

## **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 1 cm = 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.

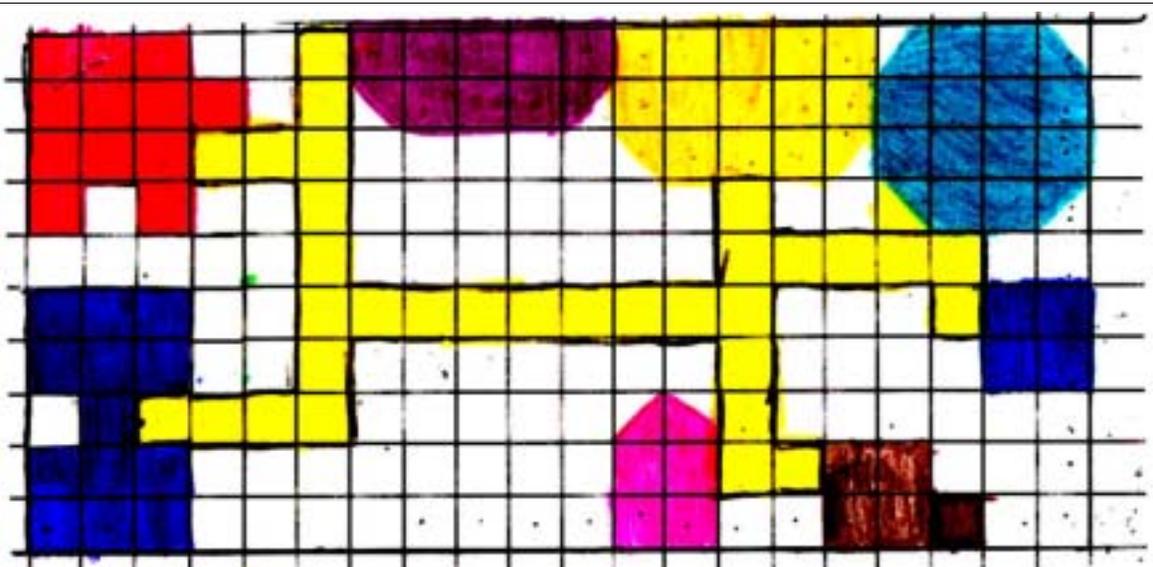
## Meets Expectations (Minimal Level)

	NOT YET	MEETS	FULLY	EXCEEDS
SNAPSHOT				
CONCEPTS AND APPLICATIONS				
STRATEGIES AND APPROACHES				
ACCURACY				
REPRESENTATION AND COMMUNICATION				

### 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



- Tree
- Pool -  $a: 14 \text{ cm}^2$   $P: 28.6 \text{ cm}$
- Walking zone  $a: 7 \text{ cm}^2$   $P: 19 \text{ cm}$
- Grass  $a: 12$   $P: 16 \text{ cm}$
- Shrub -  $a: 4 \text{ cm}^2$   $P: 8 \text{ cm}$
- Tree  $a: 4 \text{ cm}^2$   $P: 10 \text{ cm}$
- Walkway  $a: 31.4 \text{ cm}^2$   $P: 56.4 \text{ cm}$
- Deck  $a: 131.8 \text{ cm}^2$   $P: 121.8 \text{ cm}$
- Store where you get candy from  $a: 5 \text{ cm}^2$   $P: 6.6 \text{ cm}$
- Border  $a: 9 \text{ cm}^2$   $P: 10.8 \text{ cm}$
- Fence  $a: 200 \text{ cm}^2$   $P: 600 \text{ cm}$

## Fully Meets Expectations

	NOT YET	MEETS	FULLY	EXCEEDS
SNAPSHOT				
CONCEPTS AND APPLICATIONS				
STRATEGIES AND APPROACHES				
ACCURACY				
REPRESENTATION AND COMMUNICATION				

