

Constructed Response Lesson-Grade 5
Pablo's Books

- I. Objectives:** Students will do a constructed response problem. Students will look at other student's examples and learn how to score them using a rubric. Students will revise their constructed response and score it using a rubric.
- II. MT Content and Performance Standard/s Addressed in This Lesson:** MT Content Standard 1, Benchmarks 1 & 3, MT Content Standard 2, Benchmarks 1 & 3. MT Performance Standard Grade 8 Mathematics; Proficient b, c & e.
- III. Materials Needed:** Copies and overhead of 2006 Grade 4 Mathematics Item, "Pablo's Books" from Measured Progress, copies and overhead of the rubric and scoring information for the problem, copies and overhead of student samples A, B, C, D, and E, copies and overhead of student scoring worksheet.
- IV. Lesson Plan:**
- a. State the lesson objectives.
 - b. Discuss the 4-Step problems solving process. Remind students of how we read the problem, talked it out to make a plan before we even started to write. Then we wrote out the problem in words and numerically to solve it. Finally, we check our work. Use this process while working on the following problem.
 - i. Read and Understand
 - ii. Make a Plan (Look for a pattern, draw a diagram, act it out, work backward, guess, check and revise, make a table, or solve a simpler problem.)
 - iii. Solve the Problem
 - iv. Look Back
 - c. Hand out the problem "Pablo's Books" and ask the students to solve it to the best of their ability. Do not provide any assistance in solving the problem. Ask students to write on their own paper and not on the problem. We will be returning to the problem later. Give the students about 10 minutes to work on their solutions. Collect the students work to use later. We will come back to their solutions to self-grade their work.
 - d. Hand out the rubric and scoring information.
 - i. Ask students to read over the scoring information. Talk about the correct solution and how the answer was obtained. Discuss how the points are assigned for each solution. The students appear to be given points for the correct answer and showing correct work toward their solution.
 1. What were your strategies for finding how much money Pablo spent on the books?
 2. What were your strategies for finding how many books of each type Dee bought?
 3. Is it important to label your answers? Why?
 4. Is it important to show your strategy or work? Why?
 5. What do the "Notes" mean?
 - e. Ask students to read of the rubric. Discuss how the points earned translate into the score they would receive.
 - i. Talk about a score of 1 for "Minimal understanding of computing with money."
 - f. Hand out the student samples of solutions to the problem.

- i. Explain that students will work with a partner to score the student samples. Please don't write on the samples because we will be collecting them back. Write the score given on the provided worksheet and the reason for the score you gave.
 - ii. Do student sample A together as a class to demonstrate how to score, record score and give reason.
 - iii. Ask students to work in pairs to score the remaining 4 student samples.
 - 1. Suggested scores for each sample are as follows.
 - a. Sample A, Score 3
 - b. Sample B, Score 2
 - c. Sample C, Score 0
 - d. Sample D, Score 4
 - e. Sample E, Score 1
 - iv. Compile the class results by asking each group for their score for each student and recording them on an overhead.
- g. Have a class discussion on the results of the scoring for the student samples.
 - i. Have the class look at the compiled scores for each sample. Look for any discrepancies in the scores and have the groups share how they scored the item.
 - ii. Ask pairs of students to demonstrate how they scored student examples and their reasons for the scores. If there is a large variation in scores given, ask each pair to present their scoring and why. Have a class discussion to reach an agreement on the final score and why.
 - iii. Discuss why the scores end up being fairly consistent by each group. Why is this important to the persons scoring the problems?
 - iv. Why is it important to discuss scores with large variations?
 - v. Is it important for you, the person trying to answer the problem, to know the scoring rubric? Why?
 - vi. Put each student work example up on the overhead one at a time. Ask students what did the person do to make it easier for you as the scorer and what made it hard?
 - 1. Nice penmanship.
 - 2. Easy to read and clearly labeled.
 - 3. Showed all their work.
 - 4. Wrote clear explanations of their work.
 - 5. Answered every part of the question being asked.
- h. Hand out the student's original solution. Ask students to score their original solution to the problem "Pablo's Books". Write down reasons for your score and what do you need to do to improve your score.
- i. Now that students have practiced scoring, ask them to return to the original problem "Pablo's Books". Redo the problem on the back of your original solution to try to improve your original score.
- j. Switch papers with your partner and have your partner score your second solution to the problem. Write down the score and the reasons for the points you gave your partner.
- k. Hand back your partners paper. Write a paragraph comparing and contrasting your original solution to your second attempt.
 - i. What did you leave the same and what did you change? Why?
 - ii. What would you tell another student is the most important thing(s) to do when answering a word problem so you achieve the highest score possible?

