Grade 5 Measurement: Additional Sample 1  

Planning a Backyard

Context
This class has had previous practice estimating and measuring the area and perimeter of irregular shapes.

Mathematical Concepts

- recognize and explain the meaning of length, width, and perimeter
- estimate and measure the perimeter and area of irregular shapes by dividing them into parts
- relate the perimeter and area of rectangles, using manipulatives or diagrams
- solve problems that involve one or more specific content areas (e.g., number concepts, number operations, shape and space)
- analyze problems to develop a plan (e.g., identify key words, relevant information)
- develop specific skills in selecting and using an appropriate problem-solving strategy or combination of strategies from, but not restricted to: guess and check; identify patterns; use a list, chart, or table; make and use a picture or diagram; role play; model using objects; work backward; simplify the original problem
- verify that solutions to problems are correct and reasonable
- communicate an understanding of a problem, the process used to solve it, and the justification of the solution
- solve problems individually and cooperatively

Process
The students were presented with the following scenario:

You have purchased a new home and the backyard is undeveloped. Your yard is 10 m by 20 m. You plan your yard and decide to make a scale drawing of your plan for the landscapers.

Students were given grid paper and asked to use a scale of 1cm = 1 m. They worked individually to plan a yard, and to create a colour coded legend to identify different areas of the yard. They were asked to calculate the area and perimeter of each area of the yard, showing all their work. They were also asked to calculate the cost of fencing the yard, if fencing material cost $10/m.
Meets Expectations (Minimal Level)

Teacher’s Observations

This student’s calculations of area are accurate although units are missed or incorrect in some cases. However, he was not able to calculate perimeter except for the smallest and simplest shapes. He was not able to calculate the cost of fencing because of his lack of understanding of perimeter.

- applies most relevant mathematical concepts, skills, and strategies appropriately; some errors or omissions
- needs help to verify results or solutions by using estimation or mental calculation
- includes major errors in recording or calculating
Pool - 4
- a: 1m², P: 13.1 cm

Garage
- a: 7.6 m², P: 18 cm

Bedroom
- a: 12.1 m², P: 16 cm

Kitchen
- a: 4 m², P: 6 cm

Bathroom
- a: 131.1 cm², P: 56.4 cm

Deck
- a: 131.6 cm², P: 121.6 cm

Shower area
- a: 5 cm², P: 81.6 cm

Wardrobe
- a: 9 cm², P: 101.8 cm

Fence
- a: 200 cm², P: 150 cm
Fully Meets Expectations

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Teacher’s Observations

This student completed all parts of the task, and clearly understands both area and perimeter. There are some careless errors in long calculations although the work shown is correct.

- applies relevant concepts, skills, and strategies appropriately; may make minor errors
- structures the task into logical steps or stages
- needs help to verify results or solutions using estimation and mental calculation
- work is generally clear and easy to follow
Legend:
- Trampoline: Area: 1+1+1+1=4 cm², Perimeter: 1+1+1+1
- Vending machine: Area: 1+1+1+1+1.5=4.5 cm², Perimeter: 1+1+1+1+1+1.5

Pool: Area: 4+4+1=12 cm², Perimeter: 4+4+3+3=14 cm³

Deck: Area: 4+4=8 cm², Perimeter: 4+5+1+4+3+1=18 cm³

Arcade: Area: 1+1+1.5+1.5+1.5=4 cm², Perimeter: 2+1.4+1.4+1.4

Movie theater: Area: 9+1.5+1.5=12 cm², Perimeter: 2+6+2+1.4+4+1.4+1.4=14.8 cm²

Sauna: Area: 2+2=4 cm², Perimeter: 2+2+2+2+2+2+2+2=18 cm²

Flipover: cm²
- BBQ: Area: $1 + 1 = 2\text{ cm}^2$, Perimeter: $2 + 1 + 2 + 1 = 6\text{ cm}$

- Doghouse: Area: $2 + 2 = 4\text{ cm}^2$, Perimeter: $2 + 2 + 2 + 2 = 8\text{ cm}$

- Picnic table: Area: $2 + 1.5 + 1.5 + 1.5 + 1.5 + 1.5 + 1.5 = 10\text{ cm}^2$, Perimeter: $1.4 + 1.4 + 1.4 + 1.4 + 1.4 + 1.4 + 1.4 + 1.4 = 9.2\text{ cm}$

- Fence: I would need $10 + 10 + 20 + 20 = 60$ m of fence. It would cost $100 + 200 + 100 + 200 = \$600.00$ to fence my yard.

