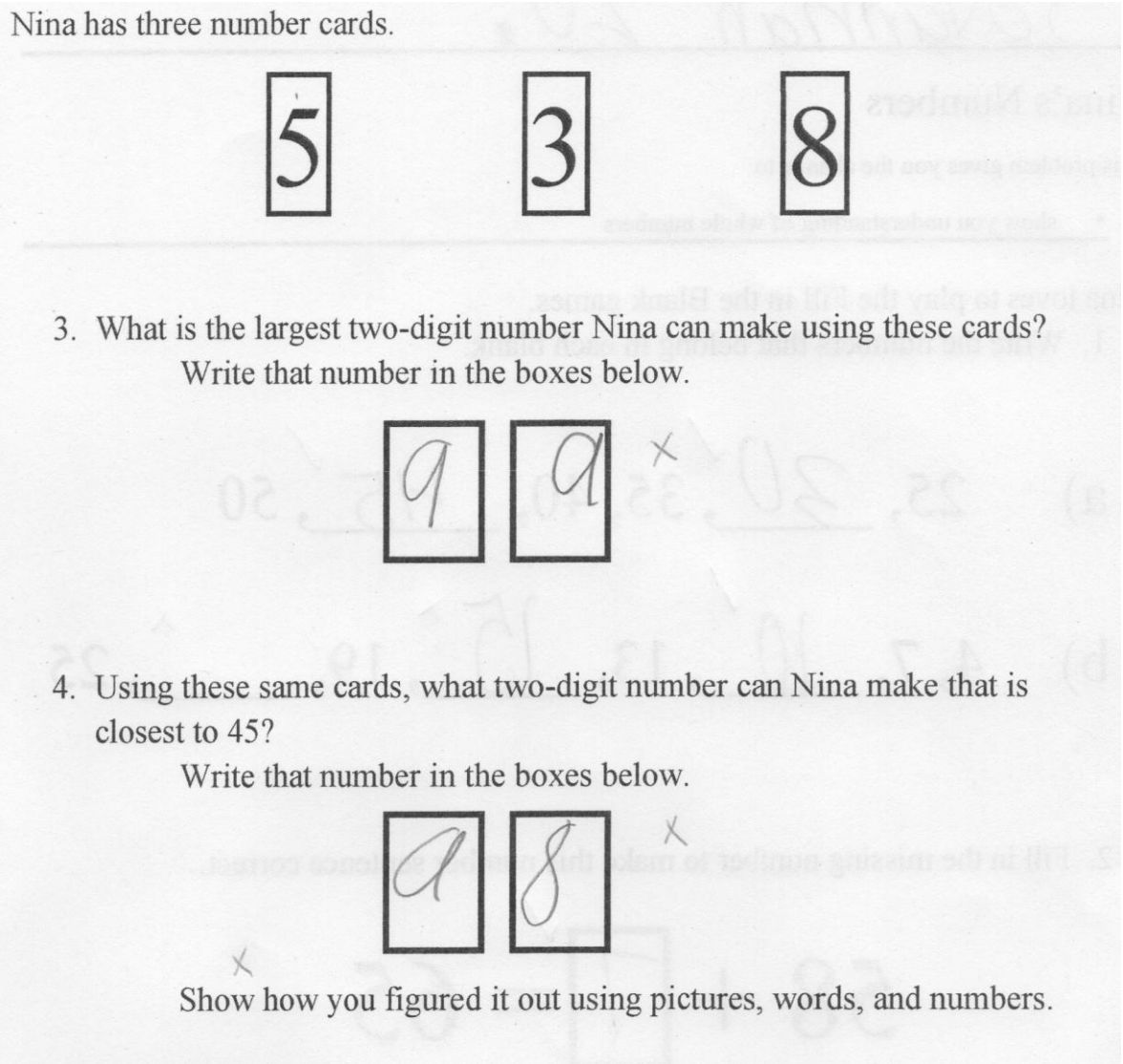
2. Fill in the missing number to make this number sentence correct.

$58 + \boxed{7} = 65$

Show your work using pictures, words, and numbers

The student's explanation is missing. The student does complete the 5 skip counting sequence correctly and gets only the first missing number in the second sequence. The student does not attempt to find the missing number after 19. But the student does find the correct unknown in part 2. 1.NBT.E, 1.NBT.U1-3, MP2

Student D – Level 2 (Score 4) Page 2



Nina has three number cards.

5 3 8

3. What is the largest two-digit number Nina can make using these cards?
Write that number in the boxes below.

9 9

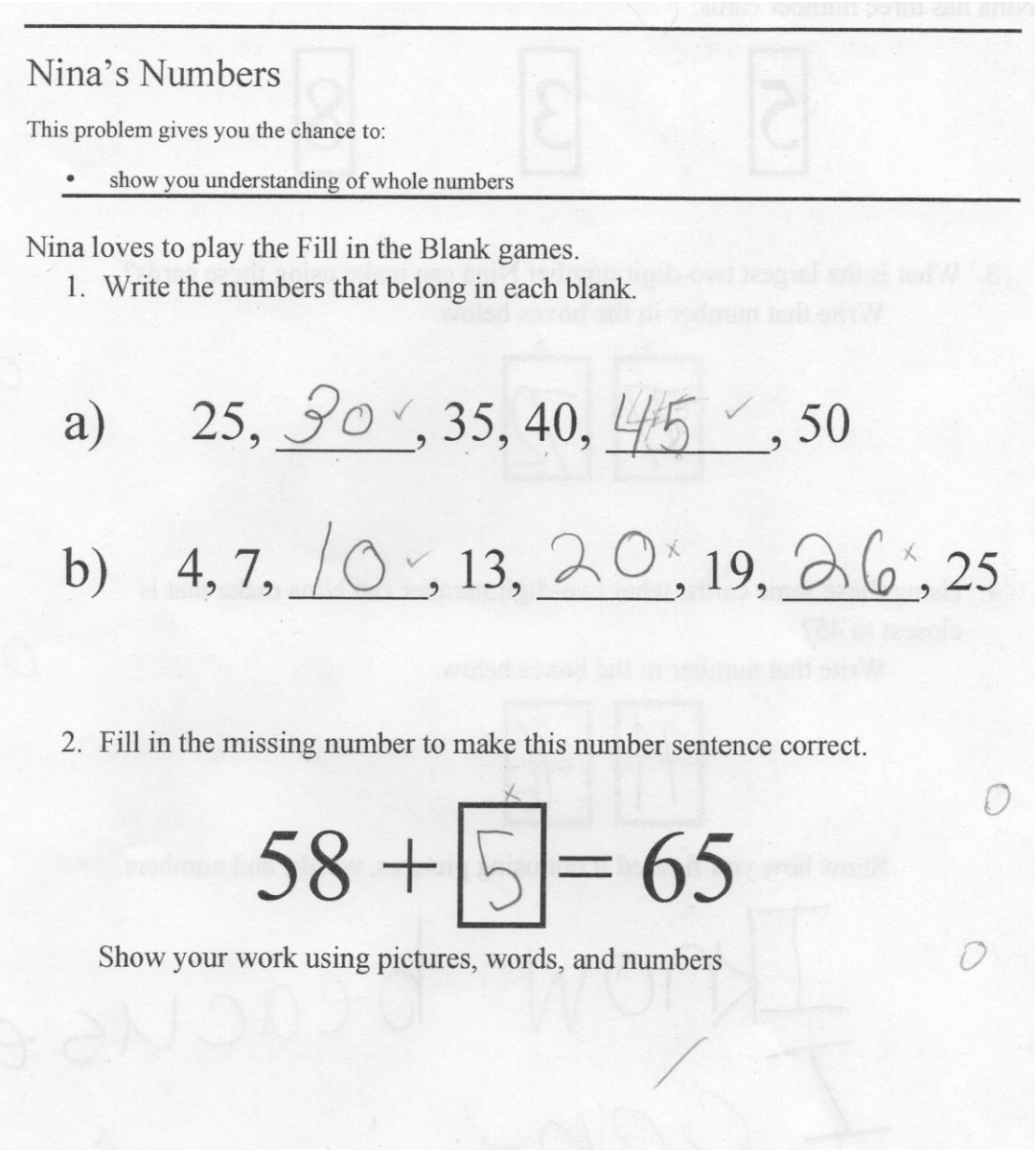
4. Using these same cards, what two-digit number can Nina make that is closest to 45?
Write that number in the boxes below.

9 8

Show how you figured it out using pictures, words, and numbers.

The student was unsuccessful on this second page. S/he did find the largest possible two digit number, but ignored the constraint of picking from three digits. The student did not attempt any explanations. More quantitative reasoning is needed. The student also needs practice in explaining her/his thinking. MP2, MP3

Student E – Level 2 (Score 3)



Nina's Numbers

This problem gives you the chance to:

- show you understanding of whole numbers

Nina loves to play the Fill in the Blank games.

