



EVALUATING STUDENTS' DIGITAL WORK: SAME AS PRINT?

NCTM Conference
April 7, 2017

Ellen Dairyko
edairyko@uchicago.edu

Carla Strickland
castrickland@uchicago.edu

Catherine Donaldson
catherine.donaldson@mheducation.com

UChicago STEM Education
UNIVERSITY OF CHICAGO
<http://stemeducation.uchicago.edu/>

WELCOME!



UCHICAGO
STEM EDUCATION

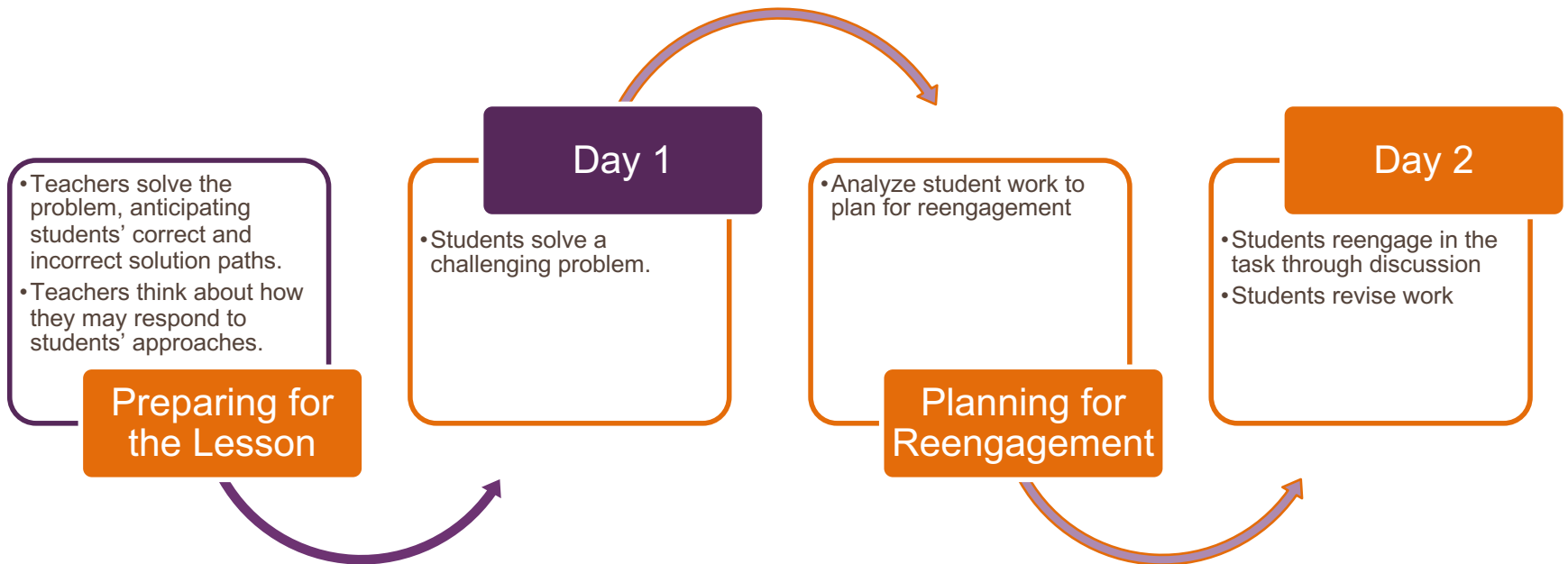
Goals

- Identify mathematically significant similarities and differences between print and digital student work.
- Propose revisions to an Open Response Task rubric that better accommodates digital student work.

Open Response and Reengagement Protocol

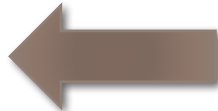


UCHICAGO
STEM EDUCATION





Open Response and Reengagement: Planning for Day 1

	Notes
Standards for Mathematical Practice • What Standard(s) for Mathematical Practice (SMP) will you highlight throughout this task? • What will be your expectations of students with regards to the focus SMP(s)? • How will students demonstrate they have met those expectations?	
Standards for Mathematical Content • What mathematical content is embedded in this task? • How does this task build on and extend students' previous experience with this mathematical content? • How will you introduce the task?	
Solving the Task and Anticipating Student Responses, Challenges, and Misconceptions • Solve the task in as many different ways as you can, anticipating students' solution paths. • What successes might your students have as they solve the problem? • What might they find challenging? • What misconceptions might they demonstrate?	
Supports and Grouping Structures • What ideas do you have to support your students as they solve the task, while still allowing room for productive struggle? • How might you group your students for the introduction of the task? • How might you group your students to solve the task?	