### Teacher's Observations

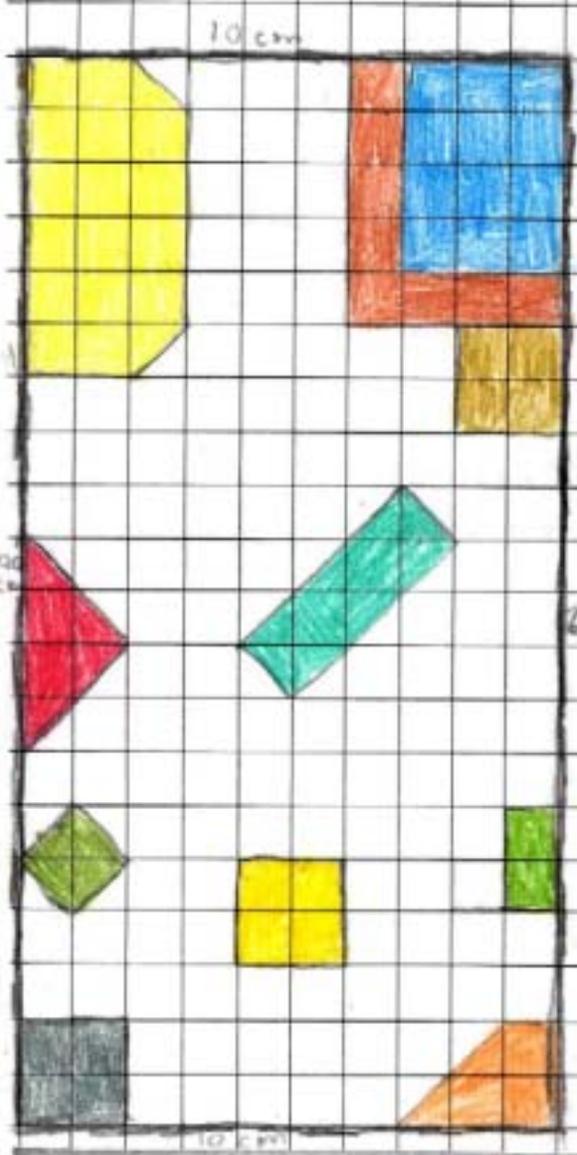
This student completed all parts of the task, and clearly understands both area and perimeter. There are some careless errors in long calculations although the work shown is correct.

- 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

June 5, 2008

Legend

- Trampoline: Area:  $1+1+1+1=4\text{cm}^2$  Perimeter:  $1+1+1+1=4\text{cm}$
- Vending machine: Area:  $1+1+1+1.5+1.5=4\text{cm}^2$  Perimeter:  $1+1+1+1+1+1+1.4+1.4=6.2\text{cm}$



- Pool: Area:  $4+4+4=12\text{cm}^2$  Perimeter:  $4+4+3+3=14\text{cm}$
- Deck: Area:  $4+4=8\text{cm}^2$  Perimeter:  $4+5+1+4+3+1=18\text{cm}$
- Arcade: Area:  $1+1+1.5+1.5+1.5=4\text{cm}^2$  Perimeter:  $2+1.4+1.4+1.4+1.4+1.4=6.4\text{cm}$
- Movie theater: Area:  $9+1.5+1.5+7=13\text{cm}^2$  Perimeter:  $2+6+2+1.4+1.4=11.8\text{cm}$
- Sauna: Area:  $2+2=4\text{cm}^2$  Perimeter:  $2+2+2+2=8\text{cm}$

Flipover

■ - 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:  $2+1.5+1.5+1.5+1.5+1.5+1.5+1.5+1.5=10\text{ cm}^2$ . Perimeter:  $1.4+1.4+1.4+1.4+1.4+1.4+1.4+1.4=4.2\text{ cm}$

- 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:  $1.4+1.4+1.4+1.4=3.6\text{ cm}$

## 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:

Ideas 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  $\text{cm}^3$
- 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  $10\,000\text{ cm}^3$ . 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  $4 \times 4 \times 4$  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)