- V. **Summary:** We studied how to answer and score constructed response (word problems) today. We used a rubric to determine the final score a student would receive and discussed why. The most important things to remember are to show all your work and explain your reasoning in sentences. That way your answer is clear to the person scoring your work.
- VI. **Assessment/s:** Word problems from the book or another constructed-response question.
- VII. **Extension:** Follow this activity with another constructed-response problem in about a week. Ask students to read the problem and have a class discussion on how they think it might be scored. Develop a class rubric for scoring. Ask students to do the problem. Compare the class rubric to the rubric provided by Measured Progress. Discuss the similarities and differences.

(Lesson format adapted from Northwest Regional Educational Laboratory Mathematics and Science Education Center, Planning the Research Lesson.)

Constructed Response Problem "Pablo's Books"

Scores for Samples

Group #	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

Name _____

Constructed Response Problem "Pablo's Books"

Student Solution	Score	Reason
1st Solution		
2nd Solution		

Write a paragraph comparing and contrasting your two solutions to the problem "Pablo's Books".
What did you leave the same and what did you change? Why?
What would you tell another student is the most important thing(s) to do when answering a word problem so you achieve the highest score possible?

Names _____

Constructed Response Problem "Pablo's Books"
Scores for Samples

Student Sample	Score	Reason
A		
B		
C		
D		
E		

Mathematics

Session 3 (No Calculator)

You may NOT use a calculator during this session.

68. At the book fair, picture books cost \$1.05 and chapter books cost \$1.75. Pablo bought 2 picture books and 1 chapter book.
- a. How much money did Pablo spend on these books? Show or explain how you found your answer.
- Dee spent EXACTLY \$7.70 buying 6 books at the book fair. She bought picture books and chapter books.
- b. How many books of each type did Dee buy? Show or explain how you found your answers. Write your answers like this:
- _____ picture books _____ chapter books

Scoring Guide

Score	Description
4	4 points
3	3 points
2	2 points
1	1 point OR minimal understanding of computing with money
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Scoring Notes

Part a: (maximum of 2 points)

- 2 points correct answer with sufficient explanation or work shown to indicate correct strategy
OR
1 point correct answer
or
sufficient explanation or work shown to indicate correct strategy

Part b: (maximum of 2 points)

- 1 point correct numbers of books
AND
1 point sufficient explanation or work shown to indicate correct strategy
OR
1 point incorrect but reasonable combination with work that demonstrates the combination given yields a sum of as close to \$7.70 as possible without going over

Notes

- In part a, response must include correct decimal notation for correct answer credit. Use of dollar sign (\$) is not required.
- Minimal understanding may be demonstrated by correct calculation of the cost of 2 or more picture or chapter books OR correct calculation of the cost of at least 1 picture and 1 chapter book.

Sample Response

Part a: $\$1.05 + \$1.05 + \$1.75 = \3.85

Part b: 4 picture books and 2 chapter books

$$(\$1.05 \times 4) + (\$1.75 \times 2) = \$4.20 + \$3.50 = \$7.70$$

Score Point 4

Sample 1

a. it cost her \$3.85.

b. 4 picture books and 2 chapter books.
It cost \$7.90.

$\begin{array}{r} 1.05 \\ 1.05 \\ + 1.75 \\ \hline 3.85 \end{array}$	$\begin{array}{r} 1.85 \\ 1.05 \\ 1.05 \\ 1.05 \\ 1.75 \\ + 1.75 \\ \hline 7.90 \end{array}$
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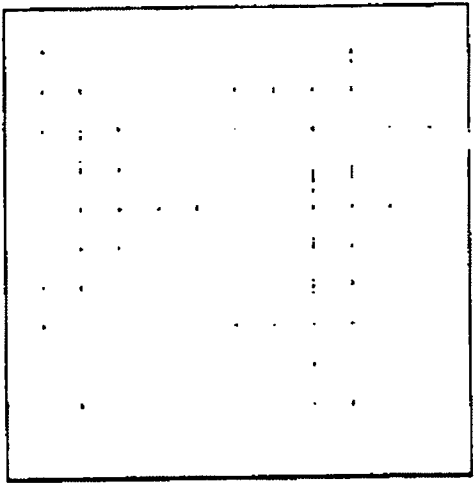
Score Point 4

