2007

Green River

Regional Educational Cooperative

Grade 5

Mathematics

Constructed Response

Measured Progress

Table of Contents

Item 1 Grandfather's Garden ..... p. 3

Standard: MA-05-1.1.01: Number Sense

Scoring Guide ..... p. 4

Sample Student Responses ..... pp. 5–15

Item 2 Models for Fractions ..... p. 16

Standard: MA-05-1.1.01: Number Sense

Scoring Guide ..... p. 17

Item 3 Bake Sale ..... p. 18

Standard: MA-05-1.3.01: Number Operations

Scoring Guide ..... p. 19

Item 4 Tropical Punch ..... p. 20

Standard: MA-05-2.2.03: Systems of Measurement

Scoring Guide ..... p. 21

Item 5 Carol's Pattern ..... p. 22

Standard: MA-05-5.1.01: Patterns, Relations and Functions

Scoring Guide ..... p. 23

Note: Each item is aligned to a standard, but does not necessarily measure the entire standard.

Item 1 Grandfather's Garden

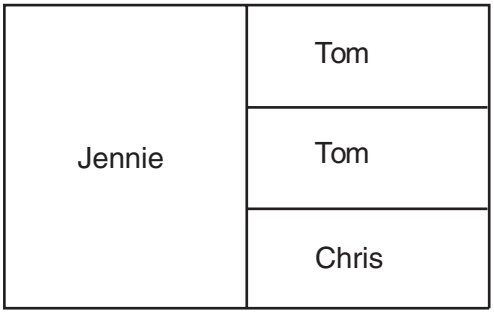
Standard: MA-05-1.1.01: Number Sense — Students will apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to represent whole numbers (0 to 99,999,999); apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, symbols) to describe commonly-used fractions, mixed numbers, and decimals through thousandths; apply these numbers to represent real-world problems; and explain how the base-10 number system relates to place value.

Bloom's Taxonomy: a. Knowledge
b. Knowledge
c. Application

Depth of Knowledge: Level 2

1. Jennie, Tom, and Chris weeded Grandfather's garden. The picture below shows the parts of the garden each of them weeded.

Grandfather's Garden



a. Write a fraction that tells how much of the whole garden Jennie weeded.

b. Write a fraction that tells how much of the whole garden Chris weeded. Use pictures or words to show how you found your answer.

c. Grandfather gave the children $24 for weeding the garden. The children decided to share the money based on how much weeding each of them did. How much money should each of them get? Explain or show how you found your answer.

Be sure to label your responses a, b, and c.

Grandfather's Garden

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Number Properties and Operations concepts involved in applying multiple representations to describe commonly used fractions and solve real-world problems.
3	The student response demonstrates a good understanding of the Number Properties and Operations concepts involved in applying multiple representations to describe commonly used fractions and solve real-world problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Number Properties and Operations concepts involved in applying multiple representations to describe commonly used fractions and solve real-world problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Number Properties and Operations concepts involved in applying multiple representations to describe commonly used fractions and solve real-world problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

Part a: $\frac{1}{2}$

Part b: He weeded $\frac{1}{6}$ of the garden. I divided Jennie's part into 3 equal sections. So Chris's part is one out of 6 equal parts.

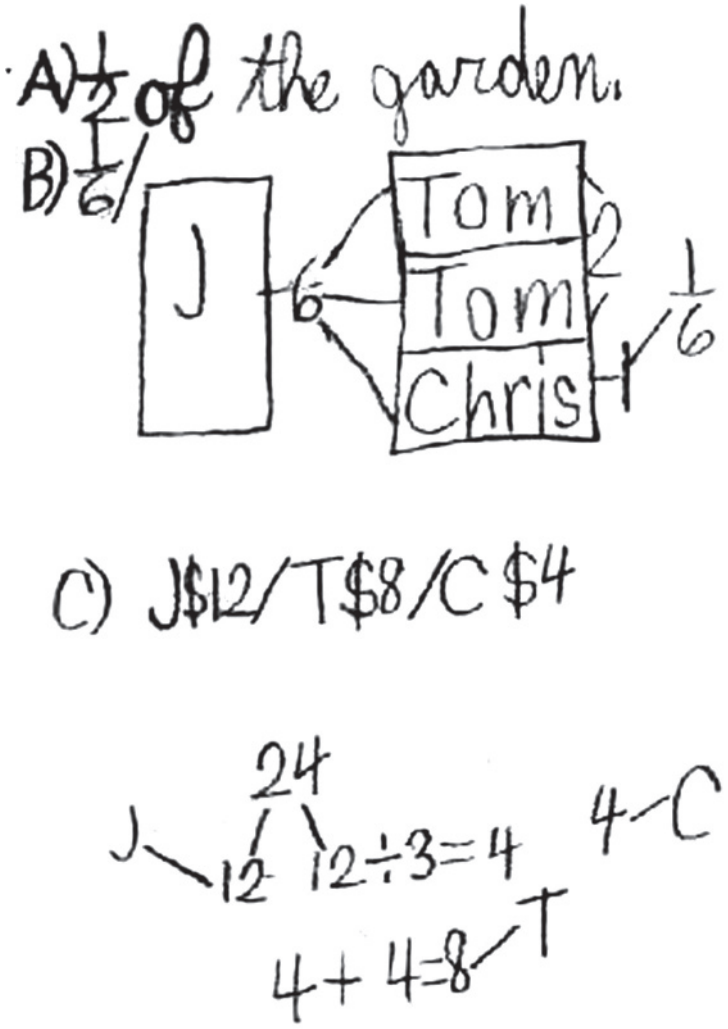
Part c: Jennie: $\frac{1}{2}$ of \$24 is \$12.