	NOT YET	MEETS	FULLY	EXCEEDS
SNAPSHOT				
CONCEPTS AND APPLICATIONS				
STRATEGIES AND APPROACHES				
ACCURACY				
REPRESENTATION AND COMMUNICATION				

### 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

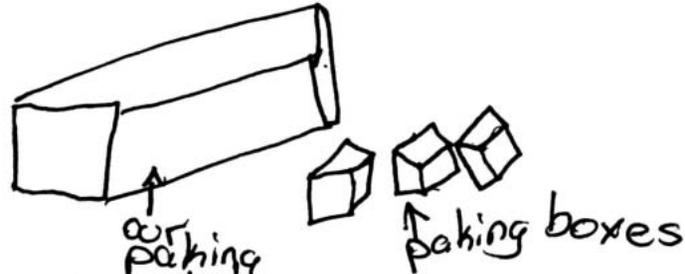
#5

MY  
LEARNING  
LOG



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 Susan make a good team. First Susan thought  $10 \times 10 \times 100$  made 10,000. So we did it and got a rectangular prism, all the packed boxes we packed were  $4 \times 4 \times 4$ . Alec gave me and Susan how to get 100 length. When we did the project I thought it took a lot of calculations on a calculator.

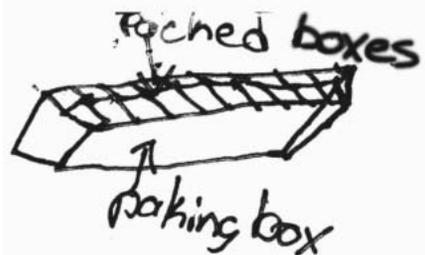
All we did was pack our packing boxes



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 sits out a bit. We hope that's ok. We have started on <sup>and</sup> simming our packing box right after library and that's how we got so far. I learned that 10000<sup>ers</sup> is a lot.



I thought it was very easy to work with a time limite. I know that packing and oil and gas jobs have time limits. I thought team work was inportent. I thought we worked as hard as we could, yes I think you would get hired if you you used your time wisly. You would get fired if you wasted your time.

thank you for listhing

## Fully Meets Expectations

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### Teacher's Observations

This group made a crate  $10 \times 10 \times 10$ , then decided these were not the most efficient dimensions and made one  $25 \times 20 \times 20$ ; all their boxes were  $4 \times 4 \times 4$ . 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

#2

# LEARNING LOG

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. Me and Lorissa only made one side. The one side we made took about 2 and a  $\frac{1}{2}$

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I started my Box over because I think if it looks more like a  $\square$  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 could only fit one box on the paper so we made the boxes smaller so we could make 3 on one piece of paper.



we only made 36 more boxes and we need 4 more boxes to fill it up perfectly.

I think some people's crates aren't right because Jess and Angus's cart has the same length and width but it is way taller than ours and they said it had the right volume. How is that possible?

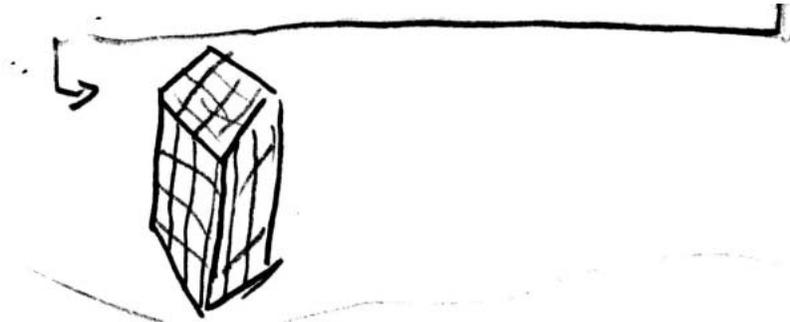
It was hard working with a time limit because we had to make a new crate because it was too long. Before our crate looked like this →



It looks like this



and now



Team work was very important because  
IF we didn't get along a project  
would not turn out as good.  
I think team work is important  
in real jobs too.