1. Write the numbers that belong in each blank.

a) 25, 30 ✓, 35, 40, 45 ✓, 50

b) 4, 7, 10 ✓, 13, 20 ✗, 19, 26 ✗, 25

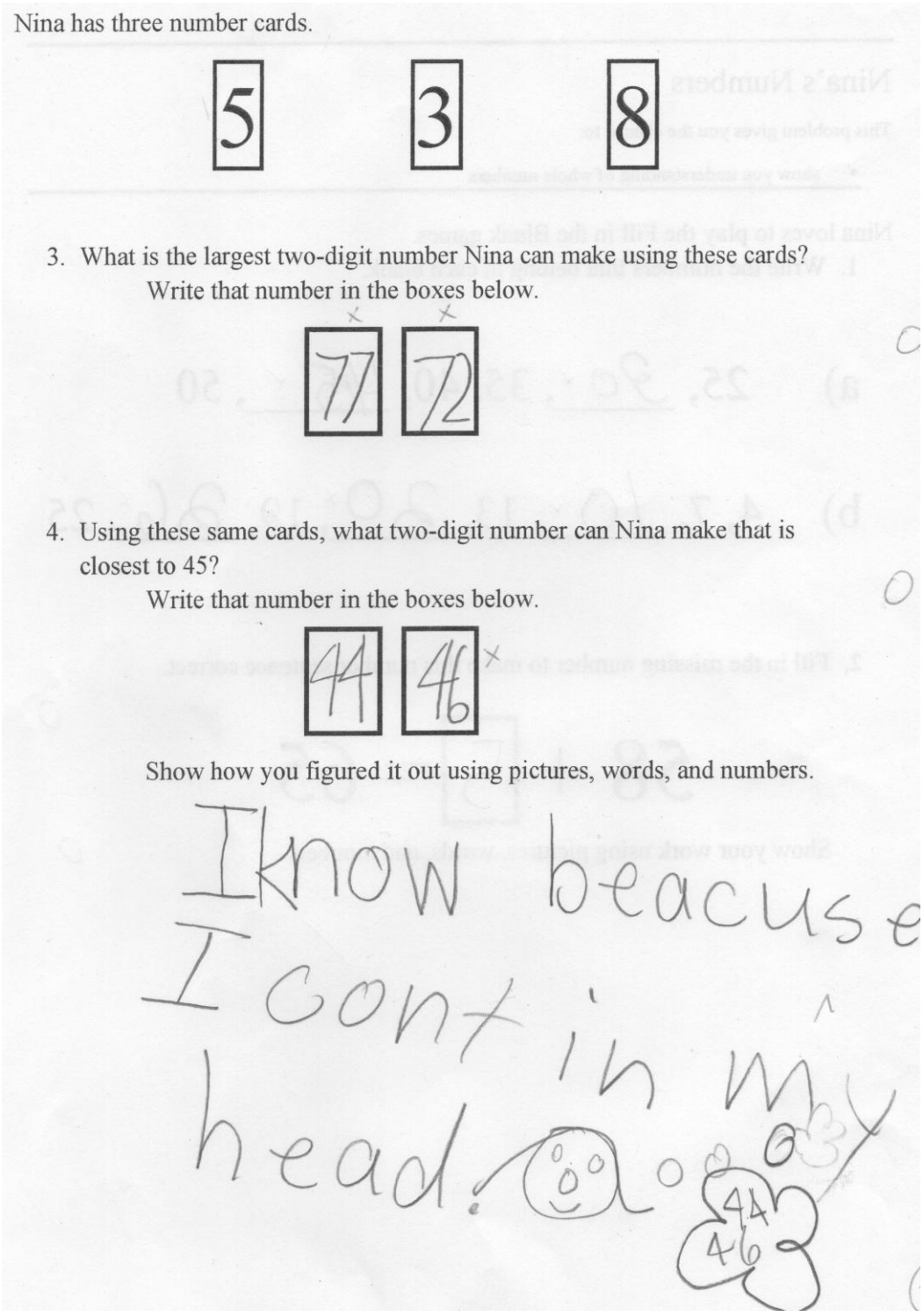
2. Fill in the missing number to make this number sentence correct.

$58 + \boxed{5} = 65$

Show your work using pictures, words, and numbers

The student is able to complete the first sequence correctly. The student finds the first unknown in the growing by three sequence, but as the numbers increase the student makes errors. The student in unsuccessful in determining the unknown in part 2. The student does not provide an explanation. 1.NBT.E

Student E – Level 2 (Score 3) Page 2



Nina has three number cards.

5 3 8

3. What is the largest two-digit number Nina can make using these cards?
Write that number in the boxes below.

77 72

4. Using these same cards, what two-digit number can Nina make that is closest to 45?
Write that number in the boxes below.

44 46

Show how you figured it out using pictures, words, and numbers.

I know beacuse I cont in my head. 44 46

The student is unsuccessful on the second page. In part four s/he finds numbers on either side of 45, but ignores the constraints of the problem. The student's explanation does not reveal any thinking. S/he need to learn to explain her/his thinking process. MP3

Level 2 Implications for Instruction

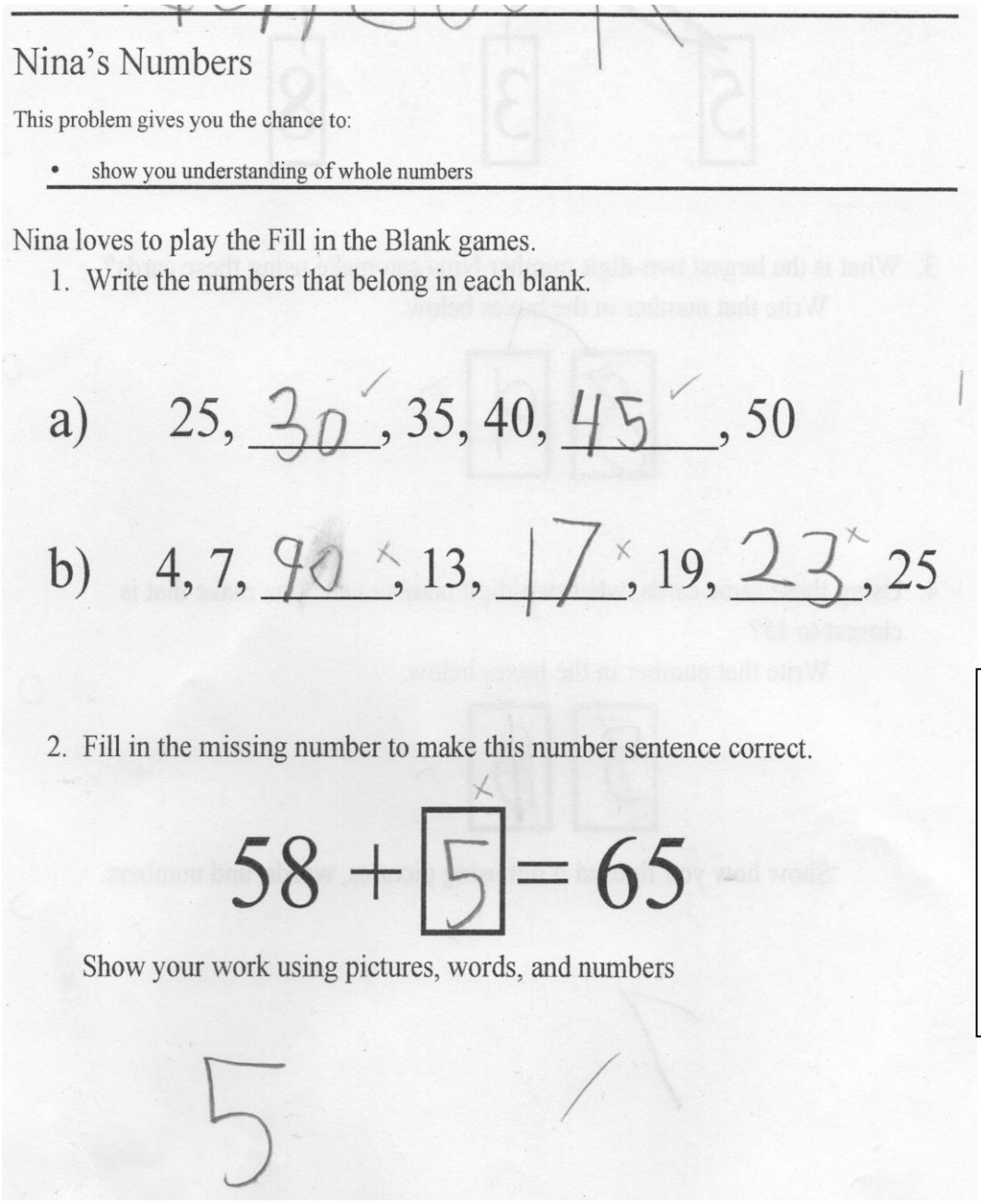
Students need help in comparing the placement of two digit numbers. The explanations at this level are either incomplete or not focused on mathematical reasoning that makes sense for the situation. The students need learning experiences with number lines and place value to understand quantities.

Students can experiment with these ideas to develop a deeper conception of numbers, so that they may more flexibly reason quantitatively. Instruction should involve more work on defining the relationships on length and the size of numbers. Students need experiences to construct learning for themselves. Students should be asked to explain and justify their answers regularly in class to develop mathematical argumentation. Examining and analyzing other students' explanations is an important experience for students. It provides models and helps students discern important elements of convincing arguments.

Level 1: Demonstrates Minimal Success (Score Range 0 – 1)

The student's response shows few of the elements of performance that the tasks demand. The work shows a minimal attempt on the problem and struggles to make a coherent attack on the problem. Communication is limited and shows minimal reasoning. The student's response rarely uses definitions in their explanations. The student struggles to recognize patterns or the structure of the problem situation.

Student F – Level 1 (Score 2)



Nina's Numbers

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- show you understanding of whole numbers

Nina loves to play the Fill in the Blank games.

