

SECONDARY SCHOOLS IMPROVEMENT PROGRAM (SSIP)

2019

GRADE 12

SUBJECT: MATHEMATICAL LITERACY

EDUCATOR NOTES

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SESSION 1

TOPIC: Measurement

SECTION: Conversions and Time

CONTEXT: Baking/Cooking, Climate and Weather Change

TERMINOLOGY: Area, Perimeter, Volume

By the end of this session, you should be able to:

- Convert units of measurement from memory for the metric system
- Convert units of measurement for metric to imperial units, solid to liquid conversions and temperature
- Read, record and perform calculations involving time values
- Calculate speed, distance and time

1.1. Facts about conversion

METRIC	IMPERIAL
- In South Africa we use a measuring system called the Metric System. - Metric system works in multiples of 10s.	- Other countries make use of a different system called the Imperial System - Imperial system does not work in multiples of 10s
Some of the more common units used in metric system	Some of the more common units used in imperial system
Grams – g	Ounces – oz
Milligrams – mg	
Kilograms – kg	Pounds – lb
Tonne – tonne	Stone – stone
	Ton – ton
Centimetres – cm	Inches – in
Millimetres – mm	
Metres – m	Feet – ft
	Yards – yd
Kilometre – km	Miles – miles
Hectare – ha	Acre – acre
Millilitres – ml	Fluid ounces – fl oz
Litres – l	Pints – pt
Kilolitres – kl	Gallons – gal

We will be looking at conversions for length, mass and volume, as well as a few basic cooking/baking conversions.

NB:

- You are expected to know the conversions within the metric system and they will not be given to you in your exam
- One way of learning the metric system conversions, is to use the following tips:

Length or Distance	Mass	Volume
- K ing H enry D ied a M iserable D eath c alled M easles	- K ing H enry D ied a g ross d eath c alled m easles	- K ing H enry D ied a l ousy d eath c alled m easles
Write the bold letters down and you will have all the units.		
Km	Kg	Kl
H	H	H
D	D	D
m	g	l
d	d	D
cm	c	c
mm	mg	ml
NB - When converting from the top down, multiply by 10. - When converting from the bottom up, divide by 10.		

Example1

Below is a list of ingredients given to bake cakes:

- 1 cup butter
- $\frac{1}{2}$ teaspoon salt
- $1\frac{1}{2}$ cups sugar
- 1 teaspoon cinnamon
- 3 eggs
- 1 cup chopped nut meat, hickory or English walnut
- 1 teaspoon soda
- $1\frac{1}{2}$ tablespoons hot water
- $\frac{1}{2}$ cup currants
- $3\frac{1}{4}$ cups flour
- $\frac{1}{2}$ cup raisins, seeded and chopped

- a. A conversion table says that 1 cup flour = 125 g. How many grams of flour will be needed? Round your answer off to the nearest 10.
- b. Another conversion table says that 1 cup = 250 ml. If you use this conversion, how many ml of flour is needed for this recipe?
- c. If you want to double up on this recipe, how many ml of water will be used?
- d. A bottle of cinnamon has 100 ml. How many batches of cakes can be made with 1 bottle?

Answers:

- a. $3\frac{1}{4} \times 125 \text{ g} = 406,25 \text{ g} \approx 410 \text{ g}$
- b. $3\frac{1}{4} \times 250 \text{ ml} = 812,5 \text{ ml} \approx 810 \text{ ml}$
- c. $1\frac{1}{2} \times 2 = 3 \text{ T} = 3 \times 15 \text{ ml} = 45 \text{ ml}$
- d. $1 \text{ t} = 5 \text{ ml}$
 $100 \text{ ml} \div 5 \text{ ml} = 20 \text{ batches}$

1.2. Converting between metric and imperial systems

- These conversions will be given when required for a question.
- Writing these down as ratios and then setting up an equation to solve is one of the ways that make the conversions quite easy.
- For example:
A cup holds 0,6litre of tea
How many pints (pts) of tea does the cup hold?
Use 1litre = 1,76pt

Answer:

$$\begin{array}{lcl} 1l & : & 1,76pt \\ 0,6l & : & \text{required pt of tea} \end{array}$$

$$\begin{aligned} \text{required pt of tea} &= \frac{1,76pt \times 0,6l}{1l} \\ &= 1,06pt \end{aligned}$$

1.3. Temperature conversions

To convert from °Celsius to °Fahrenheit use the following formulae:

$$^{\circ}\text{F} = (1,8 \times ^{\circ}\text{C}) + 32^{\circ} \quad \text{or} \quad ^{\circ}\text{C} = (^{\circ}\text{F} - 32^{\circ}) \div 1,8$$

NB: these formulae will be given to use.

