Maths

Measurement

THE LENGTH OF THE GLUE STICK IS ABOUT 9 CM

Preview

For Middle Primary

mini e-book

Contents

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Measurement

Believe me, that toad was as big as a hippo!

Why do we use common units of measurement?

Common units of measurement help people all around the world agree on the length, the mass or the capacity of things. Common units of measurement for example, help us to more easily understand Olympic world records and agree on the world's tallest man!

1 Read the 9 statements below and decide what is being measured: length, mass or capacity. Put an L, M or C next to each statement. Look at the example.

1. Mia wants to find out if she's grown since last year.	L
2. The truck driver needs to know how much petrol will fill his truck.	
3. The nurse weighs the baby.	
4. The seamstress is making a wedding dress.	
5. The patient takes the correct dose of medicine.	
6. A teacher wonders if there's room for a bigger display board.	
7. A vet wants to know how many worm tablets to give the dog.	
8. I need to know if all my clothes will fit in a suitcase.	
9. Chloe wants to know how far the nearest bus stop is.	

2 Work with a partner. Make up examples like the ones above to go with: length, mass and capacity.

length:

mass:

capacity:

Length 1

You know that you can use a ruler to measure the length of a pencil, but did you know that a pencil can be used to estimate the length of other things?

Most pencils and pens are about one centimetre (1 cm) wide.

1 cm

*E.g. You can use a pencil to estimate the length of your glue stick: *The example below has been scaled down.*

THE LENGTH OF THE GLUE STICK IS ABOUT 9.5CM

Choose and Estimate

1. Choose three small objects (e.g. eraser, crayon, sharpener) that you can lay in a vertical position on a sheet of paper.

2. Line up the end of a pencil as close to the edge of the object as you can. Label the first mark you make "0."

3. Continue to move your pencil along the object marking off the 1cm intervals.

4. The last labelled mark you make will help you estimate your objects' lengths.

5. Record your estimates in the table below.

	object 1	object 2	object 3
estimated length (cm)			
ruler (actual) length (cm)			

6. Measure your three objects again using your ruler. Remember to put the edge of the object as close to the "0" mark on the ruler as possible. Record the lengths in the table above.

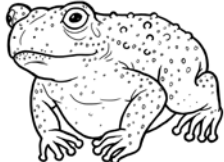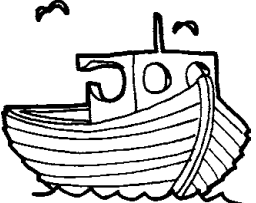7. What did you observe about the estimated and actual lengths of your objects?

_____

_____
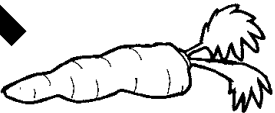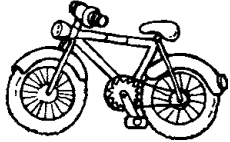
Length 2

1 **Would you measure the following objects in centimetres or metres? Remember there are 100 centimetres (100 cm) in one metre (1 m). Tick the correct unit.**

a
❏ cm   ❏ m

b
❏ cm   ❏ m

c
❏ cm   ❏ m

d
❏ cm   ❏ m

e
❏ cm   ❏ m

f
❏ cm   ❏ m

g
❏ cm   ❏ m

h
❏ cm   ❏ m

i
❏ cm   ❏ m

j
❏ cm   ❏ m

❏ cm   ❏ m

l
❏ cm   ❏ m

2 **Answer these questions using your answers from Question 1.**

a. Which objects would be longer than 5 metres?_____

_____

b. Which objects would be shorter than 30 cm? _____
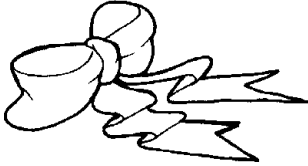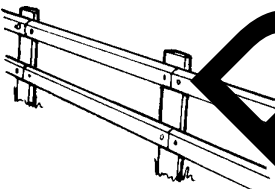
_____

c. How long do you think a blue whale is?_____

d. Estimate the length of a carrot. _____

Curriculum Link: Measure, order and compare objects using familiar metric units of length, mass and capacity (ACMMG061)
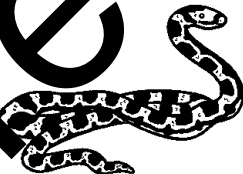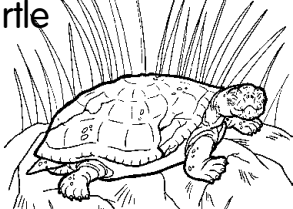
Mass 1

Mass tells you how light or heavy something is. The mass of light objects is measured in grams (g). The mass of heavy objects is measured in kilograms (kg).