1. Write the numbers that belong in each blank.

a) 25, 30, 35, 40, 45, 50

b) 4, 7, 10, 13, 17, 19, 23, 25

2. Fill in the missing number to make this number sentence correct.

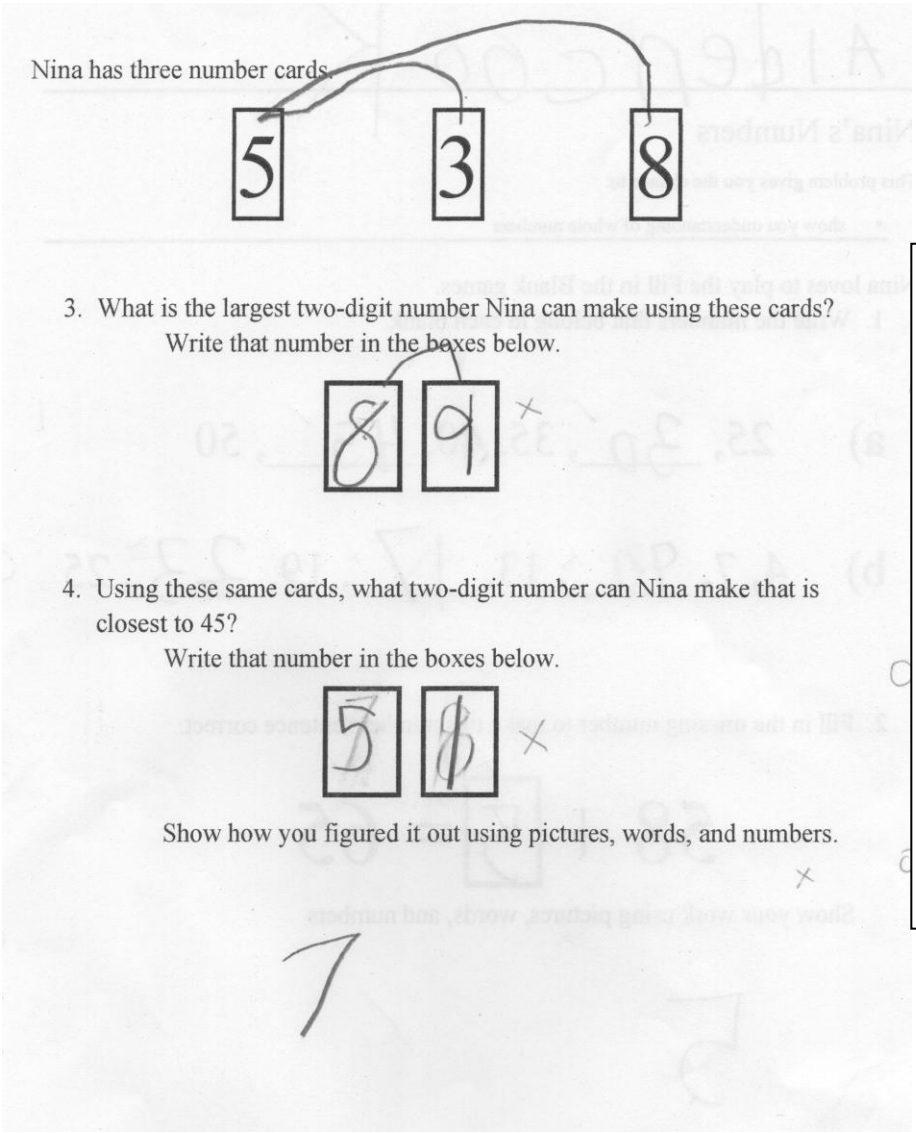
$58 + \boxed{5} = 65$

Show your work using pictures, words, and numbers

5

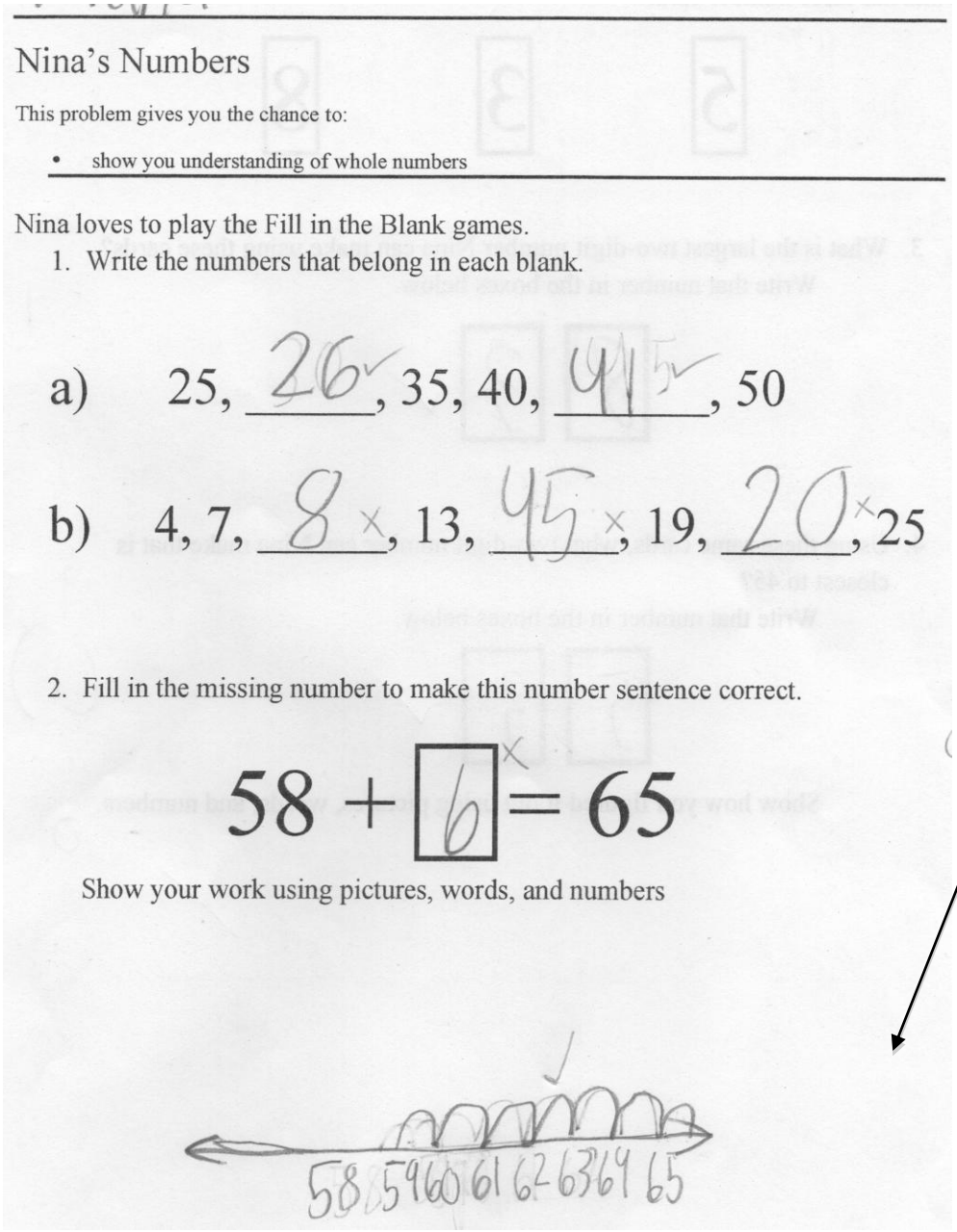
The student was able to demonstrate skip counting by 5, but was unsuccessful with the rest of the task. The student's explanation showed a lack of understanding how to explain his/her thinking. MP3

Student F – Level 1 (Score 2) Page 2



The student showed little understanding of the prompt and seems to only use the cards for considering the ten's place. The explanation is negligible. This student needs additional instruction in understanding the task prompts and explaining his/her thinking. MP3

Student G – Level 1 (Score 1)



Nina's Numbers

This problem gives you the chance to:

- show you understanding of whole numbers

Nina loves to play the Fill in the Blank games.

1. Write the numbers that belong in each blank.

a) 25, 26, 35, 40, 41, 50

b) 4, 7, 8, 13, 45, 19, 20, 25

2. Fill in the missing number to make this number sentence correct.

$58 + \boxed{6} = 65$

Show your work using pictures, words, and numbers

The student doesn't provide any correct answers in the task, although there are signs of reasoning. The explanation is awarded a point because it shows a counting on strategy that would have worked if the student began with the right starting location. MP3

Student G – Level 1 (Score 1) Page 2

Nina has three number cards.

5 3 8

3. What is the largest two-digit number Nina can make using these cards?
Write that number in the boxes below.

8 3 ✓

4. Using these same cards, what two-digit number can Nina make that is closest to 45?
Write that number in the boxes below.

5 3 ✓

Show how you figured it out using pictures, words, and numbers.

The student made a good attempt at finding the largest number and the number closest to 45. Unfortunately both number were the second closest possibility. The student did illustrate understanding of the tens place. That indicates some quantitative reasoning. MP2, 1.NBT.U.2

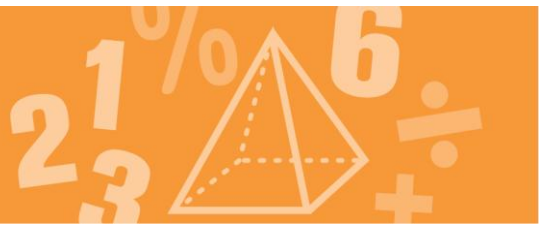
The student did not provide an explanation of his/her thinking. MP3

Level 1 Implications for Instruction

Students need support in reasoning quantitatively. They may need to start with number lines and the idea that length on the line equals the size of a number. Students have trouble counting on. Using the number line students can learn quantities. Having students divide the distance between zero and the number to find the location is important. The location of the number on the line is the equal to the number of partitioned segments of length 1.

Students need a deeper understanding of place values. Students need experiences in reasoning about place values, the number of ten bundles plus the number of ones. Students need experiences connecting numbers to their place values and understanding the relative size of numbers.

Students need additional instruction and experiences in writing explanations that explain their process of finding their answers. Sharing models of good explanations are helpful. Having students rewrite and revise explanations is important. The reading of others' explanations and critiquing their reasoning raises the cognitive demand and helps students create better explanations.



GRADE 1 MATH: NINA'S NUMBERS INSTRUCTIONAL SUPPORTS

The instructional supports on the following pages include a unit outline with formative assessments and suggested learning activities. Teachers may use this unit outline as it is described, integrate parts of it into a currently existing curriculum unit, or use it as a model or checklist for a currently existing unit on a different topic.

Unit Outline First Grade Math

INTRODUCTION: This unit outline provides an example of how teachers may integrate performance tasks into a unit. *Teachers may (a) use this unit outline as it is described below; (b) integrate parts of it into a currently existing curriculum unit; or (c) use it as a model or checklist for a currently existing unit on a different topic.*

Grade 1 Math: Using Base Ten

UNIT TOPIC AND LENGTH:

- The unit should run between 20 and 25 standard periods of instruction. One of the periods will involve the pre-assessment (0.5 period), introducing and supporting problem solving on the long lesson (2 periods), teaching the formative assessment lesson (2.5 periods) and the final assessment (0.5 period).

COMMON CORE LEARNING STANDARDS:

- **1.NBT.2** Understand that the two digits of a two-digit number represent amount of tens and ones. Understand the following as special cases:
  - **a)** 10 can be thought of as a bundle of ten ones – called a "ten."
  - **b)** The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
  - **c)** The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).
- **1.NBT.3** Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.
- **1.NBT.4** Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.
- **1.OA.1** Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
- **1.OA.6** Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).
- **MP. 1** Make sense of problems and persevere in solving them.
- **MP.2** Reason abstractly and quantitatively.
- **MP.3** Construct viable arguments and critique the reasoning of others.
- **MP.4** Model with mathematics.
- **MP.7** Look for and make use of structure.