Chris: $\frac{1}{6}$ of \$24 is \$4.

Tom gets the rest: 24 – 12 – 4 = \$8

Sample Student Responses

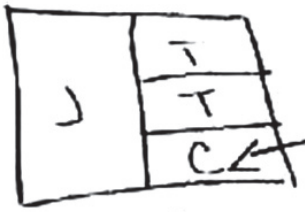
Grandfather's Garden



Score Point: 4

a. $\frac{3}{6}$ or $\frac{1}{2}$

b. $\frac{1}{6}$



the graph can be divided by sixths so he did one sixth.

or

C. Jeanie-$12 Tom-$8

Chris-$4

$6\overline{)24}$ 4$

| whole garden

each sixth of the garden is $4.

Jeanie = $\frac{1}{2}$

Tom = $\frac{1}{3}$ or $\frac{2}{6}$

Chris = $\frac{1}{6}$

Score Point: 4

a $\frac{1}{2}$ of the garden

b $\frac{1}{6}$ of the garden

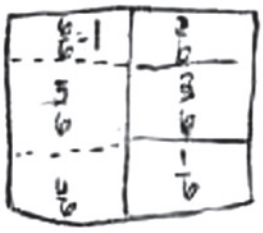
c

Jennie = $12
tom = $8
Chris = $4

Score Point: 3

a. $\frac{1}{2}$ of the garden b. $\frac{1}{6}$ of the garden

b.



c. Jennie - $12 Tom - $7 Chris - $5

Since Jennie did half the lawn, she should get half the money. Since Tom did less than half, he should get a little less than half the money. Since Chris did the least, he should get the least money.

Score Point: 3

a. $\frac{3}{6}$

b. $\frac{1}{6}$

C. Jennie gets $8

Tom gets $6.50
Chris gets $5.50

Score Point: 2

a. $\frac{1}{2}$ = Jennie

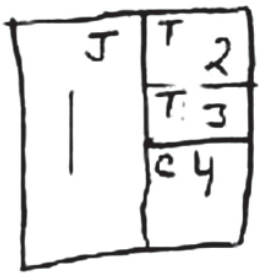
b. $\frac{1}{4}$

$= \frac{1}{4}$ for chris

c. Jennie = \$12 because she did half the garden & half of 24 is 12.
Tom should get \$8 because he did the 2nd most. Chris should get \$4 because he did the least amount for the garden.

Score Point: 2

a. Jennie weeded $\frac{1}{2}$ of the yard

b 

chris weeded 1 of the small parts of the yard wich $= \frac{1}{4}$

c. Jennie gets 16¢ and Chris gets 8¢.

$$\begin{array}{r} 16¢ \\ +\ 8¢ \\ \hline 24¢ \end{array}$$

Score Point: 1

A.	B.	C.
$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$

Score Point: 1

a. Jennie weeded one whole part of the garden.

b. Chris weeded about $\frac{1}{5}$ of the garden.

c. They should get six dollars each because if you multiply six and four you get twenty four dollars.

Score Point: 0

A. $\frac{1}{4}$

B. $\frac{1}{2}$

C. Jennie $11 Tom $16 Chris $12

Score Point: 0

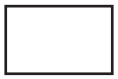
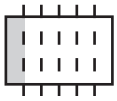
Item 2 Models for Fractions

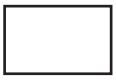
Standard: MA-05-1.1.01: Number Sense — Students will: apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to represent whole numbers (0 to 99,999,999); apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, symbols) to describe commonly-used fractions, mixed numbers and decimals through thousandths; apply these numbers to represent real-world problems and explain how the base-10 number system relates to place value.