For example:

A cake needs to bake at a temperature of 250°F.

Use the conversion $^{\circ}\text{C} = (^{\circ}\text{F} - 32^{\circ}) \div 1,8$ to calculate at what temperature (Celsius) the cake needs to bake, correct to the nearest ten degrees.

$$\begin{aligned} ^{\circ}\text{C} &= (250^{\circ}\text{F} - 32^{\circ}) \div 1,8 \\ &= 121,111... ^{\circ}\text{C} \\ &\approx 120^{\circ}\text{C} \end{aligned}$$

1.4. Solids to liquids

Volume can be measured using different units: either unit³ or in litres.

The conversions are as follows and one of them should be given if it needs to be used:

$$\begin{array}{lcl} 1 \text{ ml} & = & 1 \text{ cm}^3 \\ 1 \text{ l} & = & 1\,000 \text{ cm}^3 \\ 1 \text{ kl} & = & 1 \text{ m}^3 \end{array}$$

For example:

A box has the following dimensions: 20 cm × 30cm × 40 cm.

How many litres of liquid can the box hold?

Use the conversion: 1l = 1 000 cm³

Volume = length × breadth × height

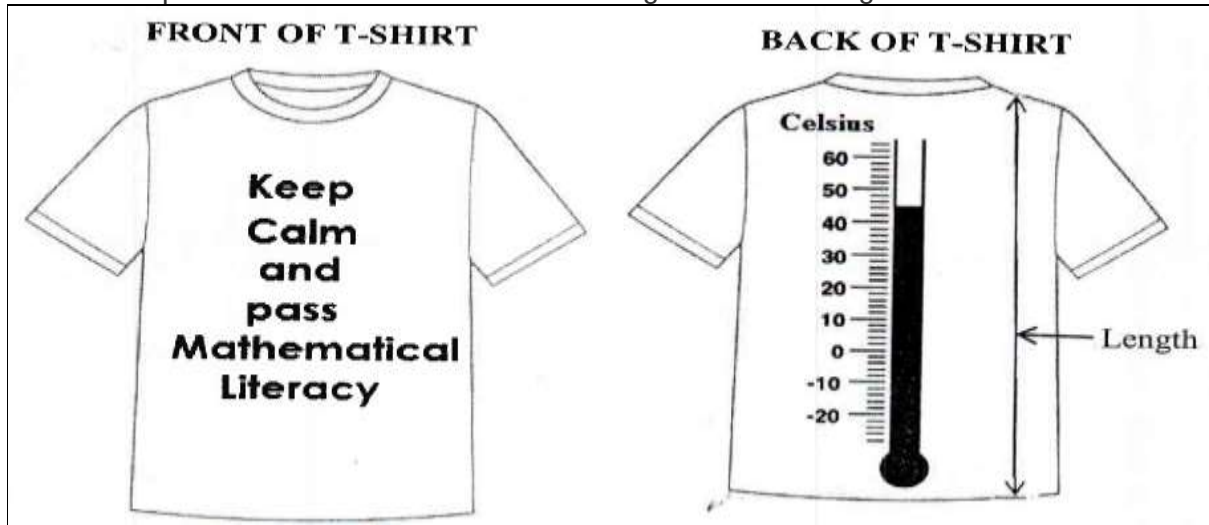
$$= 20 \text{ cm} \times 30 \text{ cm} \times 40 \text{ cm}$$

$$= 24\,000 \text{ cm}^3$$

$$= 24\text{l}$$

Question 1 (Adapted from MLT P1 2018 NSC)

1.1. The picture below is a 1:25 scaled drawing of a T-shirt for grade 12 learners.



1:25

Use the picture above to answer the questions that follow:

- a) Calculate the number of letters needed to print the logo on the front of the T-shirt. (2)
 - b) Write down the temperature displayed on the thermometer in °C. (2)
 - c) Explain the meaning of the scale in the drawing above. (2)
- 1.2. The cake must be baked at 356°F.
Determine to what degree Celsius the oven should be turned.
You must use the formula: $^{\circ}\text{C} = (^{\circ}\text{F} - 32^{\circ}) \div 1,8$ (2)
- 1.3. The distance from Joe's house to the parkrun is 2,34km. The team travel at an average speed of 40 km/h.
Determine how long it will take the team (in minutes) to get from Joe's house to the parkrun.
You must use the formula: $Speed = \frac{distance}{time}$ (3)

1.4.

