



Oregon Mathematics Assessment

Going Green Performance Task
Grade 3 Mathematics Sample Test
Scoring Guide
January 2017

Going Green

The “Go Green” company held a week-long recycling contest at your school. The grade that collects the most bottles and cans wins the contest.

Your task is to determine which grade won the “Go Green” contest.

The items that can be recycled are shown.



- Plastic bottles
- Aluminum cans
- Glass bottles

Students from the 3rd grade, 4th grade, and 5th grade classes collected bottles and cans and brought them to school.

Table 1 shows how many bottles and cans each grade collected on each day of the week.

Table 1. Bottles and Cans Collected

Class	Bottles and Cans Collected Each Day				
	Monday	Tuesday	Wednesday	Thursday	Friday
3rd Grade	50	60	90	120	90
4th Grade	70	90	100	50	80
5th Grade	80	80	80	80	80

1

Use **Table 1** to help you answer this question.

On which days did the 3rd grade class collect more cans and bottles than the other two grades? Select **all** that apply.

- Monday
- Tuesday
- Wednesday
- Thursday
- Friday

2

Use **Table 1** to help you answer this question.

On Tuesday, how many more bottles and cans did the 4th grade class collect than the 3rd grade class?

3

You are the contest judge. You need to figure out who won the contest. Did 3rd grade, 4th grade, or 5th grade win the "Go Green" contest?

Use words and numbers to clearly explain:

- which grade won the contest, and
- how you know they collected the most cans and bottles.

4

The 2nd grade class got excited about the "Go Green" contest and wanted to join in. They started collecting bottles and cans on Wednesday, even though they missed the first two days.

Complete the table to show a way for the 2nd grade class to still win the contest.

	Wednesday	Thursday	Friday
2nd Grade	<input type="text"/>	<input type="text"/>	<input type="text"/>

5

Use your answers from questions 3 and 4 to explain how the 2nd grade class could have won the "Go Green" contest.

1

Use **Table 1** to help you answer this question.

On which days did the 3rd grade class collect more cans and bottles than the other two grades? Select **all** that apply.

- Monday
- Tuesday
- Wednesday
- Thursday
- Friday

#1 Multiple select – 1 point

Item	Claim	Domain	Target	DOK	Content	MP	Key(s)	Points
#1	2	NBT	2D	1	1.NBT.B.3	1	D and E	1

Rubric (1 point): The student selects both Thursday and Friday.

2

Use **Table 1** to help you answer this question.

On Tuesday, how many more bottles and cans did the 4th grade class collect than the 3rd grade class?

#2 Equation numeric – 1 point

Item	Claim	Domain	Target	DOK	Content	MP	Key(s)	Points
#2	2	NBT	2D	1	1.NBT.B.3	1	30	1

Rubric (1 point): The student enters 30.

Commentary: The purpose of these first two questions is primarily to assess whether the student (1) understands the context and the representation (a table) and (2) can identify and infer relevant quantities and perform typical calculations (compare magnitudes).

The context is reasonably authentic. Many schools have recycling contests to encourage students to bring in bottles and cans to recycle. Keeping track of how many each class brings in each day is a good experience for students to record and represent quantities. This task is about deciding which class wins the school recycling contest.

Rationale for Content:

The content is securely held, being essentially Grade 1:

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

Since these questions are intended to be accessible for most students, the numbers have been kept simple so as not to create arithmetic computational obstacles in obtaining evidence of Claims 2, 3, or 4.

Rationale for Claim:

The fact that the student must extract the quantities, choose the procedure, and calculate the answer from a well-posed problem is what makes both questions 1 and 2 align to Target 2D.

Claim 2, Target D: Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas).

Rationale for DOK:

Both items are straightforward DOK 1: From the *Cognitive Rigor Matrix/Depth of Knowledge* chart:

-Retrieve information from a table or graph to answer a question.

3

You are the contest judge. You need to figure out who won the contest. Did 3rd grade, 4th grade, or 5th grade win the “Go Green” contest?

