Making Sense of Integer Operations:
Contexts, Tasks, and Models
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Introductory Context (Gregg & Gregg, 2007)

Mrs. Brady gives her children a monthly allowance based on whether or not they complete their assigned chores during the month. She gives them a +1 chip worth $1 for each chore completed and a -1 chip for each chore they fail to complete. She records these on a credit-debit board on the refrigerator. At the end of the month, she figures the amount each child should receive (or the amount they owe, if they have more debits than credits).

Task 1: Find the value of each board:

Debbie's Board													
Credits	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1			
Debits	-1	-1	-1	-1	-1								

Mike's Board													
Credits	+1	+1	+1	+1	+1	+1							
Debits	-1	-1	-1	-1	-1	-1	-1	-1					

Rachel's Board													
Credits	+1	+1	+1	+1	+1	+1	+1	+1	+1				
Debits	-1	-1	-1	-1	-1	-1	-1	-1	-1				

Building Further in this Context:

Task 2: Write a number sentence for computing the result in each of the following situations:

- Sam's credit-debit board showed a net value of +4 on Monday morning. As a reward for getting an A on his spelling test, Mrs. Brady removed -2 in debits. What value does his board show after this change?
- Becca's board showed a value of -1 on Tuesday morning. At the end of the day, her board was worth +3. What change (or changes) did Mrs. Brady make on Tuesday?
- On Wednesday evening, Mrs. Brady added -3 in debits to Quigley's board, making its new value +8. What was its value before this change?

Board												
Credits												
Debits												

Board												
Credits												
Debits												

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Credits												
Debits												

Board												
Credits												
Debits												

Types of Start-Change-Result (SCR) Problems:

•Start unknown

•Change unknown

•Result unknown

Task 3: Classify each of the previous problems according to what is unknown.

Task 4: Comparing Temperatures on a Number Line

State	**Record Low**	**Record High**
Hawaii	$15^{o}F$	$100^{o}F$
Missouri	$-40^{o}F$	$118^{o}F$

Use a number line model to find the difference in temperatures within each state. (How many degrees from the record low to the record high?)

Hawaii _____ Missouri _____

Task 5: Combining Multiple Changes

At the beginning of the month, Cara had $123.62 in her savings account. During the month, she made the following deposits and withdrawals (negative amounts indicate withdrawals): -20, +50, -40, +50, -20

a) What was the net change in her balance during the month?

b) What was her balance at the end of the month?

Task 6: A Constant Rate Problem

Water is flowing into a tank at a rate of 2 gallons per minute.

a) Compared to the amount in the tank now, how much would be in the tank after 6 minutes have passed?

b) Compared to the amount in the tank now, how much was in the tank 15 minutes ago?

c) When would there be 18 more gallons in the tank than there is now?

d) When would there be 24 gallons less in the tank than there is now?

Task 7: Negative Rate

Emily got a huge bag of M&Ms for Christmas. She wants them to last a long time, so she only eats 8 each day.

a) Compared to her M&M supply now, how much will she have 7 days from now?

b) Compared her current M&M supply, how much did she have 30 days ago?

c) How long would it take her M&M supply to drop by 40?

d) When did she have 200 more M&Ms than she has now?