## **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)

	NOT YET	MEETS	FULLY	EXCEEDS
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REPRESENTATION AND COMMUNICATION				

### 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

$$\begin{array}{r} 26.66 \\ 3 \overline{) 79.99} \\ \underline{79.99} \\ 0 \end{array}$$
$$\begin{array}{r} 79.99 \\ - 26.66 \\ \hline 53.33 \end{array}$$

mummy style  
Sleeping bag

What is  $\frac{1}{4}$  of 125.00

$$\begin{array}{r} 31.25 \\ 4 \overline{) 125.00} \\ \underline{125.00} \\ 0 \end{array}$$

Can't  
Buy

$$\begin{array}{r} 125.00 \\ - 93.75 \\ \hline 31.25 \end{array}$$

total for sleeping bag

light weight Day Packs

What is  $\frac{1}{4}$  of 39.00?

$$\begin{array}{r} 9.75 \\ 4 \overline{) 39.00} \\ \underline{39.00} \\ 0 \end{array}$$

$$\begin{array}{r} 39.00 \\ - 9.75 \\ \hline 29.25 \end{array}$$

29.25 cost of day pack

$$\begin{array}{r} 53.33 \\ - 17.42 \\ \hline 35.91 \end{array}$$

$$\begin{array}{r} 53.33 \text{ skates} \\ + 29.25 \text{ daypack} \\ \hline 82.58 \end{array}$$

I'm going to keep my 17.42  
for my horse that I'm going to  
Buy!

mummy Sleeping

Bag. what is  $\frac{1}{4}$  of 125.00

$$4 \overline{) 125.00} \quad \begin{array}{r} 31.25 \\ \hline \end{array}$$

$$\begin{array}{r} 125.00 \\ - 31.25 \\ \hline 93.75 \end{array}$$

I have 6.25 money left

$$\begin{array}{r} 125.00 \\ - 93.75 \\ \hline 6.25 \end{array}$$

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I bought these Items:

1. youth roller Skates (53.33)  
light weight day Pack (29.25)
2. mummy Sleeping bag (93.75)

## Fully Meets Expectations

	NOT YET	MEETS	FULLY	EXCEEDS
SNAPSHOT				
CONCEPTS AND APPLICATIONS				
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REPRESENTATION AND COMMUNICATION				

### 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

\$100

May 4 2001

$\frac{1}{3}$  off

$$79.99 \div \frac{1}{3} = 26.66$$

79.99	
- 26.66	
<u>\$53.33</u>	In line skates

$\frac{1}{3}$  off

$$34.99 \div \frac{1}{3} = 11.66$$

34.99	
- 11.66	
<u>23.32</u>	Bicycle Helmet

$\frac{1}{3}$  off

$$29.99 \div \frac{1}{3} = 9.99$$

29.99	
- 9.99	
<u>20.00</u>	Running shoes

In line skates \$53.33

Bicycle Helmet 23.32

Running Shoes  
20.00

Bill

In line skates	53.33
Bicycle Helmet	23.32
Running shoes	+ 20.00
	<u>96.65</u>

Total charge 96.65

change 3.35

signature \_\_\_\_\_

\$100

May 4 2001

$\frac{1}{4}$  off

$$125.00 \div \frac{1}{4} = 31.25$$

<del>125.00</del>
31.25
<hr/>
93.75

3-season mummy style sleeping Bag

$\frac{1}{4}$  off

$$39.00 \div \frac{1}{4} = 9.75$$

<del>39.00</del>
- 9.75
<hr/>
29.25

Lightweight day packs

3-season mummy style sleeping bag  
93.75

Lightweight day pack 29.25

Bill

3-season mummy style sleeping bag 93.75

Total charge 93.75  
change 6.25

Signature \_\_\_\_\_