Use words and numbers to clearly explain:

- which grade won the contest, and
- how you know they collected the most cans and bottles.

#3 Short answer – 2 points

Item	Claim	Domain	Target	DOK	Content	MP	Key(s)	Points
#3	3	NBT	3F	3	2.NBT.B	3	See rubric	2

Rubric:

2 points: The student develops an approach (add the totals and compares) to determine the winner AND gives a justification for the result.

1 point: The student correctly states that 3rd grade won but without an explanation as to why OR gives correct calculations but with a logically flawed justification.

0 points: All other responses

Commentary: This question is designed to provide 3rd-grade students an opportunity to develop and justify a result. It is reasonably authentic and addresses the overarching question, which is “who won the contest?” The key elements are that students are not told what quantities to use, how they are operated on, nor what to conclude from them. This increases the depth of knowledge. This question is not meant to be overly difficult in terms of numeric computational complexity, lest it distract students from the communicating reasoning aspect of the question.

Rationale for Content:

The content is securely held, Grade 2 NBT:

- 2.NBT.B Use place value understanding and properties of operations to add and subtract.
5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
6. Add up to four two-digit numbers using strategies based on place value and properties of operations.
7. Add and subtract within 1000, 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. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

Again, the numbers are designed to be easy to work with so as not to be an obstacle for students focusing on communicating reasoning.

Rationale for Claim:

The work required for this problem has a few necessary steps: (1) Students must develop a chain of reasoning, i.e., interpret the context (winning class collects the most for the week). This requires adding up the amounts collected by each class each day and then comparing the totals.

NOTE: By design, this problem does *not* tell the students to add up the totals and compare. This takes away the scaffolding and requires the student to select the quantities and appropriate operation to use on them, based on the context. (2) Students must provide an explanation to justify a claim. Correctly adding the amounts does not provide a logical argument. The student must connect the computation to the reasoning, essentially, that the 3rd grade total is greater than the totals for the 4th- and 5th-grade classes, hence they win the contest.

Claim 3, Target B: Tasks used to assess this target should ask students to develop a chain of reasoning to justify or refute a conjecture. Tasks for Target B might include the types of examples called for in Target A as part of this reasoning, but should do so with a lesser degree of scaffolding than tasks that assess Target A alone.

Rationale for DOK:

This question qualifies for DOK 3 for a few reasons. From the *Cognitive Rigor Matrix/Depth of Knowledge* chart:

ANALYZE (DOK3)

- Compare information within or across data sets or texts
- Analyze and draw conclusions from data, citing evidence

EVALUATE (DOK3)

- Cite evidence and develop a logical argument

It is crucial to note that scaffolding is not provided for the students. The students must do the analyzing and evaluating to support the conclusion of which class won the contest. Specifying the steps for the students would have reduced this problem to DOK 2 or DOK 1.

What follows are sample responses and scoring annotations for Item 3.

Sample Response 3a

B
I
U
~~I~~
☰
☷
☰
☷
✂
📄
📁
↶
↷
ABC
Ω

3rd grade won because I added up each one and got the most for 3rd grade. 3rd grade had 410, 4th grade has 390, and 5th grade had 400.

5th grade is $80+80+80+80+80=400$ total

4th grade is $70+90+100+50+80=390$ total

3rd grade is $50+60+90+120+90=410$ total

SCORE POINT

2

The student correctly calculated the total number of bottles and cans collected by each grade, as well as explained why 3rd grade was the winner of the contest. The response contains evidence of the student's competence in reasoning to the full extent that these processes apply to this item.

Sample Response 3b

B I U I_x **☰ ☷ ☹ ☺** **✂ 📄 📁 ↶ ↷** **ABC Ω**

3rd grade won the "Go Green" contest. I know that because I added
 $120+90+90+60+50$ and got 410.
 4th grade got 290 bottles and cans.
 5th grade got 400 bottles and cans.