- Cat house: Area: $1.5 + 1.5 + 1.5 + 1.5 = 4.5\text{ cm}^2$, Perimeter: $1.4 + 1.4 + 1.4 + 1.4 = 5.6\text{ cm}$
Grade 5 Measurement: Additional Sample 2

*Designing Packing Crates*

**Context**

Students in this class routinely keep learning logs to record their thinking in a variety of subject areas. The teacher finds this especially useful in assessing their thinking in problem solving. The teacher uses the following generic guide for learning logs:

Idea you can use in your journal:
- **questions** you have about anything you’re doing, whether at the beginning, anytime during the project, or even at her very end;
- **answers** to anything you had questions about;
- description(s) of how you did your work (could include a diagram);
- telling what you learned at any time during the activity;
- **ideas** you tried, and whether they worked or not;
- changes you made in your thinking (be sure to tell why you made the changes);
- ideas you heard other people talk about and what you thought about those ideas, whether you agreed or disagreed with them and why;
- anything else that has to do with the project during the time you are working on it.

Remember: Every thought is important to write down.

**Mathematical Concepts**

- generate and of a problem, the process used to solve it, and the justification of the solution
- solve problems extend number patterns from a problem-solving context
- recognize and explain the meaning of length, width, height
- estimate, measure, and record the volume of containers, using cm³
- solve problems that involve one or more specific content areas (e.g., number concepts, number operations, shape and space)
- analyze problems to develop a plan (e.g., identify key words, relevant information
- develop specific skills in selecting and using an appropriate problem-solving strategy or combination of strategies from, but not restricted to: guess and check; identify patterns; use a list, chart, or table; make and use a picture or diagram; role play; model using objects; work backward; simplify the original problem
- verify that solutions to problems are correct and reasonable
- communicate an understanding individually and cooperatively
Process

The students were presented with the following scenario:

You work in the shipping department of a company that manufactures various non-toxic products. Orders come in various amounts and require boxes of different sizes. A large order has come from England, requiring your company to build and pack a large crate that will be put on a ship and sent across the Atlantic Ocean. Your job is to design a crate with a volume of 10,000 cm³. You must figure out the dimensions that will be most efficient with respect to not wasting space. The boxes that will be packed in the crate can be different sizes, but the smallest is 4 x 4 x 4 cm. You decide to build a scale model of your packing crate.

In addition to the generic guide for learning logs, the teacher prepared a list of questions specific to this activity that students could use to prompt their thinking when writing in their learning logs:

- Any new problems, questions, or discoveries?
- What do you think about the other crates that are being made?
- Any predictions?
- Why are so many people making small boxes to fit in their crate? What will fill up the crate faster, big or little boxes?
- Is it easier working with a partner? Why or why not?
- Was teamwork important? Is teamwork important for “real” jobs and careers? Why or why not?
- Did you change something? What was it and why?
- Did you make a mistake? How did you know it was a mistake? Did you learn anything from that? What did you learn?
- What made it easier to cut out your boxes?
- What about waste?
- Do all the boxes need to be the same size?
- Was it hard working with a time limit? Do “real” jobs have set time limits? What might they be?
- Were you an efficient packer? How do you know?
- Did you use all the space in your crate? How did you figure that out?
- What did you think about as you were making your boxes?
- Did you work as hard as you could? Why or why not? Did you waste time? What are some things you did that wasted your time?
- If this was a “real” job and your team rated your work, what would they say?
- What did you learn from this whole activity?

Students worked with a partner to design the crate, but completed their learning logs individually.
Meets Expectations (Minimal Level)

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Teacher’s Observations

The dimensions of the crate were 10 x 10 x 100; all their boxes were 4 x 4 x 4. Although these dimensions are a correct option, their crate was bulging, suggesting problems with measurement.