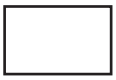
Bloom's Taxonomy: Application

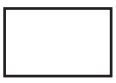
Depth of Knowledge: Level 2

2. Matt is using shapes and shading to show numbers.

For example, using $= \frac{1}{2}$, he drew to equal 1, and using  $= 1$, he drew  to equal $\frac{1}{6}$.

a. Using  $= 1$, draw a figure that represents the number $\frac{1}{4}$.

b. Using  $= \frac{1}{5}$, draw a figure that represents the number $1\frac{2}{5}$.

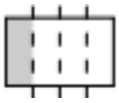
c. Using  $= \frac{1}{3}$, draw a figure that represents the number $\frac{1}{2}$. Explain your answer.

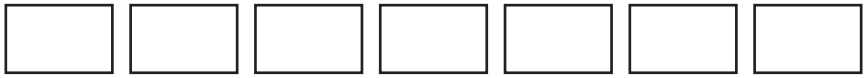
Models for Fractions

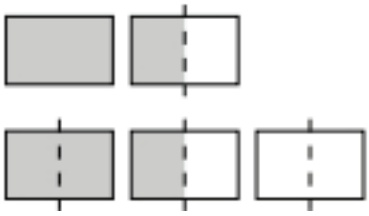
Scoring Guide

Score	Description
4	The student demonstrates a thorough understanding of modeling fractions by correctly drawing models of fractions or mixed numbers, given either a model of one unit or the model of a fraction.
3	The student demonstrates a general understanding of modeling fractions by drawing models of fractions or mixed numbers, given either a model of one unit or the model of a fraction, with only minor errors or omissions. The response indicates that the student could readily correct any errors and omissions if given written feedback.
2	The student demonstrates a basic understanding of modeling fractions by correctly completing a significant portion of the required tasks. The response indicates that the student would require some instruction to successfully complete the tasks.
1	The student demonstrates a minimal understanding of modeling fractions. The response indicates that the student would require significant instruction to complete the tasks.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

Part a: 

Part b: 

Part c: 

$\frac{1}{3} = \frac{2}{6}$ and $\frac{1}{2} = \frac{3}{6}$ so that means you would need 1 bar plus $\frac{1}{2}$ of another bar. Each bar is $\frac{1}{3} = \frac{2}{6}$ so you'd need 3 bars to make a whole. Then, shade half of that.

Item 3 Bake Sale

Standard: MA-1.3.01: Number Operations — Students will analyze real-world problems to identify appropriate representations using mathematical operations, and will apply operations to solve real-world problems with the following constraints: add, subtract, multiply, and divide whole numbers (less than 100,000,000), using technology where appropriate; add and subtract fractions with like denominators through 16, with sums less than or equal to one and add and subtract decimals through hundredths.

Bloom's Taxonomy: Application

Depth of Knowledge: Level 3

3. Mr. Miller's class is having a bake sale to raise money for a class trip. They hope to raise $100. By the day of the sale, the students will bake 550 cookies. The class is thinking about charging 15¢ per cookie.
   a. If Mr. Miller's students sell every cookie they baked for 15¢, how much money will they earn? Explain your answer.
   b. Some students think the cookies should be sold for 20¢ each. How much money will the class earn if the students sell every cookie they baked for 20¢? Explain what you did to get your answer.
   c. Mr. Miller's students think that they will be able to sell only 400 cookies. What is the least they will have to charge for each cookie to be sure to raise $100? Explain how you got your answer.

Bake Sale

Scoring Guide

Score	Description
4	The student demonstrates excellent problem solving skills by correctly analyzing and solving real-world problems involving multiplication.
3	The student demonstrates good problem solving skills by analyzing and solving real-world problems involving multiplication with only minor errors or omissions. The response indicates that the student could readily correct any errors and omissions if given written feedback.
2	The student demonstrates basic problem solving skills by correctly completing a significant portion of the required tasks. The response indicates that the student would require some instruction to successfully complete the task.
1	The student demonstrates minimal problem solving skills. The response indicates that the student would require significant instruction to complete the task.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

Part a: 550 × 0.15 = \$82.50

OR

Every 100 cookies is \$15.00. There are 5 sets of 100 and another $\frac{1}{2}$ set of 100 in 550. That means 15 + 15 + 15 + 15 + 15 + 7.50 = \$82.50

Part b: 550 × 0.20 = \$110.00

OR

Every 100 cookies is \$20.00. There are 5 sets of 100 and another $\frac{1}{2}$ set of 100 in 550. That means 20 + 20 + 20 + 20 + 20 + 10 = \$110

OR

They will sell 5 cookies for \$1.00. 550 ÷ 5 = 110 so that's \$110.

Part c: \$100 ÷ 400 = \$0.25

OR

400 × 0.15 = \$60

400 × 0.20 = \$80 \$0.25 is the lowest price they can charge to meet their goal.