SCORE POINT

2

The student *incorrectly* calculated the total number of bottles and cans collected by each grade (error in 4th grade), but *correctly* determined the winner based on those calculations and provided a logical explanation as to why 3rd grade won the contest. The response contains evidence of the student's competence in reasoning and while it contains a minor flaw, it does not detract from a demonstration of full understanding.

Sample Response 3c

B I U I_x **☰ ☷ ☹ ☺** **✂ 📄 📁 ↶ ↷** **ABC Ω**

3rd grade 410
 4th grade 390
 5th grade 400

- 3rd grade won the "Go Green" contest
- I know that 3rd grade won because I count how many bottles and cans they have each day.

SCORE POINT

1

The student correctly calculated the total number of bottles and cans collected by each grade, as well as correctly identified the winner of the contest. However, "because I count how many bottles and cans they have each day" is not the reason the 3rd grade class won the contest. The student was unable to make the logical connection and has demonstrated only a **partial** understanding of the mathematical content and practices essential to this item.

Sample Response 3d

B I U I_x **☰ ☲ ☱ ☴** **✂ 📄 📁 ↶ ↷** **ABC Ω**

3rd grade: $50 + 60 + 90 + 120 + 90 = 410$ bottles and cans
 4th grade: $70 + 90 + 100 + 50 + 80 = 390$ bottles and cans
 5th grade: $80 + 80 + 80 + 80 + 80 = 400$ bottles and cans
 3rd grade won the "Go Green" contest because they have 410 bottle and cans.

SCORE POINT

1

The student correctly calculated the total number of bottles and cans collected by each grade, as well as correctly identified the winner of the contest. However, the student did not make a logical connection between why 3rd grade won the contest (i.e. collected the most bottles and cans) and has therefore demonstrated only a **partial** understanding of the mathematical content and practices essential to this item.

Sample Response 3e

B I U I_x **☰ ☲ ☱ ☴** **✂ 📄 📁 ↶ ↷** **ABC Ω**

$50 + 60 + 90 + 120 + 90 = 410$ for 3rd grade.
 $70 + 90 + 100 + 50 + 80 = 390$ for 4th grade.
 $80 + 80 + 80 + 80 + 80 = 400$ for 5th grade.

SCORE POINT

0

Although the student correctly calculated the total number of bottles and cans collected by each grade, he/she did not identify the winner of the contest, nor justify why that grade won. No evidence is present that demonstrates the student's competence in reasoning or communicating essential to this item.

Sample Response 3f

B I U I_x **☰ ☷ ☹ ☺** **✂ 📄 📋 ↶ ↷** **ABC** **Ω**

4th grad won becse they claked the mast bottles
3rd 310 4th 400 5th 420

SCORE POINT

0

The student made two errors. First, he/she did not add the total number of bottles and cans correctly. Second, based on the incorrect calculations, he/she did not draw a correct conclusion. Based on the addition shown in the response, 5th grade should have won the contest but this student claimed that 4th grade won. No evidence is present that demonstrates the student's competence in reasoning essential to this item.

4

The 2nd grade class got excited about the "Go Green" contest and wanted to join in. They started collecting bottles and cans on Wednesday, even though they missed the first two days.

Complete the table to show a way for the 2nd grade class to still win the contest.

	Wednesday	Thursday	Friday
2nd Grade	<input type="text"/>	<input type="text"/>	<input type="text"/>

#4 Table item – 1 point

Item	Claim	Domain	Target	DOK	Content	MP	Key(s)	Points
#4	4	OA	4A	2	2.OA.A.1	2,4	See rubric	1

Rubric:

1 point: The student enters any numbers in the three days that add up to more than 410 (the total from 3rd grade for the week). NOTE: Do not grade on "reasonableness", i.e., answers like 1,000,000 are allowed.