Task 1: Subtracting with Base-10 Blocks (G2)



Using Base-10 Blocks to Represent Subtraction

Lesson 6-9

NAME

DATE

One day the bakers make 53 dinner rolls. They sell 38 of the rolls that day. How many rolls do they have left over?

Solve the problem using base-10 blocks. Draw a picture to show how you used the blocks and write an explanation of how you solved the problem.

1. Half of each group will use paper and pencil.
2. Half of each group will work digitally.

Discussion



- Compare your experiences between working with the print and digital task.
- Turn and talk:
 - What are some similarities you noticed?
 - What are some differences you noticed?

Open Response and Reengagement Rubric



U CHICAGO
STEM EDUCATION

(Task 1: Subtracting with Base-10 Blocks)

Goal for Mathematical Practice	Not Meeting Expectations	Partially Meeting Expectations	Meeting Expectations	Exceeding Expectations
GMPS.2 Use tools effectively and make sense of your results.	Does not provide an explanation in words or in a drawing of a strategy for representing the subtraction problem using base-10 blocks.	Provides an incomplete explanation of a strategy for representing the subtraction problem using base-10 blocks that may include words, a drawing, or both. OR Provides an explanation that includes contradictions between the words and drawing.	Provides a complete explanation of a strategy for representing the subtraction problem using base-10 blocks that includes either words or a drawing, or possibly a combination of the two. (Note: If the strategies are different between the two representations, but at least one is complete and does not contradict the other, the work meets expectations.)	Meets expectations and provides a complete explanation both in words and in a drawing, each showing a strategy for representing the subtraction problem using base-10 blocks. (Note: If the strategies are different between the two representations, and each one is complete and does not contradict the other, then the work exceeds expectations.)

Getting Ready for Day 2



UCHICAGO
STEM EDUCATION

Getting Ready for Day 2

Math Masters, p. TA5

Planning a Follow-Up Discussion

Review children's work. Use the Reengagement Planning Form (*Math Masters*, page TA5) and the rubric on page 586 to plan ways to help children meet expectations for both the content and practice standards. Look for common misconceptions in children's use of base-10 blocks as well as a variety of successful subtraction strategies.

Look for trends in children's work. Think about how they used base-10 blocks in their solutions.

Getting Ready for Day 2



UCHICAGO
STEM EDUCATION

Planning the Reengagement Discussion

Issue to address	Work samples that illustrate this issue	Questions to ask about the sample student work



Student Work Discussion

- What do you notice about children's understanding of subtraction with base-10 blocks?
- Are there differences that you notice between print and digital work samples?
- What might be some topics for reengagement lessons?



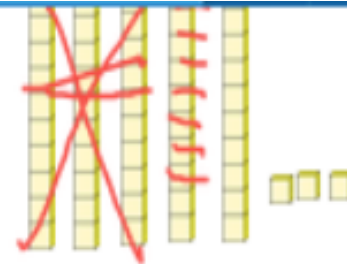
Student A Work

One day the bakers make 53 dinner rolls.

They sell 38 of the rolls that day.

How many rolls do they have left over?

Solve the problem using base-10 blocks.



15 rolls
I started at 53 and I crossed out 30 then 8 and I had to on the ~~ten~~ ten I crossed off of, it had two blocks left and a ten and 3 so it was 15.

Student B Work

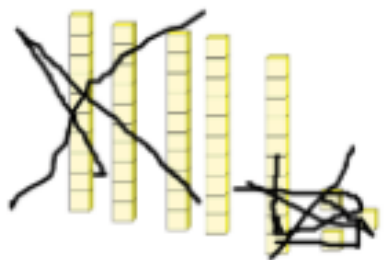


[← Back To Activity](#)[Quick Entry](#)[Digital Activity](#)[Refresh](#)[Settings](#)

Solve the Problem and Revise: Using Base-10 Blocks to Represent Subtraction

Screen 1

One day the bakers make 53 dinner rolls.
They sell 38 of the rolls that day.
How many rolls do they have left over?
Solve the problem using base-10 blocks.