Remember:

1000 g = 1 kg

WEIGH-IN TIME AT THE ZOO

Can you estimate the mass of each animal? Write your estimates in the table below. *A hint: the smallest animal is 3 g and the largest animal is 200 kg! Your teacher will tell you the average body mass for each animal later.*

1. Hairy-nosed Wombat	**2.** Numbat	**3.** Blue Tongue Skink
Estimated mass:	Estimated mass:	Estimated mass:
Actual average mass:	Actual average mass:	Actual average mass:
4. Male Koala	**5.** Carpet Python	**6.** Corroboree Frog
Estimated mass:	Estimated mass:	Estimated mass:
Actual average mass:	Actual average mass:	Actual average mass:
7. Fairy Penguin	**8.** Tasmanian Devil	**9.** Adult Green Sea Turtle
Estimated mass:	Estimated mass:	Estimated mass:
Actual average mass:	Actual average mass:	Actual average mass:

Which combination/s of animals could sit on a see-saw to balance out the average mass of four Tasmanian Devils? Draw your solution/s on the back of this sheet.

Curriculum Link: Measure, order and compare objects using familiar metric units of length, mass and capacity (ACMMG061)

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Mass 2

Put on your thinking caps to solve these problems related to mass. You can check your answers with a calculator.

1 At the Easter Show, pumpkin farmers receive a point for every gram their monster-sized vegetables weigh. The masses of the winning pumpkins are: 1st place: 735.5 kg; Runner up: 621 kg; Best in junior section: 347.2 kg. **How many points did each of the winning entries receive?**

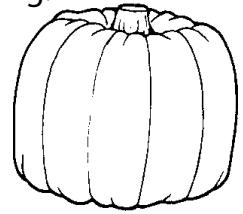**2** Mum bought a watermelon with a mass of 1 kg. She cut 3 slices from the watermelon to take on a picnic. Each slice had a mass of 150g. **What was the mass of the leftover watermelon that she put in the fridge?**
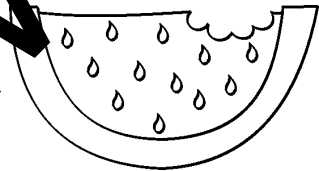
3 **Circle the heaviest fruit.** Explain your choice in the space below.

a   b   c
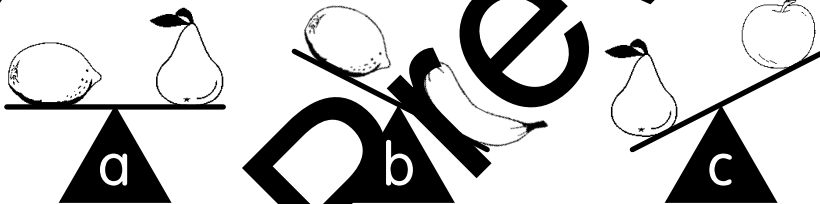
4 Oliver wants to make brownies for both teams competing in the cricket final next week. He's found a recipe for 20 servings that includes the following ingredients: 400g of sugar; 45g of cocoa powder; 250g of butter; 180g of flour.
How much sugar, cocoa powder, butter and flour does Oliver need if he wants to make 60 servings of brownies?

sugar   cocoa   flour
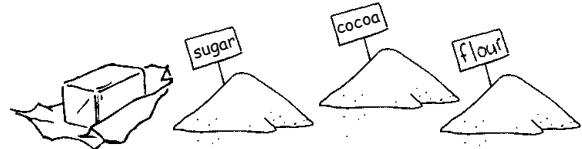
5 A man picks up a box containing 8 cans of sliced beetroot. The total mass of the cans is 3.4 kg. **How many grams does one can of sliced beetroot weigh?**

BEETROOT
400g

Massive Problems

Work with a partner. Rank the mass of these objects from heaviest (1) to lightest (3). Circle the unit of measurement – kg or gm. Be ready to justify your choices. Your teacher will tell you the answers later. Note that images are not to scale.

1.

☐ **kg**
☐ **gm**

◯ hippo   ◯ leopard seal   ◯ great white shark

2.

☐ **kg**
☐ **gm**

◯ box of cereal   ◯ pair of boots   ◯ single DVD

3.