0 points: All other responses

One example of a correct response:

	Wednesday	Thursday	Friday
2nd Grade	200	200	200

Commentary: The purpose of the question is to increase the level of abstraction for a 3rd-grade student to solve a reasonably authentic "extension" question, involving hypothetical 2nd-grade students wanting to join the contest late. The student must be able to reason that, even though they have less time, the 2nd-grade class could still win if they collect more than the 3rd-grade class. This question splits off the modeling from the explanation (see Question #3).

Rationale for Content:

The content is securely held; it moves on the progression from Grade 2 Operations and Algebraic Thinking.

2.OA.A.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions.

Note that the numbers exceed the "within 100" description, but 3rd-grade students should, by the time of the PT, be comfortable with numbers with values of several hundred.

Rationale for Claim:

This question is different in that students are *not given specific numbers to work with*. This increases the abstraction. They need to interpret the context and invent numbers that will reasonably model a hypothetical scenario. In some sense, this is a *design under constraints* type of modeling question. That is what makes this a Claim 4: Apply mathematics to solve problems arising in everyday life, society, and the workplace.

Claim 4, Target A: Problems used to assess this target for Claim #4 should not be completely formulated (as they are for the same target in Claim #2), and require students to extract relevant information from within the problem and find missing information through research or the use of reasoned estimates.

Rationale for DOK:

This question is DOK 3 for the following reasons. From the *Cognitive Rigor Matrix/Depth of Knowledge* chart:

UNDERSTAND (DOK 3)

-Use concepts to solve non-routine problems

-Explain reasoning when more than one response is possible

CREATE (DOK 3)

-Develop an alternative solution

This is non-routine problem, with many different possible answers. The fact that students must develop a solution to a problem by creating numbers that satisfy certain constraints pushes this past the threshold of DOK 2 and into DOK 3 territory.

5

Use your answers from questions 3 and 4 to explain how the 2nd grade class could have won the "Go Green" contest.

#5 Short answer – 2 points

Item	Claim	Domain	Target	DOK	Content	MP	Key(s)	Points
#5	3	OA	3A	3	2.OA.A	3	See rubric	2

Rubric:

2 points: The student takes the value from Question 4 and states that it is more than the winning number from Question 3 (e.g., 410). NOTE: For full credit the student cannot just give a number (e.g., 800) and state, "it is more." We are looking for a *logical statement that explicitly makes use of the information*.

1 point: The student states the information but does not fully make the logical connections.

0 points: All other responses

NOTE: We anticipate people will disagree with some of these samples. We want to highlight that we are not looking for just *evidence of understanding*, but we are looking for evidence of *communicating reasoning*. In piloting, many 3rd-grade students understood and correctly answered the question, but did not communicate or justify the result at a level we want as the expectation for Grade 3.

Commentary: This question is designed to provide an opportunity for students to create an explanation based on several pieces of information. Students cannot just make calculations or statements without justification.

Rationale for Content:

The content is securely held; it moves on the progression from Grade 2 Operations and Algebraic Thinking.

2.OA.A.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions.

Note that the numbers exceed the "within 100" description, but 3rd-grade students should, by the time of the PT, be comfortable with numbers with values of several hundred.

Rationale for Claim:

This question addresses Claim 3. Students must put together several pieces of information to support a claim.

Claim 3, Target A: Tasks used to assess this target should ask students to develop a chain of reasoning to justify or refute a conjecture.

Rationale for DOK:

This question is DOK 3 for the following reasons. From the *Cognitive Rigor Matrix/Depth of Knowledge* chart:

UNDERSTAND (DOK 3)

-Use concepts to solve non-routine problems

-Explain reasoning when more than one response is possible

This is non-routine problem, with many different possible answers. The key aspect of the argument must be that the numbers proposed for 2nd graders in Question #4 must be explicitly compared to the totals in Question #3, and the logical connection is that that the amount is more, and whoever collects the most wins the contest.

What follows are sample responses and scoring annotations for Item 5.