I got 53 blocks I took away 38 of them and I got 15 rolls
those 5 on the base ten are still in it they are cubes

Activity Kit

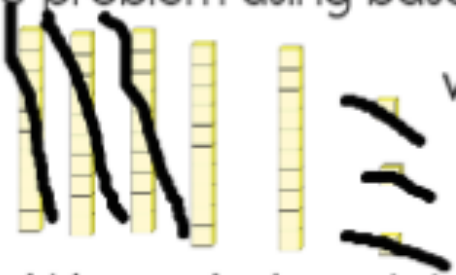
Student C Work



← Back To Activity Quick Entry Digital Activity Refresh Settings

Solve the Problem and Revise: Using Base-10 Blocks to Represent Subtraction

They sell 38 of the rolls that day.
How many rolls do they have left over?
Solve the problem using base-10 blocks.

 what?!

We can't show it in base ten blocks because there's not enough ones because there's only three and we have to do eight. But we can show it on a open number line.

Activity Kit

Student D Work



← Back To Activity

Quick Entry

• Digital Activity

↻ Refresh

⚙ Settings

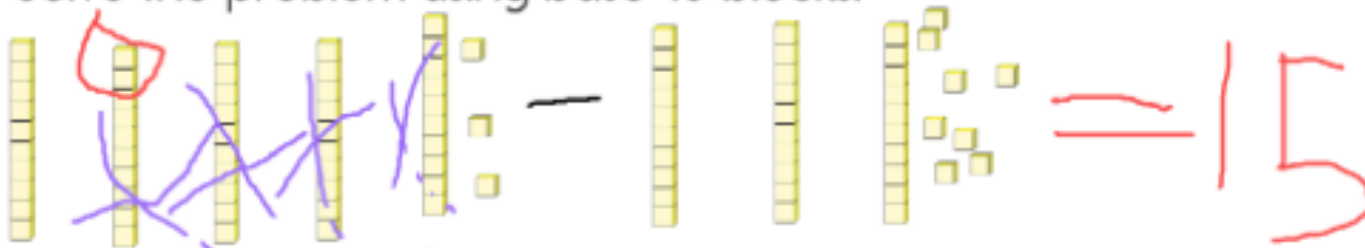
Solve the Problem and Revise: Using Base-10 Blocks to Represent Subtraction

Screen 1

EVALUATION



One day the bakers make 53 dinner rolls.
They sell 38 of the rolls that day.
How many rolls do they have left over?
Solve the problem using base-10 blocks.



