

MeTEOR Performance Task

Seventh Grade

Mathematics
Modeling Integers

Performance Task Item: Modeling Integers

Grade Level: 7th grade

Focus Area: Adding and Subtracting Integers

Essential Question: What strategies can be used to add and subtract integers?

Core Ideas:

- Understands opposite numbers.
- Understands that the sum of positive and negative integers will be positive or negative or zero.
- Understands how to decompose and regroup numbers using chips to model the zero-sum property.
- Understands adding positive and negative rational numbers.
- Understands how to use number lines and manipulatives to add and subtract integers.

Learning Targets:

- Students will add opposite numbers and determine that their sum is always 0.
- Students will make conjectures about sums and differences of positive and negative numbers based on observed patterns.
- Students will develop an understanding of addition and subtraction as movement along the number line.
- Students will articulate the algorithm for adding and subtracting integers.

STANDARDS

Domain: Number System

Content Standards:

- Represent addition and subtraction on a horizontal or vertical number line diagram.
- Describe situations in which opposite quantities combine to make 0.
- Understand $p + q$ as the number located a distance $|q|$ from p , in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0.
- Apply properties of operations as strategies to add and subtract rational numbers.

Supporting Standard:

- Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers.

Math Practice Standards:

MP 1: Make sense of problems and persevere in solving them.

MP 3: Construct viable arguments and critique the reasoning of others.

MP 4: Model with mathematics.

MP 6: Attend to precision.

MP 7: Look for and make use of structure.

Materials:

- Performance Task
- Pencil
- Paper
- Number Line
- Two-Way counters or integer chips

Task/Question 1:

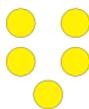
DOK Level 1: Recall & Reproduction

Math Practice Standards:

- MP 6: Attend to precision.
- MP 4: Model with mathematics.

For the Tasks Below, Yellow Chips are Positive (+) and Red Chips are Negative (-)

A. What integer is represented by the figure below?



B. What integer is represented by the figure below?



C. Draw a model using counters for the following expression: $-3 + 3$

D. Plot 3 and -3 on the number line below.

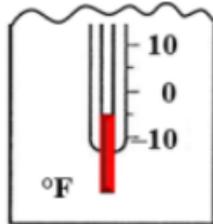


E. Evaluate $-3 + 3$:

Task/Question 2:**DOK Level 2:** Basic Application of Skills and Concepts**Math Practice Standards:**

- MP 1: Make sense of problems and persevere in solving them.
- MP 4: Model with mathematics.
- MP 6: Attend to precision.

- A.** What temperature would be 15° more than the temperature shown on the thermometer below?



- B.** Jim's cell phone bill is automatically deducting \$32 from his bank account every month. Write an integer that represents the total deductions for the year?

- C.** A submarine was situated 450 feet below sea level. If it descends 300 feet, what is its new position?

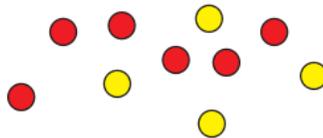
Task/Question 3:

DOK Level 3: Strategic Thinking and Complex Reasoning

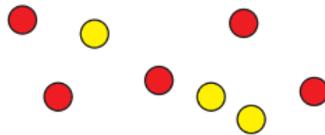
Math Practice Standards:

- MP 1: Make sense of problems and persevere in solving them.
- 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.

- A.** Red (negative) and yellow (positive) chips represent the sum of positive and negative numbers for the equation shown below. Write the two equations and the sum each represents:



- B.** Red (negative) and yellow (positive) chips represent the sum of positive and negative numbers for the equation shown below. Write the two equations and the sum each represents:



- C.** Explain why the expressions in Part A and Part B have the same sum.
- D.** Write another equation that has the same sum. Justify your reasoning using yellow (positive) and red (negative) chips.

Task/Question 4:

DOK Level 2: Strategic Thinking and Complex Reasoning

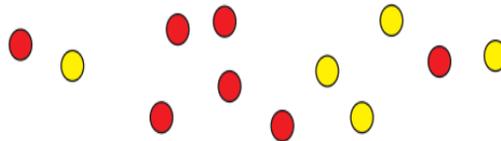
Math Practice Standards:

- MP 1: Make sense of problems and persevere in solving them.
- 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.

A. Represent each number in two different ways using positive (Yellow) and negative (Red) chips. Each representation must include *both* positive and negative chips.

Number	Chip Representation 1	Chip Representation 2
-5		
2		

B. Red (negative) and yellow (positive) chips represent the sum of positive and negative numbers. Explain why the figure below represents -2.



Task/Question 5:

DOK Level 3: Strategic Thinking and Complex Reasoning

Math Practice Standards:

- 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.

- A.** Explain $(-2) + 5$. Model using colored chips. Are you able to remove any? Why? Defend your thinking.
- B.** Explain $a + b$ if both a and b are positive numbers. Model using colored chips. Will the answer always be positive? Why? Defend your thinking.
- C.** Explain $(-a) + (-b)$ if $(-a)$ and $(-b)$ both represent negative numbers. Model using colored chips. Will the answer always be negative? Why? Defend your thinking.
- D.** Explain $2 + 8 + (-7)$. Model using colored chips. How does having three terms change the strategy you have been using to solve the other problems?

Task/Question 6:

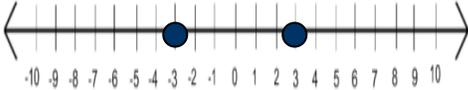
DOK Level 3: Strategic Thinking and Complex Reasoning

Math Practice Standards:

- 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.
- A.** Create an original scenario that incorporates a minimum of 10 transactions or events that would conclude with a **sum of 100**. Utilize both positive and negative integers within your transactions or events. Explain each transaction or event as positive or negative and how the sum was affected at that time. Be prepared to share and defend your scenario.

Complete Performance Task Scoring Rubric *Modeling Integers*

20-35 Proficient 14-19 Good 9-13 Satisfactory 5-8 Poor 0-4 Unsatisfactory

	Depth of Knowledge Level	Points	Total Possible Points for Task	Total Points Earned by Student
Task 1: A. 5 B. -9 C.  D.  E. 0	1	1 1 1 1	5	
Task 2: A. 10° B. -384 C. -750 feet below sea level	2	1 1 1	3	
Task 3: A. 4-6 and -6+4 (both equal -2) B. 3-5 and -5+3 (both equal -2) C. Answers will vary. Possible Explanation: They both have 2 more negative chips than positive chips. D. Answers will vary. Examples must add/subtract to create a solution of -2.	2	1 1 1 1	4	

<p>Task 4:</p> <p>A. Answers will vary. Chips must represent -5 and 2</p> <p>B. Answers will vary. Student should include zero pairs, and 2 red left over</p>	2	4 1	5	
<p>Task 5:</p> <p>A. Answers will vary. Total points for a viable answer.</p> <p>B. Answers will vary. Solutions will be positive -- all chips should be positive.</p> <p>C. Answers will vary. Solution will be Negative -- all chips should be negative.</p> <p>D. Models will vary. Solution should address combining like numbers.</p>	3	2 2 2 2	8	
<p>Task 6:</p> <p>A. Answers will vary. Student demonstrates ability to add and subtract a minimum of 10 positive and negative integers that evaluate to a total of 100. Student must explain each transaction as positive or negative.</p>	3	10	10	
TOTAL POINTS:				



meteoreducation.com . 800.699.7516

MeTEOR CONNECT, MeTEOR Education and MeTEOR Design are trademarks or registered trademarks of MeTEOR Education, LLC © 2019.

All rights reserved. PTMATH7.4