The Comrades Marathon Association (CMA) has issued its medical statistics for the race held on Sunday 4 June 2017.
Start of the race: 05:30
End of the race: 17:30

TABLE 2 shows the medical statistics on race day.

TABLE 2: MEDICAL STATISTICS

Athletes starting the race	17 031
Athletes finishing the race	13 852
Athletes treated in the medical tent	400
Hospital-treated athletes	90
Hospital-admitted athletes	40

[Adapted from <http://www.runnersworld.co.za>]

Use the table 2 above to answer the questions that follow:

- Write down the maximum time given to the athletes to complete the comrades Marathon. (2)
- Write down the ratio of athletes starting the race to the athletes finishing the race. (2)

Question 2

Use the Tide Time table (Annexure A) to answer the questions that follow:

- Use the Tide Time table to complete the following:

On Friday, 19th of February of 2019, the sun rose at (a) ----- and sunset will be at (b) -----.

In the high tide and low tide chart, we can see that the first low tide was (c) ----- high at 7:38am and the next low tide was 0,52 m at (d) ----- . (4)

- Give the summary of the weather on 20th February in the afternoon till night. (2)
- If a balloon is released on Thursday afternoon, exactly how far in kilometres, centimetres would the balloon have travelled in 779 seconds? Give your answer correct to the nearest centimetre.

You must use the formula $Speed = \frac{Distance}{Time}$ (3)

Annexure A: Tide Table

The Tide Table for 7 days Issued (local time): 7 am Tuesday 16 Feb 2019																		
	Saturday 16			Sunday 17			Monday 18			Tuesday 19			Wednesday 20			Thursday 21		
Name	morning	Afternoon	night	morning	Afternoon	night	morning	Afternoon	night	morning	Afternoon	night	morning	Afternoon	night	morning	Afternoon	night
Wave Height Map (See all maps)																		
High Tide height (m)	9:57A M 1.46		10:57P M 1.36		11:33 AM 1.45	12:25A M 1.43		12:47P M 1.51	1:25A M 1.53		1:41P M 1.59	2:09A M 1.64		2:24P M 1.65	2:46A M 1.72		2:59P M 1.70	3:19A M 1.78
Low Tide height (m)		4:46P M 0.72		5:18A M 0.77		6:12P M 0.68	6:40A M 0.70		7:14P M 0.60	7:38A M 0.61		8:00P M 0.52	8:22A M 0.53		8:38P M 0.45	8:58A M 0.47		9:10P M 0.40
Wave Height (m)	3.0	3.0	3.0	2.2	2.3	2.1	1.6	1.6	1.5	1.4	1.6	2.2	3.0	3.0	2.5	3.0	3.0	2.5
Period (s)	8	8	8	13	13	12	12	11	11	16	15	15	14	13	12	10	10	12
Wind (km/h)																		
Today's sea temperature is 17.0 °C (Statistics for 16 Feb 1981-2005 – mean: 19.8 max: 21.4 min: 18.6 °C)																		
																		
Summary	Clear	clear	clear	clear	clear	clear	clear	clear	clear	some clouds	rain shwrs	rain shwrs	rain shwrs	rain shwrs	clear	clear	clear	clear
Sunrise	6:22	-	-	6:22	-	-	6:22	-	-	6:24	-	-	6:24	-	-	6:26	-	-
Sunset	-	7:37	-	-	7:37	-	-	7:35	-	-	7:34	-	-	7:32	-	-	7:31	-

MEMORANDUM

QUESTION 1		
Ques	Solution	
1.1.	a)	35
	b)	42°C
	c)	One unit on the drawing represents twenty five units in reality
1.2.	°C = 180°	
1.3.	Time = 3,51 min	
1.4.	a)	12 hours
	b)	17031 : 13852
QUESTION 2		
2.1.	a)	06:24
	b)	19:34
	c)	0,61m
	d)	20:00
2.2.	Rain in the afternoon Clear in the evening	
2.3.	779 ÷ 3 600 = 0,2163888889 hours 0,2163888889hrs x 40km/h = 8,655555556km In centimeters = 86555,56cm	