BIG IDEAS/ENDURING UNDERSTANDINGS:

Students will understand:

- How to use place value understanding and properties of operations to add and subtract within 10, within 20, within 100.
- How to interpret the action of a situation in order to choose an appropriate operation for solving a problem.
- Make convincing arguments for why strategies work using knowledge of place value and operations properties.

ESSENTIAL QUESTIONS:

- What are the ways to compose and decompose numbers to aid in adding and subtracting numbers with ease? What situation types represent addition and subtraction?

CONTENT:

- Student will understand the meaning of place value and properties of operations to develop strategies for adding and subtracting. The "benchmarks" of 5 and 10 will serve as useful anchors for helping to ground student thinking about place value.
- Students will be able to justify strategies using models and the properties of operations.
- Students apply the new knowledge to construct arguments to make connections between representations.
- Students demonstrate knowledge through the expert investigation, the performance assessment task in the formative assessment lesson and the final assessment.

SKILLS:

- Students match situations involving numbers of objects, addition, and subtraction with number sentences and visual representations.
- Students look at problem situations and choose among strategies based on place value and the properties of the numbers.
- Students will apply strategies to solve one- and two-step problems and express their ideas using number sentences.
- Students write summaries and reflections of what they learned and understood.
- Students will represent strategies using number sentences, words and drawings.
- Students use understanding of equivalency to compose and decompose numbers using place value and properties of operations.

ASSESSMENT EVIDENCE AND ACTIVITIES:

INITIAL ASSESSMENT :

The unit begins with the performance task ***Pencils and Erasers*** (G1 SVMI 11). The task is designed to measure what students bring to the unit in regard to their knowledge and skill at working with making tens. Please reference ***Pencils and Erasers*** for full details.

FORMATIVE ASSESSMENT:

About 3/4 of the way through the unit, teachers would use the ***formative assessment lesson (FAL)***. The FAL is entitled ***Using Base Ten Menu***. A different pre-assessment task should be administered in class at least two days prior to the two-day lesson. Students should spend no more than 20 minutes on the task. Teachers should review the student work prior to teaching the lesson. The FAL comes with complete teacher notes and the student pages. Please reference ***Using Base Ten Menu*** for full details.

FINAL PERFORMANCE TASK:

The final performance assessment is entitled ***Nina's Numbers*** *(*SVMI 1 '11). It should be administered during a class period. The task is read to the students. Most students will complete the task in about 10 – 20 minutes, although time should not be a factor. The teacher should provide a reasonable amount of time for all students to finish. The students should be allowed to use any tools or materials they normally use in their classroom. The task can be read to the students and all accommodations delineated in an IEP should be followed. Most performance tasks will include a Spanish version. The task has a specific rubric and a set of benchmark calibration papers. Annotated student work is also included. Please reference ***Nina's Numbers*** for full details.

LEARNING PLAN & ACTIVITIES:

- The unit is designed with a pre-assessment task, an expert task/investigation, a formative assessment lesson and a final assessment. This unit is designed to accompany the curriculum a teacher currently uses to teach the topics listed. The elements in the unit will provide activities to foster formative assessment practices, conceptual understanding and non-routine problem solving.

- The expert investigation is entitled ***Forwards and Backwards.*** It contains three separate but mathematically related problems labeled Primary A, Part A, and Part B. All students should start with the Primary A task and then proceed at their own speed to Part A and Part B. It is more important for the student to work deeply on a part and complete a write up than to merely work through and find answers. It is the student's responsibility to be reflective and thorough in their explanations, findings and justifications.

- In addition to the expert investigation, teachers may use the following activities in this unit.

Number Talks – A daily ritual with the entire class for the purposes of developing conceptual understanding of numbers, operations and mathematics. Number talks are used to:

- •Review and practice operations, procedures and concepts of numbers.
- •Introduce concepts and properties about numbers.
- •Reinforce procedures and number concepts.
- •Explore the connections between numbers.

Do a number talk every day but for only 10 minutes. A few minutes more often is better than a lot of minutes infrequently.

1. Ask questions such as:
   - How did you think about that?
   - How did you figure it out?
   - What did you do next?
   - Why did you do that? Tell me more.
   - Who would like to share their thinking?
   - Did someone solve it a different way?
   - Who else used this strategy to solve the problem?
   - What strategies do you see being used?
   - Which strategies seem to be efficient, quick, and simple?
2. Give yourself time to learn how to:
   - Record student solutions
   - Listen to and observe students
   - Collect notes about student strategies and understanding
3. Name/label the strategies that emerge from your students:
   - Use doubles
   - Break apart numbers
   - Make it simpler
   - Use landmark numbers (25, 50, 75, 200, etc)
   - Use a model to help
   - Use what you already know
   - Make a "10"
   - Start with the 10's
   - Think about multiples
   - Think about money
   - Traditional algorithm
   - Counting on
4. Create a safe environment. When students feel safe, they are comfortable sharing answers even when it's different from everyone else's.
5. Give opportunities for students to "think first."
6. Encourage self-correction; it's okay to change your mind, analyze your mistake, and try again.
7. Give number talks time to become part of your classroom culture. Expect them to follow the usual learning curve stages. "Keep on keeping on" and you will get positive results.

Think/Write/Pair/Share is a high leverage strategy that respects individual time to process and organize ideas before engaging in peer-to-peer discussions. This process can be used throughout the unit as a vehicle for students to self reflect, construct new meaning by building on the ideas of others, and strengthen their arguments.

Journal Entries for Reflection: Using prompts such as, *"How has my thinking changed?" or "How*

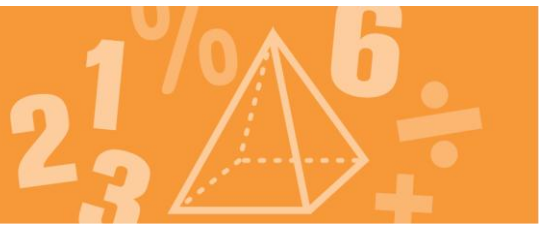
can I explain better?" can provide valuable opportunities for students to tweak their own solutions during class or for homework, and subsequently, deepen their understanding of content.

Working on the rug: This strategy helps students to focus, consider having students "circle up" on the floor. Other important strategies include:

- Create a safe environment. When children feel safe, they are comfortable sharing answers even when it's different from everyone else's.
- Provide concrete models (snap cube "trains", base 10 blocks, money, etc.)
- Give opportunities for children to "think first" and then check with the models.
- Have students occasionally record their thinking and the steps they use to solve a problem.
- Encourage self-correction; it's okay to change your mind, analyze your mistake, a try again.
- Provide number stories to reinforce a context and purposes for number operations.
- Be curious; avoid making assumptions.
- Expect students to break apart numbers. Use strategies such as making tens, or use of ten-frames. Show them steps of how to add: 6+8 (think of 6 as 4+2; add the 2 to 8 to get 10 and just add the remaining 4 to get 14).
- Show the strategy you used. Make sure they know it's not "the" way, just another strategy.
- Give students larger numbers so they can give "estimates."

RESOURCES:

- Normal materials used in math class include manipulatives such as cards for matching activity, square tiles, counters, and ten frames, etc.
- All the materials referenced in the assessments, formative assessment lesson and expert investigation are included.



GRADE 1 MATH: NINA'S NUMBERS
INITIAL TASK: PENCILS AND ERASERS

Pencils and Erasers

There are 10 things on a desk. Some of them are pencils and some are erasers. Remember there are 10 in all. How many of each could be on the desk?

Show how you figured out your answer using pictures, numbers and words.

Can you find a different way to show 10 pencils and erasers on a desk?

GRADE 1 MATH: NINA'S NUMBERS

FORMATIVE ASSESSMENT LESSON: BASE TEN MENU

Base Ten Menu

Mathematics Assessment Project

BAM/MARS
Silicon Valley Mathematics Initiative- University of Nottingham
2011

Formative Assessment Lesson

Mathematical goals

This lesson unit is intended to help you assess how well students are able to compose and decompose numbers within 20. Students should develop a range of strategies and be able to explain why the strategies work. The number ten is emphasized as it is key to understanding our number system. In particular, this unit aims to identify and help students who have difficulties with:

- Thinking of ten in two ways: as one ten and as ten ones
- Composing and decomposing numbers in a variety of ways and discovering how to use this information when adding and subtracting
- Developing strategies for determining sums and differences when adding and subtracting one- and two-digit numbers
- Describing and explaining solutions clearly and effectively

Standards addressed

This lesson relates to the following Common Core State Standards:

First Grade Number and Operations in Base Ten: Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand that the numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight or nine ones.

First Grade Number and Operations in Base Ten: Add within 100 using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

First Grade Number and Operations and Algebraic Thinking: Add and subtract within 20, demonstrating fluency for addition and subtraction within 10.

First Grade Number and Operations and Algebraic Thinking: Understand the meaning of the equal sign.

This lesson relates to the Mathematical Practices:

- Modeling: Mathematically proficient students can apply the mathematics they know to solve problems. This might mean at early grades being able to write an equation or problem to demonstrate a situation.
- Constructing Viable Arguments and Critiquing the Reasoning of Others: At the early grades, this might mean that students can compare their results with others. They might find ways to order and/or generalize about solutions. Others may find more than one solution path to a given problem.

Introduction

This lesson unit is structured in the following way:

- Students work on their own to complete an assessment task, *Maria's Piggy Bank*, designed to reveal their current understanding and difficulties.
- Students are introduced to a series of "warm-up" or quick activities that may be continued throughout the year.
- Students work on a series of Menu activities, some are individual activities and some involve partner work. These activities may be set up in a menu format, taught as whole class lessons or both. They may continue throughout the year.
- Students return to their work on the assessment task and try to improve their own responses.

Materials required

Each student will need one copy of the assessment task, *Maria's Piggy Bank*.
Each pair of learners with need the following:

- Manipulatives used regularly in math class to facilitate number, operations and place values such as: paper and pencil, mini-white boards, 100s and/or 0-99 charts, ten frames (blank, filled in, and sets of playing cards), decks of number cards, dice, counters, cubes, etc.