- applies most relevant mathematical concepts, skills, and strategies appropriately; some errors or omissions
- identifies simple patterns and relationships
- follows stages, steps, or sections of the task without adjusting or checking procedures; inefficient
- may include some calculation errors; generally answer or solution is “close”
- work may be confusing in places with some necessary information omitted
- includes most required diagrams; those provided may be incomplete
- demonstrates procedures and explains results logically, in own words, using some mathematical language
# My Learning Log
I think that figuring the number of papers is hard because it uses a lot of calculation. I think it would work better if we did the box as a class so we would have enough paper to go around for the box. So I think that this poset can be done if done right.

\[ \text{height} \times \text{length} \times \text{width} = 10,000 \quad \text{If all of} \]
\[ \text{height} \quad f \quad \text{width} \quad \text{length} \quad \text{height} \quad f \quad \text{height} \quad \text{f} \quad 10,000 \]

the packing crate won't hold the same amount.
We were the first to finish our packing box. We did it in 45 minutes and started to pack it before anyone did. I think that me and Gusten make a good team.

First Gusten thought 10 x 10 x 100 made 10,000, so we did it and got a rectangular prism. All the packed boxes we packed were 4x4x4. Alec gave me and Gusten how to get 100 length. When we did the project I thought it took a lot of calculations on a calculator.
All we did was pack our packing boxes.

All we did was packing our packing boxes, and put them in.

All we need to do now is put the top on.

We used over 77 boxes, I think that it went smoothly. Our box sotes out abite. We hope right after library and slimming our packing box.

That's how we got so far, I learned that 1000 is a lot.
I thought it was very easy to work with a time limit. I know that packing and oil and gas jobs have time limits. I thought teamwork work was important. I thought we worked as hard as we could. Yes, I think you would get hired if you used your time wisely. You would get fired if you wasted your time.

Thank you for listening.
Fully Meets Expectations

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Teacher’s Observations

This group made a crate 10 x 10 x 10, then decided these were not the most efficient dimensions and made one 25 x 20 x 20; all their boxes were 4 x 4 x 4. The work was complete and accurate.

- applies relevant concepts, skills, and strategies appropriately; may be somewhat inefficient
- identifies and uses simple patterns and relationships
- structures the task into logical steps or stages; may be somewhat inefficient
- may independently verify results or solutions by using estimation, mental calculations, or inverse operations
- calculations are generally accurate
- includes required diagrams
- demonstrates procedures and explains results clearly and logically, using appropriate mathematical language
The first thing I did was look at the volume which was 10000. Then I found the length, width, and height. The length is 10, the width was 10, and the height is 100. After I found out the length, width, and height, I had to find out how many pieces of paper I needed to have to make it fit. Me and Lorissa only made one side. The one side we made took about 2 and 1/2.

I started my box over because I think if it looks more like a box it will fit more boxes inside it. The width of my new box is 20. The length of my new box is 20, and the height is 25. What I found difficult was trying to make the sides. Most of the other boxes in my class are longer. It is easier working with a partner because then your partner can help you and you can get your work done faster.
I finished the big box except the top. And now I am working on the little boxes. I made 2 boxes with the volume of 125, the length width and height is 5.

I am making little boxes to fill up my crate, not big ones because I think it will be easier to see how many will fill it up.

My crate looks like this.

Something I found difficult was making some of the little boxes because we couldn't fit one box on the pepper, so we made the box smaller so we could make 3 on one peace of pepper.
we only made 36 more boxes and we need 4 more Cees to fill it up perfectly.
I think some people’s crates aren’t right because Jess and Anglas cart has the same length and width but it is way toller then are ares and they said it had the right volume. How is that possible?

It was hard working with a time limit because we had to make a new crate because it was too long, before are crate looked like this → and now it looks like this ↓
Team work was very important because if we didn't get along as a project would not of turned out as good.
I think team work is important in real jobs to.
Grade 5 Money: Additional Sample 1

Sporting Goods Sale

Context
This class was nearing completion of a unit on fractions and decimals. The teacher wanted to provide some practical applications for their learning.