first I started at 53. then I did -38.
finally I got 15



Activity Kit



100%



Student E Work



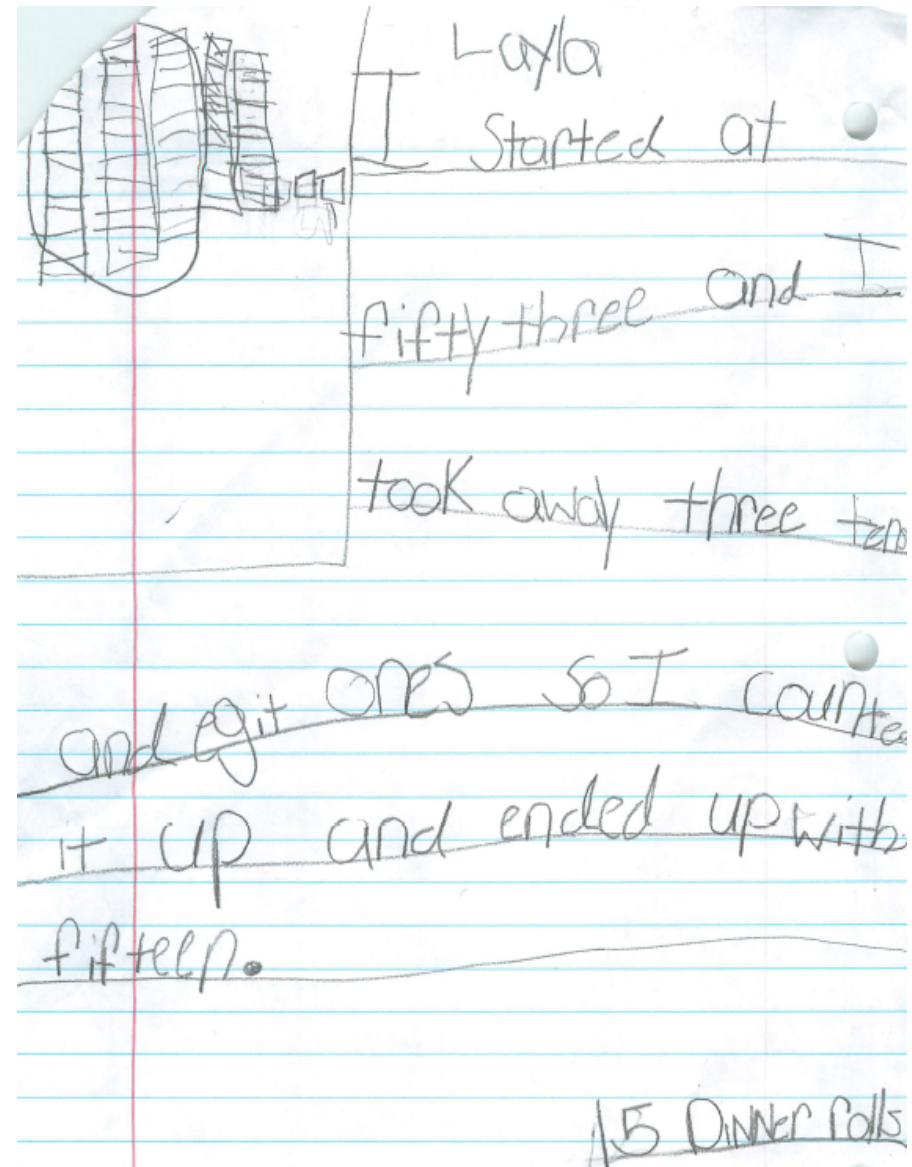
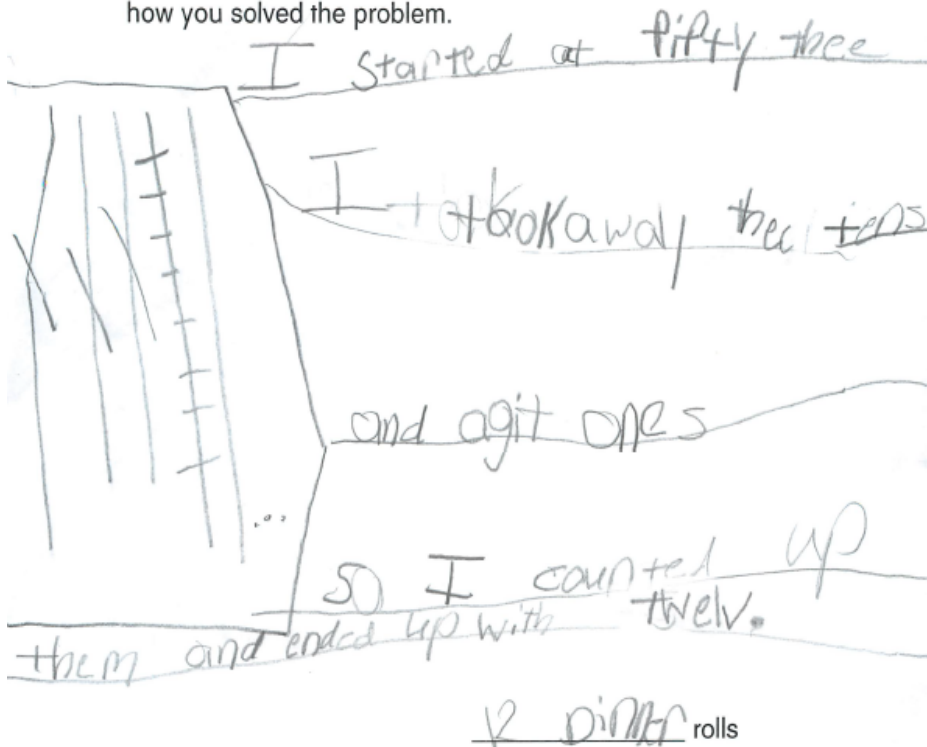
UCHICAGO
STEM EDUCATION

Name Layla Date _____

Lesson 6-9 Using Base-10 Blocks to Represent Subtraction

One day the bakers make 53 dinner rolls. They sell 38 of the rolls that day. How many rolls do they have left over?

Solve the problem using base-10 blocks. Draw a picture to show how you used the blocks and write an explanation of how you solved the problem.



Student F Work



UCHICAGO
STEM EDUCATION

Name Amey Date _____

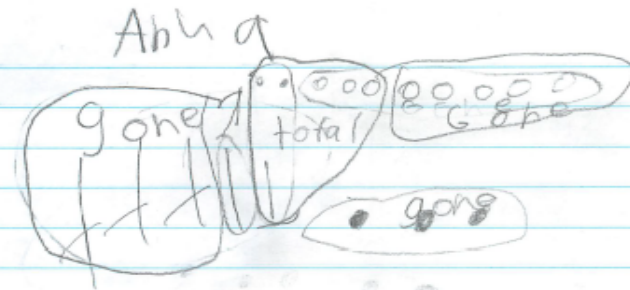
Lesson 6-9 Using Base-10 Blocks to Represent Subtraction

One day the bakers make 53 dinner rolls. They sell 38 of the rolls that day. How many rolls do they have left over?