400 × 0.25 = \$100

Item 4 Tropical Punch

Standard: MA-05-2.2.03: Systems of Measurement — Students will convert units within the same measurement system [U.S. customary (inches, feet, yards, miles; ounces, pounds, tons), metric (millimeters, centimeters, meters, kilometers; grams, kilograms), money, or time] and use the units to solve problems.

Bloom's Taxonomy: Application

Depth of Knowledge: Level 2

4. Use the recipe below to answer the question.

Tropical Punch (serves 6)
1 quart orange juice
1 pint pineapple juice
1 cup grapefruit juice
1 cup fresh lime juice

2 cups = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon

Carmelita is having a Hawaiian party for her friends. She plans to serve Tropical Punch.

a. Rewrite the recipe so it will serve 12 people.

b. Carmelita has 1 cup of pineapple juice. How much more does she need to make the recipe that serves 6?

c. Carmelita has only 1 pint of orange juice. If she has all the other juices she needs, how many servings of punch can she make with 1 pint of orange juice? Explain how you found your answer.

Tropical Punch

Scoring Guide

Score	Description
4	The student demonstrates a thorough understanding of capacity concepts by correctly converting recipes based on number of servings and available ingredients.
3	The student demonstrates a general understanding of capacity concepts by converting recipes based on number of servings and available ingredients with only minor errors or omissions. The response indicates that the student could readily correct any errors and omissions if given written feedback.
2	The student demonstrates a basic understanding of capacity concepts by correctly completing a significant portion of the required tasks. The response indicates that the student would require some instruction to successfully complete the tasks.
1	The student demonstrates a minimal understanding of capacity concepts. The response indicates that the student would require significant instruction to complete the tasks.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

Part a: Tropical Punch (*Double original recipe*) (serves 12)

2 quarts orange juice OR $\frac{1}{2}$ gallon

2 pints pineapple juice OR 1 quart

2 cups grapefruit juice OR 1 pint

2 cups fresh lime juice OR 1 pint

Part b: 1 cup OR 8 oz. OR $\frac{1}{2}$ pint

Part c: 1 pint of orange juice will only serve 3 people. That's because the recipe for 6 people calls for 1 quart, which is the same as 2 pints. Carmelita only has $\frac{1}{2}$ that amount.

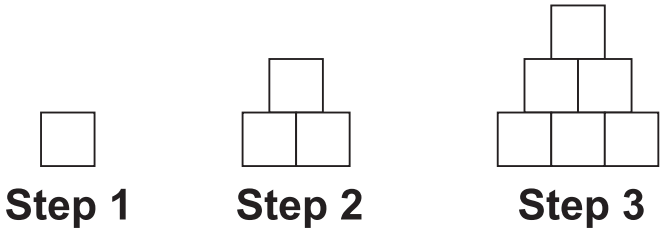
Item 5 Carol's Pattern

Standard: MA-05-5.1.01: Patterns, Relations and Functions — Students will extend patterns, find the missing term(s) in a pattern or describe rules for patterns (numbers, pictures, tables, words) from real-world and mathematical problems.

Bloom's Taxonomy: Analysis

Depth of Knowledge: Level 3

5. Carol is making a pattern using small squares. The first three steps in her pattern are shown below.



a. Draw a picture of Step 4 in the pattern.

b. Complete the chart in the box below.

Step	1	2	3	4	5	6
Number of squares used	1	3	6			

c. How many squares are needed for Step 10? Show or explain how you found your answer.

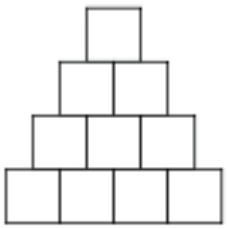
Carol's Pattern

Scoring Guide

Score	Description
4	The student demonstrates a thorough understanding of a geometric pattern by extending the pattern using pictures and numbers.
3	The student demonstrates a general understanding of a geometric pattern by extending the pattern using pictures and numbers with only minor errors or omissions. The response indicates that the student could readily correct any errors and omissions if given written feedback.
2	The student demonstrates a basic understanding of a geometric pattern by correctly completing a significant portion of the required tasks. The response indicates that the student would require some instruction to successfully complete the tasks.
1	The student demonstrates a minimal understanding of a geometric pattern. The response indicates that the student would require significant instruction to complete the tasks.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

Part a:



Part b:

Step	1	2	3	4	5	6
Number of squares used	1	3	6	10	15	21

Part c: 55, I started with 21 and kept adding the step number to figure out the next step.
Step 7: added 7, Step 8: added 8, Step 9: added 9, Step 10: added 10.
OR
21 + 7 + 8 + 9 + 10 = 55