Sample Response 5a

2nd grade could have won the contest if they collected 260 bottle and cans on Wednesday, 100 on Thursday, 300 on Friday. If you add it up it will beat 3rd grade.

$$\begin{array}{r} 300 \\ 260 \\ + 100 \\ \hline 660 \end{array}$$

Bottles and cans

SCORE POINT

2

The student selected values for bottles and cans collected that exceeded 410 (more than 3rd grade), and he/she explained why a total of 660 bottles and cans would result in the 2nd grade class winning the contest. The student has demonstrated a **full and complete** understanding of all mathematical content and practices essential to this item.

Sample Response 5b

2nd grade could have won the contest if they collected 120 on Wednesday and 200 on Thursday and 100 on Friday and that would bet 3rd grade had 410 and if you add 120, 200, 100, it would be 420 and 420 is greater than 410.

SCORE POINT

2

The student selected values for bottles and cans collected that exceeded 410 (more than 3rd grade), and he/she explained why a total of 420 bottles and cans would result in the 2nd grade class winning the contest. The student has demonstrated a **full and complete** understanding of all mathematical content and practices essential to this item.



Sample Response 5c

B I U I_x

Well, I put 500 because 3rd grade had 410. So if I put 500 then thy will have more.

SCORE POINT

1

The student selected values for bottles and cans collected that exceeded 410 (more than 3rd grade), but he/she did not explain why it is important for 500 to be more than 410. The student's response contains some of the attributes of an appropriate response but lacks convincing evidence that the student fully comprehends the essential mathematical ideas addressed by this task.

Sample Response 5d

B I U I_x

2nd could have won the contest if they collected 200 cans
Wednesday - Friday.

136	200
136	200
<u>136</u>	<u>200</u>
408	600 is greater than 410
<u>+ 2</u>	
410	

SCORE POINT

1

The student selected values for bottles and cans collected that exceeded 410 (more than 3rd grade), but he/she did not explain why it is important for 600 to be more than 410. The student's response contains some of the attributes of an appropriate response but lacks convincing evidence that the student fully comprehends the essential mathematical ideas addressed by this task.

Sample Response 5e

B I U T_x   **ABC** 

Well they won because in number 3 there says that they have to win the contest because they wanted to participate in the "Go Green" so I got from that answer 800.

SCORE POINT

0

Although the student selected values for bottles and cans collected that exceeded 410 (more than 3rd grade), he/she did not explain why the value of 800 bottles and cans would be a way for 2nd grade to win the contest. There are significant omissions or irregularities that indicate a lack of comprehension in regard to the mathematical content and practices essential to this task.

The handscored items in this guide are both 2-point short-text items. The general rubric that is used as a basis for scoring all 2-point short-text items is shown below. Although item-specific rubrics are also provided to scorers to facilitate the handscoring of short-text items, every response should be able to map back to this general rubric in a consistent and reliable manner.

Mathematics General Rubric for 2-Point Items

Score	Description
2	The student has demonstrated a full and complete understanding of all mathematical content and practices essential to this task. The student has addressed the task in a mathematically sound manner. The response contains evidence of the student's competence in problem solving, reasoning, and/or modeling to the full extent that these processes apply to the specified task. The response may, however, contain minor flaws that do not detract from a demonstration of full understanding.
1	The student has demonstrated a partial understanding of the mathematical content and practices essential to this task. The student's response contains some of the attributes of an appropriate response but lacks convincing evidence that the student fully comprehends the essential mathematical ideas addressed by this task. Such deficits include evidence of insufficient mathematical knowledge; errors in fundamental mathematical procedures; and other omissions or irregularities that bring into question the student's competence in problem solving, reasoning, and/or modeling related to the specified task.
0	The student has demonstrated merely an acquaintance with the topic, or provided a completely incorrect or uninterpretable response. The student's response may be associated with the task, but contains few attributes of an appropriate response. There are significant omissions or irregularities that indicate a lack of comprehension in regard to the mathematical content and practices essential to this task. No evidence is present that demonstrates the student's competence in problem solving, reasoning, and/or modeling related to the specified task.