Resources

Books

Carpenter, Thomas P., Fennema, Elizabeth, Franke, Megan Loef, Levi, Linda and Empson, Susan B., 1999. **Children's Mathematics: Cognitively Guided Instruction** Portsmouth, New Hampshire: Heinemann

Carpenter, Thomas P., Franke, Megan Loef, and Levi, Linda 2003. **Thinking Mathematically: Integrating Arithmetic & Algebra in Elementary School** Portsmouth, New Hampshire: Heinemann

Corwin, Rebecca B. 1996. **Talking Mathematics: Supporting Children's Voices** Portsmouth,New Hampshire: Heinemann

Fosnot, Catherine Twomey and Dolk, Maarten 2001. **Young Mathematicians at Work: Constructing Number Sense, Addition, and Subtraction** Portsmouth, New Hampshire: Heinemann

Heibert, James et.al., 1997. **Making Sense** Portsmouth, New Hampshire: Heinemann

Richardson, Kathy 2002. **Assessing Math Concepts: Hiding Assessment** Bellingham, Washington: Mathematical Perspectives

Richardson, Kathy 1997. **Math Time, The Learning Environment**, Norman, Oklahoma: Educational Enrichment, Inc.

Richardson, Kathy 1999. **Developing Number Concepts: Addition and Subtraction**, White Plains, New York: Pearson Education, Inc.

Richardson, Kathy 1999. **Developing Number Concepts: Place Value, Multiplication and Division**, White Plains, New York: Pearson Education, Inc.

Van de Walle, John A. 2004. **Elementary and Middle School Mathematics: Teaching Developmentally** Boston, MA: Pearson Education, Inc.

Van de Walle, John A. 2006. **Teaching Student Centered Mathematics: Grades K-3** Boston, MA Pearson Education, Inc

Videos

"How to Teach Math as a Social Activity" Edutopia.org-video on building community norms around math discussions.

Video episodes throughout this resource show students formulating conjectures around properties of numbers and operations: Carpenter, Thomas P., Franke, Megan Loef, and Levi, Linda 2003 **Thinking Mathematically: Integrating Arithmetic & Algebra in Elementary School** Portsmouth, New Hampshire: Heinemann

Time needed

The lesson will need one 20-25 minute pre-assessment session, at least four - seven 25-40 minute sessions (composed of a 10-15 minute warm-up activity and a 25-30 minute menu session) and a 15-20 minute student editing session to revise initial pre-assessment. Timings given are only approximate. Exact timings will depend on the needs of the class.

Before the lesson

Individual Assessment Task:

The assessment task, *Maria's Piggy Bank*, should be completed before the lesson. If needed, the task may be read to students. Ask students to attempt the task on their own. Explain that they should not worry too much if they cannot understand or do everything, because you plan to have other opportunities which should help them.

It is important that students are allowed to answer the questions without assistance, as far as possible. If students are struggling to get started then ask questions that help them understand what is required, but don't do it for them. For example,

"What is this problem asking us to find out?"

"What do you know?"

Assessing students' responses

Collect a sample of students' responses to the task and make some notes on what their work reveals about their current levels of understanding. The purpose of doing this is to forewarn you of the difficulties students may experience during the formative assessment lesson itself and so that you may prepare carefully. Do not grade students' work at this stage. Research shows that this will be counterproductive, as it will encourage students to compare their grades and distract their attention from the mathematics. Instead, try to understand their reasoning and think of ways in which you can help them. Wait to grade this task until it is revised by students at the end of this lesson.

Suggested lesson outline

Since every first grade classroom is unique, teachers should feel free to organize the following activities in ways that make the most sense for their students. For example, the warm-ups could come at the beginning of the main lesson or they might be introduced throughout the day when there are an "extra few minutes". Likewise, some classes might be ready to handle several menu choices and others might need to stick with a whole class model. Hopefully, many of these activities will become an ongoing part of the year's curriculum. Giving students enough time with activities will provide evidence of their application of concepts (Richardson, **Math Time,** p. 119).

Warm-Ups

A warm-up activity should be a short time (5-10 minutes) to look at mathematical ideas together. Introduce new warm-up ideas gradually. As students do each warm-up activity repeatedly, they gain experience analyzing what is happening and strengthening their ability to justify their solutions. These warm-up activities are designed to be used with an overhead projector, a Smartboard or white board. If one of these is not available, you can present the problem(s) on a large sheet of paper.

Warm-up Activities

Quick Look With Ten-Frames

Students will be given a "quick look" (2 seconds) at a ten-frame and respond by holding up their fingers to match the number shown. The teacher presents the ten-frames on flash cards large enough for the class to view (these may be enlarged from those in Appendix 2, or used on an overhead projector). Students should be encouraged to justify their answers.

Extensions:
As students become more fluent with their responses they can be asked to show how many are needed to make ten.
Hold up a full ten-frame and a second ten-frame and have students record the correct number on individual white boards.

This activity gives the opportunity for students to:
Think of ten in two ways – as one ten and as ten ones.
Compose and decompose numbers in a variety of ways and discover how to use this information when adding and subtracting.
Develop strategies for determining sums and differences when adding and subtracting one and two-digit numbers.
Describe and explain solutions clearly and effectively.

Roll The Dice

The teacher rolls a large die, or a regular die can be rolled and viewed by students using a document camera, and students respond by showing how many they see with their fingers. This warm-up helps students to practice subitizing, or instant recognition of small numbers. Students should be encouraged to justify their answers.

Extensions:
Roll two dice and have students record their responses on individual white boards.
The number of dice can be increased for students who have mastered beginning math facts and are ready to practice three addends.
Play Dice Roll as a partner game and students say the number rolled rather than holding up fingers.

This activity gives the opportunity for students to:
Think of ten in two ways – as one ten and as ten ones
Compose and decompose numbers in a variety of ways and discover how to use this information when adding and subtracting.
Develop strategies for determining sums and differences when adding and subtracting one and two-digit numbers.
Describe and explain solutions clearly and effectively.

Rename That Number

The teacher selects a target number and students are asked to record that number in as many ways as possible on a mini-whiteboard. Students hold up their boards at the end of the activity for the whole group to view. Students share their partner's responses and then individuals may be called on to share with the whole group.

Example:

27

(is written by the teacher)
Possible ideas seen on student white boards:
2 tens and 7 ones
1 ten and 17 ones

30 – 3
20 + 4
And so on…

This warm-up helps student to understand that there are many and varied ways to represent numbers.

This activity gives the opportunity for students to:
Think of ten in two ways – as one ten and as ten ones
Compose and decompose numbers in a variety of ways and discover how to use this information when adding and subtracting.
Develop strategies for determining sums and differences when adding and subtracting one and two-digit numbers.
Describe and explain solutions clearly and effectively.

What Is My Shortest Name?

The teacher asks students to record the "shorter name" for the number clues given. For example:

"I have one ten and three ones?" (13)
"I have one ten and four plus four ones." (18)
"I have one ten and no ones." (10)
"I have two tens and six ones." (26)
"I have nine ones and three tens." (39)
I have twelve ones and one ten. (22)
"I have seventeen ones and three tens." (47)

This activity gives the opportunity for students to:
Think of ten in two ways – as one ten and as ten ones
Compose and decompose numbers in a variety of ways and discover how to use this information when adding and subtracting.
Develop strategies for determining sums and differences when adding and subtracting one and two-digit numbers.
Describe and explain solutions clearly and effectively.

Menu

The following menu activities are designed to be introduced during a directed instructional time but done by students independently in pairs or pair partners. Provide multiple opportunities for students to practice these planned and focused activities. After students fully understand how to do a task they will be ready to benefit from the experience. At that point, children deepen their conceptual understanding of the activity and teachers have the opportunity to observe and listen to student thinking. Important formative assessment information can be garnered at this time.

As stated earlier, each classroom is unique and the implementation of these menu activities may vary. What is important is that students learn the routine of the activity and have multiple opportunities to practice each experience in order to internalize the concepts and build confidence, accuracy, and consistency.

Menu Activities

How Many Are Hiding?

This partner game gives students practice in composing and decomposing numbers within ten. It can be played using any small counting objects (chips, small stones, etc.) and a cup to hide some of the objects. This deep work with small numbers is "key" to effective counting methods, to place value, and to addition and subtraction strategies.

If possible, the teacher should individually assess children before playing the game. Start with three or four objects and ask the student to verify how many are on the table. Ask the student to close their eyes and then the teacher hides some of the counters under the cup. The student should be able to quickly and confidently identify how many objects are hiding by viewing the number showing. If the student shows mastery of this number (e.g. can identify all of the possible combinations without counting) increase the number by one until the student reaches the number where they need additional practice.

Students may be partnered with someone working on the same number. Students take turns hiding counters and identifying how many are missing. Students are encouraged to justify their answers.

Extensions:
Students may be asked to fill in a recording sheet that indicates how many counters can be seen and how many are hiding. (Appendix 2)
Students may be asked to check in with the teacher when they feel they are ready to move on to a larger number.

This activity gives the opportunity for students to:
Compose and decompose numbers in a variety of ways and discover how to use this information when adding and subtracting.
Describe and explain solutions clearly and effectively.

Which Is Greater (Which Is Less)?

This is a partner card game played with a deck of ten-frame playing cards. It gives students practice in recognizing ten-frames and developing fluency in combining numbers within twenty.

The game is played as follows:
Divide the cards into two stacks, face down.
Players determine if they are looking for the card that is greater or the card that is less (this may be decided by the teacher).
Players each turn over one card from the stack at the same time.
The player with the larger (smaller) number says, " ___ is greater (less) than____."
Players may keep their own cards or the player with the "winning card" may collect both.
Play continues until all of the cards have been turned over.
Students are encouraged to justify their greater (lesser) number.

Extensions:
Players turn over two cards at a time and compare the sums.
Play with a deck of numeral dot cards or number cards.

This activity gives the opportunity for students to:
Think of ten in two ways – as one ten and as ten ones
Compose and decompose numbers in a variety of ways and discover how to use this information when adding and subtracting.
Develop strategies for determining sums and differences when adding and subtracting one and two-digit numbers.
Describe and explain solutions clearly and effectively.

Find Tens

Using a deck of dot numeral cards (4 each of 1-9 cards) students turn over nine cards and display them in a 3x3 grid. The first player selects all the pairs of cards that total ten and collects those cards. The missing cards are replaced from the deck and the second player finds all the pairs of two cards that total ten. Those missing cards are replaced, and play continues until combinations of ten can no longer be made. Students are encouraged to justify their selections. Students record their pairs of numbers that equal 10.