Mathematical Concepts
- represent proper fractions concretely, pictorially, or symbolically
- add and subtract decimal fractions to hundredths concretely, pictorially, and symbolically
- multiply and divide decimal numbers to hundredths concretely, pictorially, and symbolically, using one-digit whole number multipliers and divisors
- verify solutions using mental math or a calculator

Process
The students were asked to imagine that they had $100 to spend at a sporting goods store currently having a sale, and provided with advertisements showing original prices and percent reductions. They were asked to work individually to calculate the sale costs of various items to determine what they could get with $100, and different combinations of items they could buy for $100.

Note: Students were told to ignore sales tax.
Meets Expectations (Minimal Level)

Teacher’s Observations
This student was initially not able to figure out how to calculate the price reductions. She required some prompting to identify the inverse operation. She was not able to estimate that the sleeping bag was too expensive to buy in combination with other items and had to do the calculations before she rejected it. She was not able to come up with a second combination.

- identifies most mathematical concepts and procedures needed to solve problems or complete tasks
- applies most relevant mathematical concepts, skills, and strategies appropriately; some errors or omissions
- may include some calculation errors
- work is generally clear and easy to follow
Youth Roller Skates!
What is $\frac{1}{3}$ of 79.99
\[
\begin{array}{c}
26.66 \\
3 \mid 79.99 \\
-26.66 \\
\underline{53.33}
\end{array}
\]

Mummy Style Sleeping Bag
What is $\frac{1}{4}$ of 125.00
\[
\begin{array}{c}
31.25 \\
4 \mid 125.00 \\
-31.25 \\
\underline{93.75}
\end{array}
\]

Light Weight Day Packs
What is $\frac{1}{4}$ of 39.00?
\[
\begin{array}{c}
9.75 \\
4 \mid 39.00 \\
-9.75 \\
\underline{29.25}
\end{array}
\]

53.33 Skates
I'm going to keep my 17.42 + 29.25 daypack for my horse that I'm going to buy!
mummy sleeping
bag. what is \( \frac{1}{4} \) of 125.00

\[
\begin{array}{c}
31.25 \\
4 \times 125.00 \\
-31.25 \\
93.75
\end{array}
\]

\[
\begin{array}{c}
125.00 \\
-93.75 \\
31.25
\end{array}
\]

I have 6.25 money left

I bought these items:
1. youth roller skates (53.33)
2. lightweight day pack (29.25)
3. mummy sleeping bag (93.75)
Fully Meets Expectations

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Teacher’s Observations

This student approached the task confidently, using estimation to determine combinations and then doing the calculations. She had no difficulty coming up with a second combination of items.

- identifies the mathematical concepts and procedures, including relevant algorithms, needed to solve problems or complete tasks
- applies relevant concepts, skills, and strategies appropriately
- structures the task into logical steps or stages
- calculations are generally accurate
- work is generally clear and easy to follow
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<td>In line skates</td>
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<tr>
<td>Bicycle Helmet</td>
<td>$23.32</td>
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<tr>
<td>Running shoes</td>
<td>$20.00</td>
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<td><strong>Total</strong></td>
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**Change**

*96.65 - 20.00 = 76.65*

Signature

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May 4 2001

1 off

79.99 ÷ 3 = 26.66

79.99

- 26.66

$53.33 In line skates

1/3 off

34.98 ÷ 3 = 11.66

34.98

- 11.66

$23.32 Bicycle Helmet

1/3 off

29.99 ÷ 3 = 9.99

29.99

- 9.99

$20.00 Running shoes
|
|---|---|
| **$100** | **May 4, 2001** |
| **40% off** | |
| **125.00 ÷ 4 = 31.25** | |
| **$98.75** | **3-season mummy style sleeping bag** |
| **31.25** | **$93.75** |
| **93.75** | **Lightweight day pack $29.25** |
| **$4.50** | **Bill** |
| **3-season mummy style sleeping bag** |
| **$4.50** | **Total charge $93.75** |
| **93.75** | **Change $6.25** |
| **$29.25** | **Signature **|
| **Lightweight day pack** |  |