Sample 2

A. Pablo spent \$385

1.05
<u>1.05</u>
1.75
<u>3.85</u>

B. Dee bought four picture books and two chapter books, I ~~kept~~ adding until I got to \$7.70 and counted each \$1.05.



Score Point 3

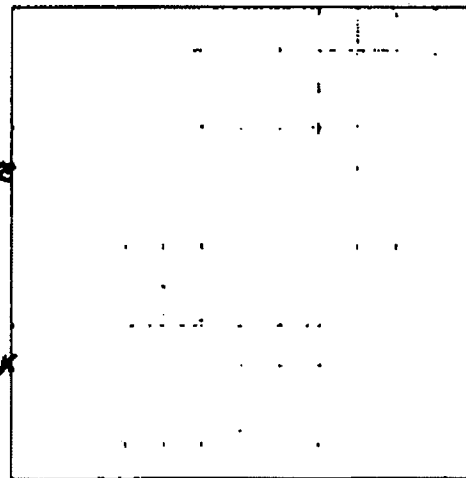
Sample 1

$$\begin{array}{r} 0.) \ \$1.75 \\ + \$1.05 \\ + \$1.05 \\ \hline \$3.85 \end{array}$$

4 picture books

2 chapter books

I know this because
I did guess and
check multiplication
only I added money
together.



Score Point 3

Sample 2

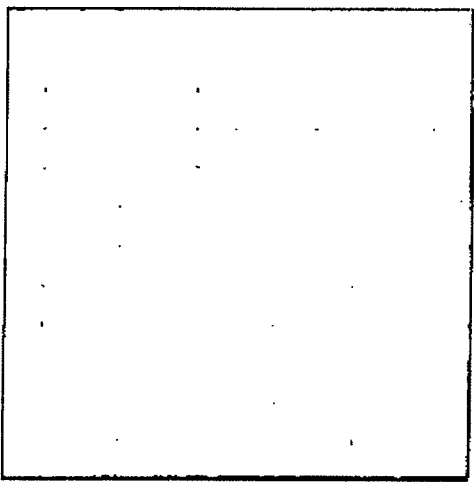
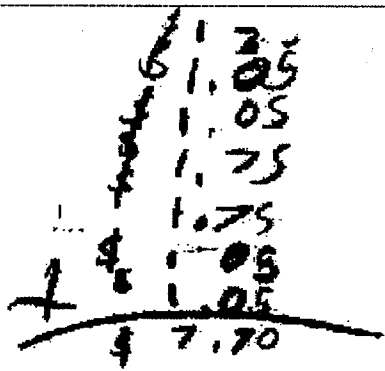
a)

$$\begin{array}{r} 1 \\ \$1.05 \\ + \$1.05 \\ + \$1.75 \\ \hline \$3.85 \end{array}$$

b)

5 picture books

2 chapter books



Score Point 2

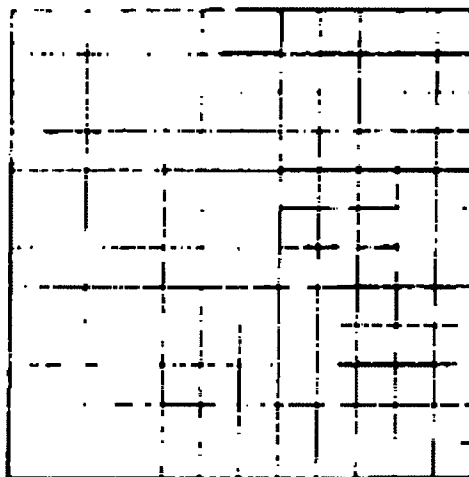
Sample 1

$$\begin{array}{r} \text{Part A} \quad \$1.75 \\ + 1.05 \\ + 1.05 \\ \hline 3.85 \end{array}$$