Solve the problem using base-10 blocks. Draw a picture to show how you used the blocks and write an explanation of how you solved the problem.

I started with 5 longs and 3 cubes. I took away 3 longs and 8 cubes and I got the total of 16.

16 rolls



I started with 53 rolls and 3 cubes. I put a gone box for three tens. I took away 3 cubes and 5. I took one ten and split it into 10 cubes and took away 5 more and got the total of 15 rolls.

15 Rolls



Student Work Discussion

- What did you notice about children's understanding of subtraction with base-10 blocks?
- Were there differences that you noticed between print and digital work samples?
- What might be some topics for reengagement lessons?

Switch Gears...



Open Response and Reengagement: Planning for Day 1

	Notes
Standards for Mathematical Practice - Teachers solve the problem, anticipating students' correct and incorrect solution paths. - Teachers think about how they may respond to student work. Day 1 - Students solve a challenging problem. Preparing for the Lesson - What mathematical content is embedded in this task? - How will you extend students' previous experience with this mathematical content? - How will you introduce the task?	Day 2 - Students reengage in the task through discussion - Students revise work Planning for Reengagement - Analyze student work to plan for reengagement
Solving the Task and Anticipating Student Responses, Challenges, and Misconceptions - Solve the task in as many different ways as you can, anticipating students' solution paths. - What successes might your students have as they solve the problem? - What might they find challenging? - What misconceptions might they demonstrate?	
Supports and Grouping Structures - What ideas do you have to support your students as they solve the task, while still allowing room for productive struggle? - How might you group your students for the introduction of the task? - How might you group your students to solve the task?	

Task 2: Queen Arlene's Dilemma (G4)



UChicago
STEM EDUCATION

Queen Arlene's Dilemma

Lesson 5-6		
NAME	DATE	TIME

- ① Queen Arlene has a problem. She wants to divide her land among her 3 daughters. She wants her oldest daughter to get $\frac{1}{2}$ of the land and her 2 younger daughters to each get $\frac{1}{3}$ of the land. Can she do it? _____

Use diagrams and words to explain your answer.

- ② After thinking about it, Queen Arlene decides to keep $\frac{1}{2}$ of her land and have her 3 daughters divide the other $\frac{1}{2}$. She still wants her oldest daughter to get more land than the 2 sisters. Think of a way to use fractions to divide the land.

a. Show a diagram of your answer.

b. Write a fraction addition equation for your answer.

1. Half of each group will use paper, pencil and fraction circle pieces.

2. Half of each group will work digitally.



Discussion - Task 2

Queen Arlene's Dilemma

- Compare your experiences between working with the print and digital task.
- Turn and talk:
 - What are some similarities you noticed?
 - What are some differences you noticed?

Anticipating Adjustments to the Open Response and Reengagement Rubric (Task 2: Queen Arlene's Dilemma)



U CHICAGO
STEM EDUCATION

Goal for Mathematical Practice	Not Meeting Expectations	Partially Meeting Expectations	Meeting Expectations	Exceeding Expectations
GMP2.2 Make sense of the representations you and others use.	Does not meet either requirement under Meeting Expectations.	Meets one of the requirements under Meeting Expectations.	For Problem 1, provides a diagram and explanation showing that the queen's plan won't work because it requires more land than she owns. And for Problem 2, provides a fraction addition equation that clearly matches the whole and the fractional parts shown in the diagram.	Meets expectations and for Problem 2, uses words to describe or explain how the diagram shows the queen getting $\frac{1}{2}$ of the land and the oldest daughter getting more than each of her sisters.

- What would be your expectations for visual representations with digital materials? Be specific.
- How might these expectations change the criteria for Meeting Expectations?

Wrapping Up



UCHICAGO
STEM EDUCATION

Reflection:

- What are some takeaways regarding Print and Digital student work?
 - For Planning
 - For Formative Assessment
- How might you share your learning with your colleagues?





EVALUATING STUDENTS' DIGITAL WORK: SAME AS PRINT?

NCTM Conference
April 7, 2017

Ellen Dairyko
edairyko@uchicago.edu

Carla Strickland
castrickland@uchicago.edu

Catherine Donaldson
catherine.donaldson@mheducation.com

UChicago STEM Education
UNIVERSITY OF CHICAGO
<http://stemeducation.uchicago.edu/>