Variation:
Students may find totals of 10 using 2 or more cards.

This activity gives the opportunity for students to:
Compose and decompose numbers in a variety of ways and discover how to use this information when adding and subtracting.
Develop strategies for determining sums and differences when adding and subtracting one and two-digit numbers.
Describe and explain solutions clearly and effectively.

How Many More?

Materials:
How Many More game board (Appendix 2)
Game markers (different kind for each pair)
cards (4 each of cards 1-6) (Appendix 2)
paper for recording equations

This activity is played by two pairs of partners. Using the How Many More game board, the first pair pulls a card to determine how many more are needed to make 10. The pair places a marker on a dot pattern that represents the missing amount. Example: If a 2 is drawn from the cards, 8 is needed to make 10. The pair then places one of their markers on one of the 8 patterns on the game board. Pairs are required to say the math fact aloud for each turn. In this case, the pair might say, $2 + 8 = 10$ or $10 – 2 = 8$.
The partner pairs alternate turns following this procedure. The first pair to place three of their markers in a row horizontally, vertically, or diagonally wins.

Extension:
The game board can remain the same but students would use cards 5- 10 in order to find How Many More to make 14.

This activity gives the opportunity for students to:
Think of ten in two ways – as one ten and as ten ones

Compose and decompose numbers in a variety of ways and discover how to use this information when adding and subtracting.
Develop strategies for determining sums and differences when adding and subtracting one and two-digit numbers.
Describe and explain solutions clearly and effectively.

Individual post-assessment work (15-20 minutes)

Finally, reissue the Assessment task, ***Maria's Piggy Bank***, and ask student to have another go at it. It is helpful if this is done in a different color, so that you can see what they have learned. This will help you monitor what has been gained from the lesson.

Maria's Piggy Bank

1. Maria's piggy bank fell off her desk and broke! There are pennies, nickels and dimes everywhere. Maria needs 25 cents to buy ice cream. What coins could she use to pay the 25 cents? Show your answer using pictures, numbers and words.

2. Show a different combination of coins that Maria could use.

3. Are there other ways to make 25 cents? _____
Show the other ways that you can make 25 cents.

Mathematics Assessment Collaborative

PERFORMANCE ASSESSMENT SCORING GUIDE GRADE 1

	Maria's Piggy Bank Grade 1:	Points	Section Points
	The core elements of the performance required by this task are: • Use operations to solve problems • Understand and apply properties of numbers • Compose and decompose numbers in flexible ways Based on these credit for specific aspects of performance should be assigned as follows		
1	Shows a combination of coins to make a total of 25 cents **25 pennies or** **5 nickels** **2 dimes and one nickel** **2 dimes and five pennies** **1 dime and 3 nickels** **1 dimes, one nickel and 10 pennies** **etc.**	**3**	**3**
2	Shows an alternate correct solution for a total of 25 cents **25 pennies or** **5 nickels** **2 dimes and one nickel** **2 dimes and five pennies** **1 dime and 3 nickels** **1 dimes, one nickel and 10 pennies** **etc.**	**3**	**3**
3	Yes Shows 3 or more additional ways Shows 2 additional ways Shows one additional way	**1** **3** **(2)** **(1)**	**4**
	Total Points		**10**

Appendix 1

Sharing Strategies and Solution Paths Around Number, Operations and Place Value

The focus of this formative assessment lesson is to have students deepen their conceptual understanding of our base-ten number system and to use this understanding to add and subtract accurately and efficiently. In order for children to learn, understand, and remember, they need time interacting with ideas, thinking about where these ideas fit in relation to what they already know, uncovering the logic, and then applying it to their thinking around these ideas. Explaining their reasoning helps to solidify and extend their understanding.

As such, correct and incorrect ideas should be accepted during the discussion of strategies and solution paths. Students and teachers need to respectfully accept correct and incorrect responses during mathematical discussions. It is important to establish a classroom atmosphere where students feel safe to share their ideas. Students should be guided to understand that learning can occur even when a response is incorrect. Questions are posed by the teacher and by students that will move all towards the underlying mathematics that determines the correctness of answers.

When learners are first introduced to sharing their strategies and solution paths, it is important to explain the purpose and to describe how they should work during these discussion times. The emphasis is on understanding. We need to think and talk about problems to solidify our learning. In order for all to benefit from these sharing of ideas, we need to remember these things:

- We share ideas and listen to others.
- We ask “why does this work” until we understand.
- We respect one another’s opinions.
- We know that we learn from mistakes as well as from correct answers.
- Our goal is for the students, the teacher and the mathematics to agree in the end.

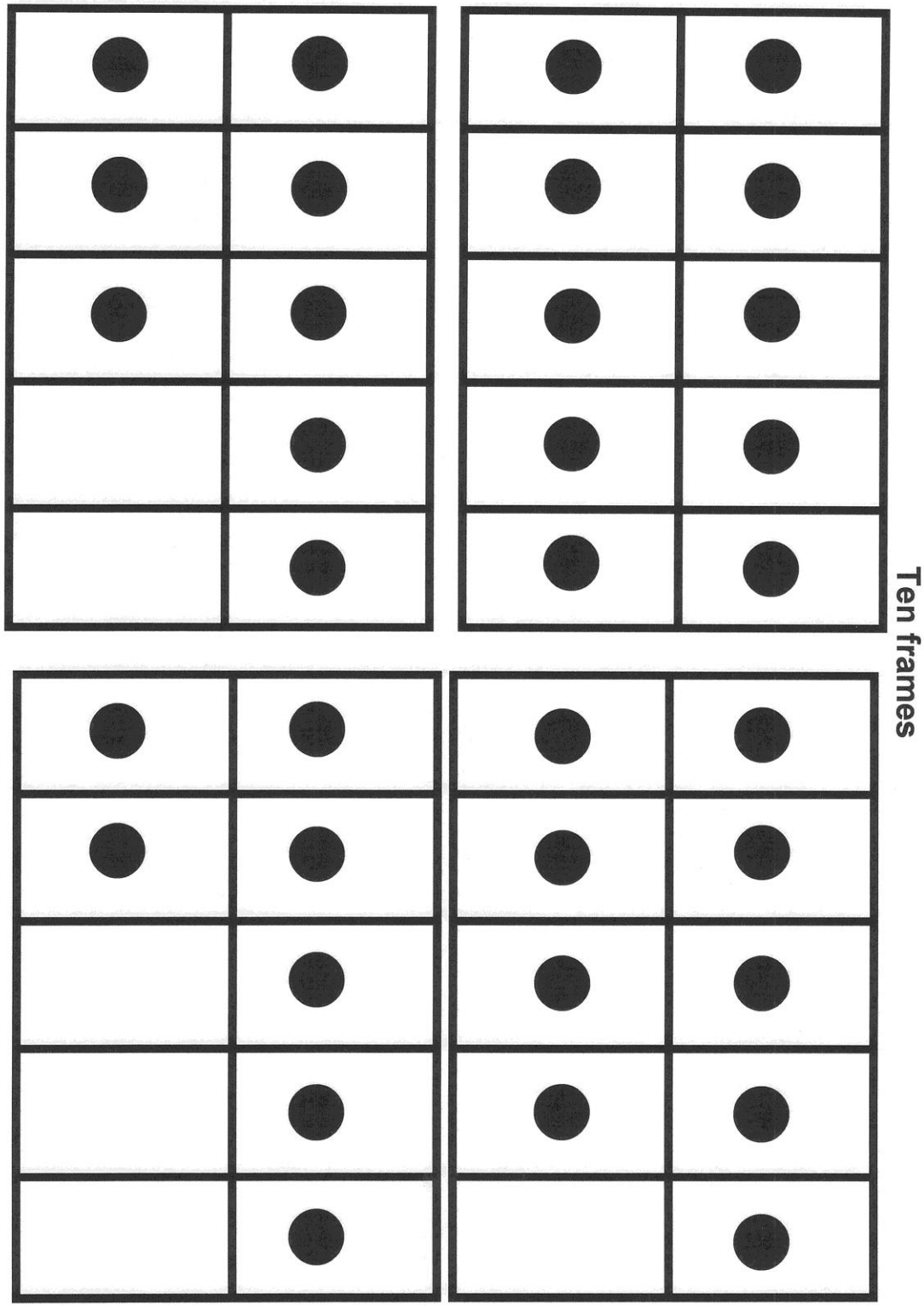
The table that follows includes some common issues confronted when students begin sharing their thinking around place value, number and operations. The suggested questions and prompts are a beginning list that will grow as you work with students to understand and make sense of the mathematics. As you start the sharing of ideas, do so by asking one or two types of questions. This gradual implementation is important for students as well as for their teachers.

Common Issues	Suggested Questions and Prompts
Warm-up Activities	
Quick Look With Ten-Frames and Roll That Dice	
Students are unable to respond after seeing the ten-frame for a short time.	When this activity is first introduced it may be necessary to give students a "second look" and allow them to view the card for a longer period of time. Give students enough time so that individuals do not "shutdown" and feel that they do not have access to the problem. *MP7 Look for and make use of structure.*
Students shown two ten-frames know the names but may be unable to think of the total number of dots as tens and extras.	Use the base ten language (i.e. one ten and four ones) showing the base ten model and also the standard language (fourteen). Emphasize that the teens sound "backwards" and do not fit the patterns of larger counting numbers. *MP4 Model with mathematics.* *MP 7 Look for and make use of structure.*
Students hold up varied answers on their white boards to totals of two ten-frames. Students hold up different numbers of fingers after seeing the dice roll.	The teacher may say: "will someone share how they are thinking about their answer?" or "will someone share with us how you found the total number of dots?" The teacher may say, "I see 3, 4, 5 and 6 fingers. Could all of those answers be correct?" Then ask different students, "tell us how you saw the number." *MP3 Construct viable arguments.*
When asked to explain their thinking, a student might say something like, "I just thought of it."	The teacher may say to that student or to another, "can you show us why that answer makes sense?" or, "would you use this picture of ten-frames (or a drawing or objects) to show us why your answer makes sense?" *MP3 Construct viable arguments and critique the reasoning of others.*
Rename That Number and What Is My Shortest Name?	
Students have a limited number or no responses. Only a few of the students in the class are sharing their solutions and justifications	Allow quiet think time and then suggest: "turn to one other person and share your answer and how you thought about it." Then prompt: "let's list some of the answers you heard". Then ask, "let's share how these answers make sense." Ask, "who thought of it in a similar way?" "Who thought of it in a different way?" or "Does anyone have the same answer but a different way to explain it?" *MP3 Construct viable arguments and critique the reasoning of others.*
Answer error	It is important to ask these questions frequently and not just for answers in error:

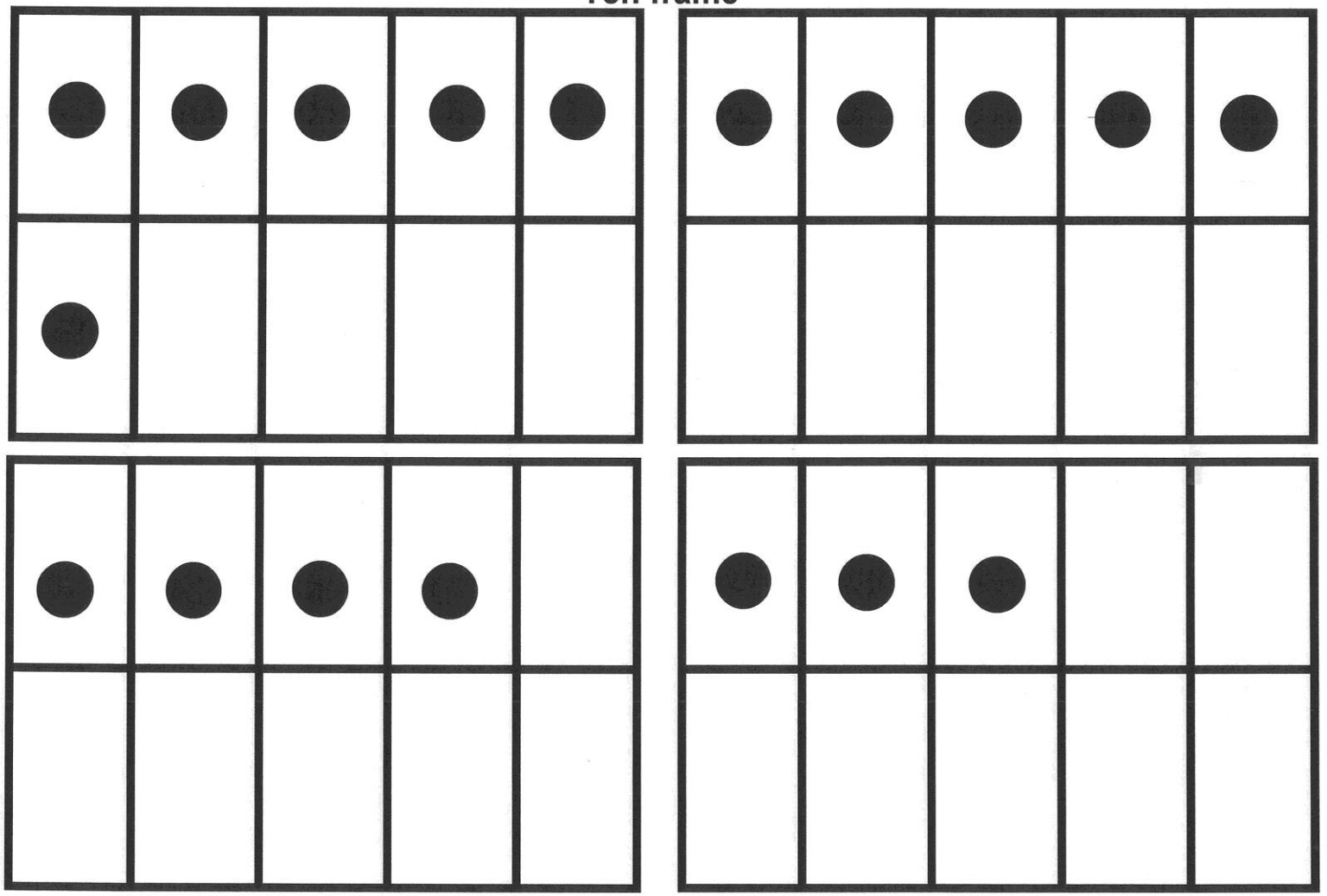
	"Do you agree or disagree with this?" "Why?" "What might a model or drawing for that look like?" "Can someone make a model or drawing for that?" *MP3 Construct viable arguments and critique the reasoning of others.* *MP4 Model with mathematics.*
Menu Activities	
How Many Are Hiding?	
No response from student when asked how many are hiding, or, the student makes an unreasonable response to the number hiding.	The number is too big and the child cannot visualize how many are hiding. Try using the next smaller amount of counters. *MP4 Model with mathematics.* *MP 7 Look for and make use of structure.*
The response is close but not correct, or, the student thinks long about what's hiding and figures out the correct answer by counting each object.	Shows some understanding of the parts of the number but needs more practice with that number of counters. *MP4 Model with mathematics.* *MP 7 Look for and make use of structure.*
The student responds quickly and accurately.	The parts of the whole have been internalized and student is ready to work on the next larger amount of counters. *MP4 Model with mathematics.* *MP 7 Look for and make use of structure.*
Which Is Greater? (Which Is Less?)/ Find Tens/How Many More?	
When using ten-frames a student does not easily recognize the amount of dots.	Students may be more successful using the referent of 5 before they can internalize the 10 in the ten-frame.
The pair, or pairs of partners, has trouble getting started.	"What do you need to find out?" "What do you already know?" "How might you begin?" *MP4 Model with mathematics.* *MP 7 Look for and make use of structure.*
The student names the correct answer but does not justify the answer.	"Tell us how you thought about that answer. Can you use these counters to prove your answer?" "Do you think your answer is reasonable?" Or Ask the partner to respond, "do you agree/disagree with ____'s answer? Can you explain why you agree/disagree with that answer?" "Can you convince me that the answer makes sense? *MP3 Construct viable arguments and critique the reasoning of others.* *MP4 Model with mathematics.* *MP 7 Look for and make use of structure.*
The student names an incorrect answer.	"Tell us how you thought about that answer. Can you use these counters to prove your answer?" Or Ask the partner to respond, "do you agree/disagree with ____'s answer? Can you explain why you agree/disagree with that answer?" "Can you convince me that the answer makes sense?" *MP3 Construct viable arguments and critique the*

	reasoning of others. *MP4 Model with mathematics.* *MP 7 Look for and make use of structure.*
The teacher wants to know more about what the student is thinking about the activity in general.	"What strategy are you using to solve this?" "What patterns do you see?" "What relationships between the numbers do you see?" "Why did you…?" *MP3 Construct viable arguments.* *MP 7 Look for and make use of structure.*