Part B

5 chapter
books

1 picture
books



Score Point 2

Sample 2

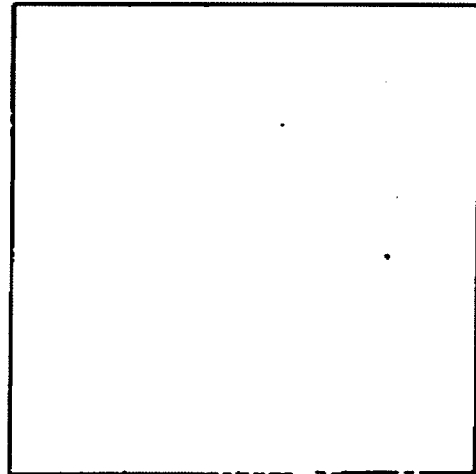
$$\begin{array}{r} \$1.05 \\ \times 2 \\ \hline \$2.10 \end{array}$$

$$\begin{array}{r} 2.10 \\ + 1.75 \\ \hline \$3.65 \end{array}$$

Show
Explan

I multiplied
\$1.05 \times 2 to
get \$2.10 then
I added \$2.10 +
\$1.75 to get
\$3.65 is how much
he spent

2 chapter books +
4 picture books



Score Point 1

Sample 1

~~A~~ 3.85

B Picture Books 3

C Chapter Books 3

A grid with 4 columns and 4 rows. The grid contains various lines and dots. The top row has a solid horizontal line in the second column, a dashed horizontal line in the third column, and a solid horizontal line in the fourth column. The second row has a solid horizontal line in the first column, a dashed horizontal line in the second column, a solid horizontal line in the third column, and a dashed horizontal line in the fourth column. The third row has a solid horizontal line in the first column, a dashed horizontal line in the second column, a solid horizontal line in the third column, and a dashed horizontal line in the fourth column. The fourth row has a solid horizontal line in the first column, a dashed horizontal line in the second column, a solid horizontal line in the third column, and a dashed horizontal line in the fourth column. There are also several vertical lines and dots scattered throughout the grid.

Score Point 1

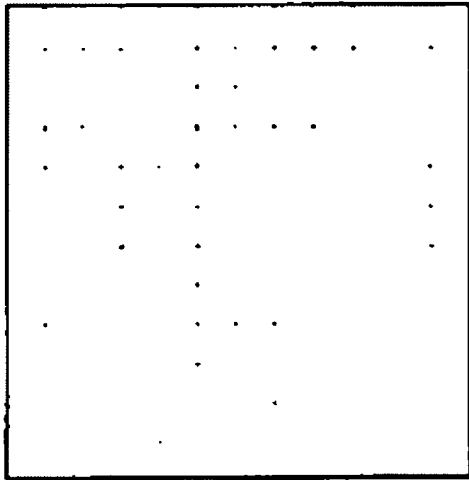
Sample 2

$\begin{array}{r} \$1.05 \\ +1.75 \\ \hline \end{array}$

$\$2.80$ Dollars 2 picture 5 chapter books

1.75
1.75
1.05
1.05
1.05
1.05
1.05

7.70



Score Point 0

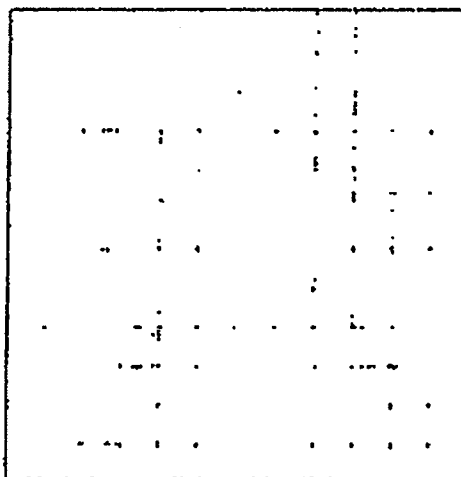
Sample 1

$$\begin{array}{r} 107 \\ + 175 \\ \hline 282 \end{array}$$

She had 6 and just split them up like $3+3=6$ and that gives you 6

3 Picture Books
3 chapter Books

$$\begin{array}{r} 1 \\ + \\ \hline 6 \end{array}$$



Score Point 0

Sample 2

5.00 on chapter books
2.83 on picture books

$$\begin{array}{r} 4 \\ 1.05 \\ 1.75 \\ \hline 2 \\ \hline 2.83 \end{array}$$

$$\begin{array}{r} B \\ 1.75 \\ .2 \\ \hline 1.77 \end{array}$$