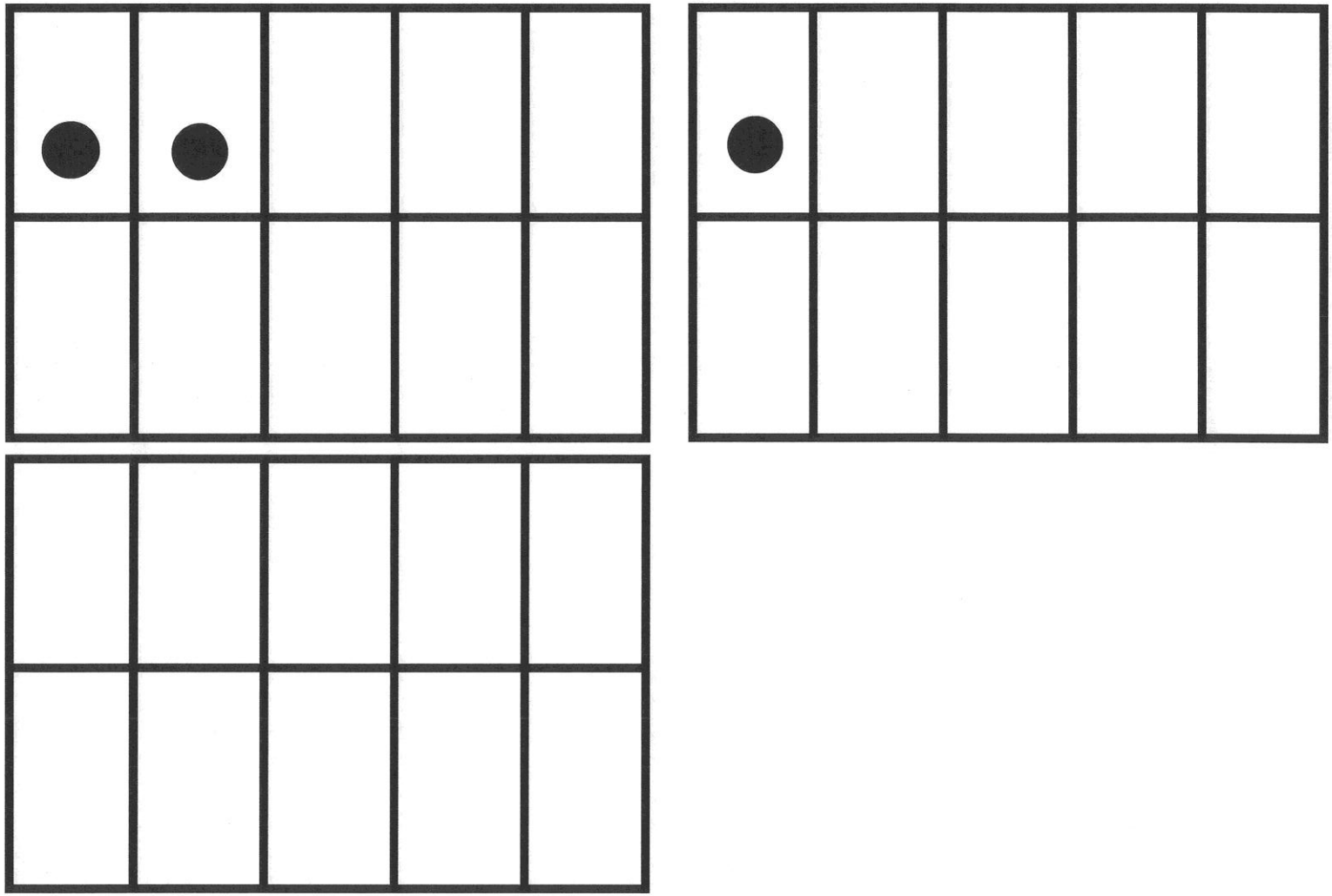
Appendix 2



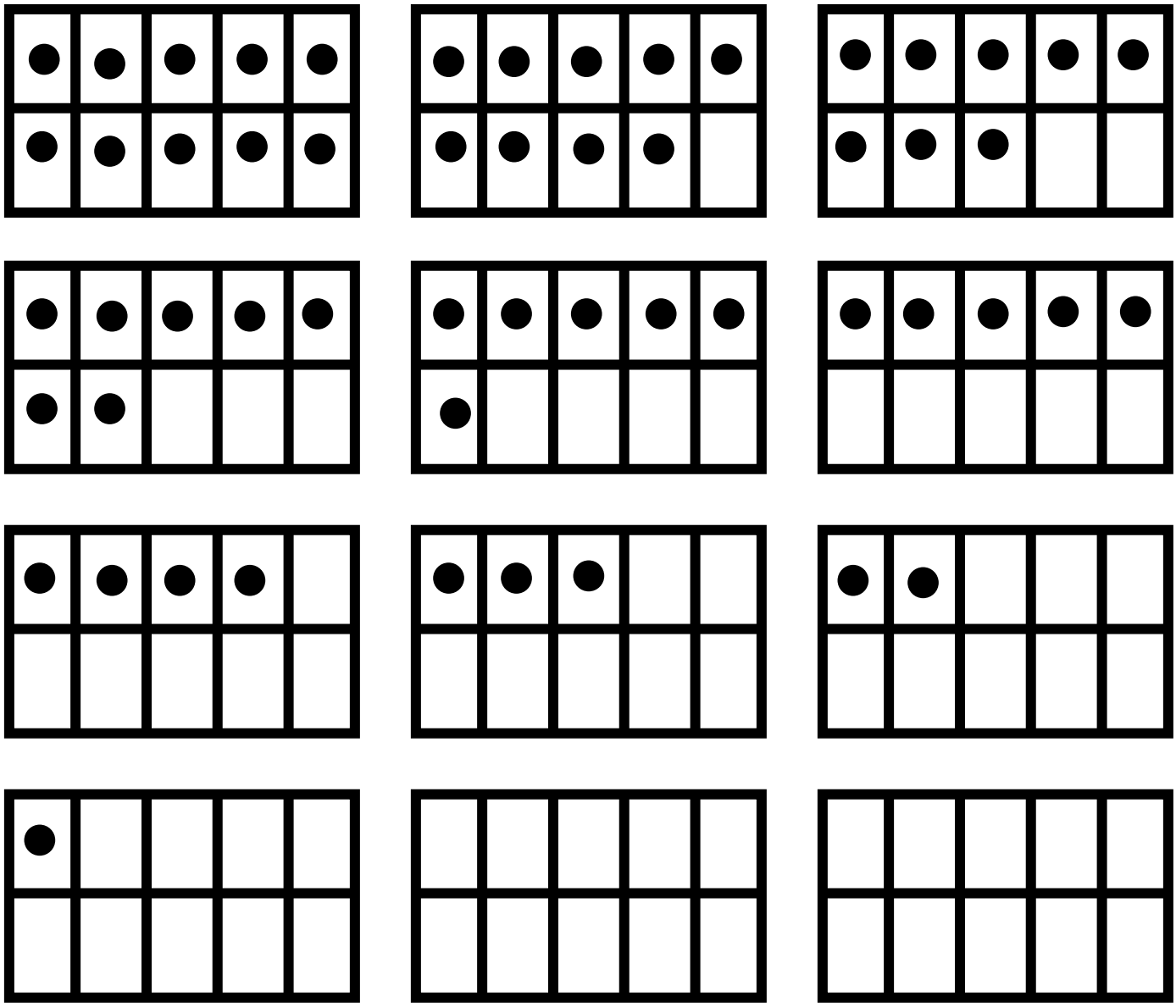
Ten frame



Ten frame



Ten Frames



Numeral Dot Cards

1	2 	3 	4 	5 
6 	7 	8 	9 	10 

How Many Are Hiding?

Game 1
Number in all _____

Hiding	Out

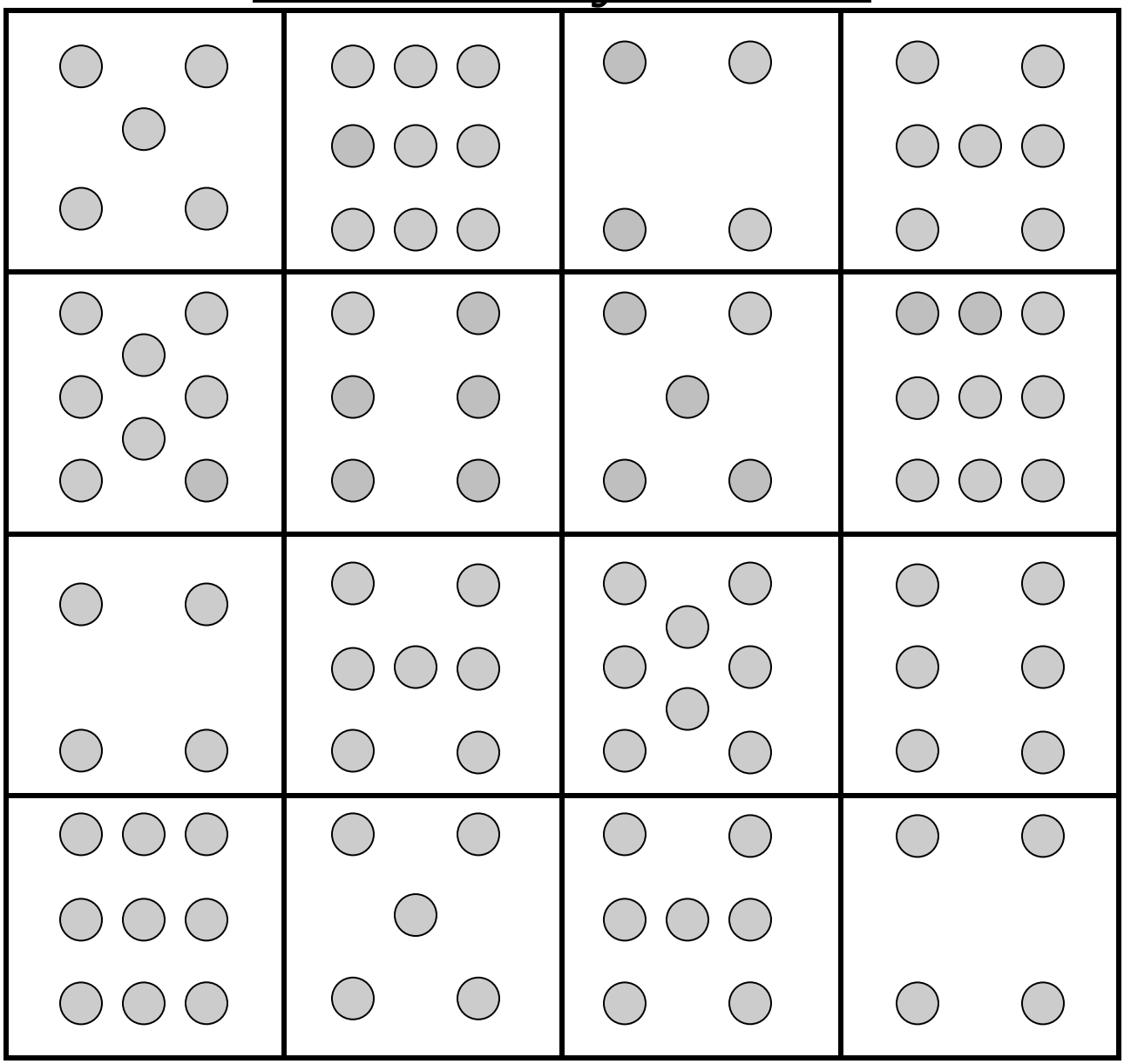
How Many Are Hiding?

Game 2
Number in all _____

Hiding	Out

How Many More? Game Board

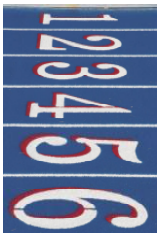
How Many More?



COMMON CORE-ALIGNED TASK
WITH INSTRUCTIONAL SUPPORTS

Mathematics

GRADE 1 MATH: NINA'S NUMBERS
INVESTIGATION: FORWARDS AND BACKWARDS



Investigation
Forwards and Backwards

Level A

Materials: A set of block or counters for each pair, pencil and paper.

Discussion on the rug: Teacher shows the pattern blocks. "How can we add to 4? Who can tell me a number sentence that adds up to 4?" Teacher asks a student and records the students' number sentences. "Who knows a different way to add to 4?" Teacher continues to ask children to find different number sentences. "Have we found every way? How will we know when we are done?" Students share their thoughts.

In small groups: Each group has a set of blocks or counters. "How many ways can you add to get an total of 8? Show me all your number sentences."

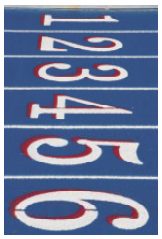
At the end of the investigation have students write all their numbers sentences. Have them answer the following questions:

"How did you find all the ways to add to 8?"

"Do you think you found every way?"

"How many ways are there?"

"Why do you think you know you found them all?"



Investigation

Forwards and Backwards

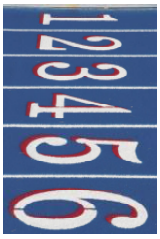
Level B

Find and list all the ways you can add two counting numbers to equal 12. The order that numbers are added doesn't matter in whether two number sentences are the same.

What patterns do you see in the number sentences?

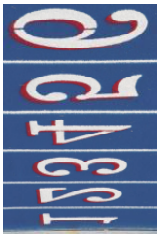
How do you know you have found all possible number sentences? Explain.

Find and list all the ways you can add three counting numbers to equal 12.



Investigation

Forwards and Backwards



Level C

Pick any 2-digit number where not all the digits are equal. Order the digits from highest to lowest to create the largest number. Next order the digits from lowest to highest to create the smallest number. Find the positive difference between the two numbers. Investigate different solutions you find. Are there patterns? If so, what patterns did you find.