☐ **kg**
☐ **gm**

◯ cup of rice   ◯ cake of soap   ◯ jeans

4.
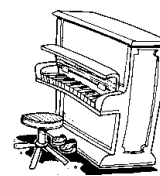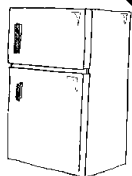
☐ **kg**
☐ **gm**

◯ refrigerator   ◯ washing machine   ◯ piano

5.
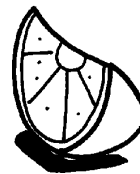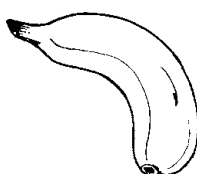
☐ **kg**
☐ **gm**

◯ chocolate bar   ◯ banana   ◯ orange wedge

Curriculum Link: Compare objects using familiar metric units of area and volume (ACMMG290)

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Present Problems

Mrs. Fernandes is posting presents to her family overseas. The weight of each box is shown below. Answer the questions that follow.

1½ kg box **a**

2 kg box **b**

0.6 kg box **c**
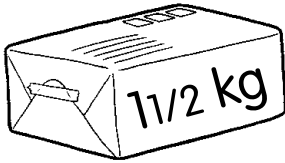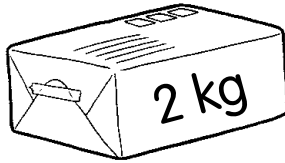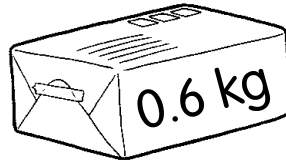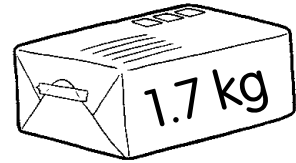
1.7 kg box **d**

Do your written work in the space provided.

1. What is the total weight of the two heaviest boxes?

_____

2. What is the difference in grams between box b and box c?

_____

3. What is the total weight of the four boxes?

_____

4. In box **a** there are four identical books about Australia each weighing 330g. How much does the box weigh?

_____

5. Which three boxes have a total weight of 3.8kg?

_____

6. In box **d** there are seven objects. Six objects are identical bottles of perfume each weighing 220g. The box itself weighs 100g. What is the mass of the seventh object?

_____

7. For boxes up to 2kg, the post office charges $11.60 each. How could Mrs. Fernandes repack her presents to save money? How much could she save?

_____

Calculating Volume 1

Volume is the space taken up by a 3D or solid object. The formula for calculating volume is: length (l) x width (w) x height (h). Volume is measured in cubic centimetres and metres (cm^3 and m^3).

Look at the example in the image:

Volume of cuboid = 5cm x 4cm x 3cm

Answer = 60 cm^3

l = 5cm

h = 4cm

w = 4cm
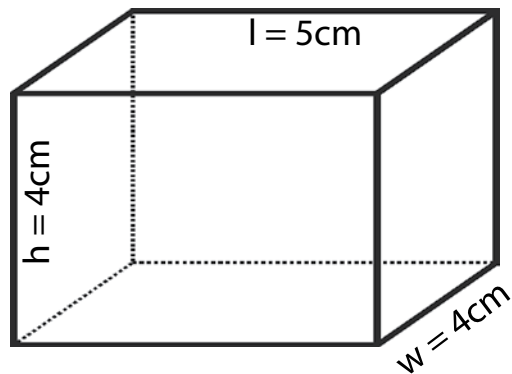
1. **Calculate the volumes of these boxes. Show your working out. You can use digital technology to help you with your answers.**

a. - 18cm -   - 18cm -   - 10cm -

b. - 7cm -   - 13cm -

c. - 12cm -   - 10cm -   - 24cm -

d. - 16cm -   - 40cm -   - 16cm -

e. - 8cm -   - 8cm -   - 18cm -

f. - 10cm -   - 33cm -   - 33cm -

2. **Rank the volumes of the packaging from smallest to largest:**

Calculating Volume 2

Nana has baked this beautiful birthday cake with three tiers. Study the dimensions of the cake then answer the questions that follow.

Tier 1: 30cm x 30cm x 10cm

Tier 2: 25cm x 25cm x 12cm

Tier 3: 18cm x 18cm x 12cm

1. Show your working out. Calculate the volume of:

Tier 1: _____

Tier 2: _____

Tier 3: _____

The total volume of the cake is:

2. You want to cut tier 1 into 30 equal slices to share with your class. What will be the volume of one slice? Complete the calculation:

$$\boxed{} \div \boxed{} = \boxed{} \text{cm}^3$$

3. You want to cut 24 equal slices from the second tier. What would be the total volume of 5 slices? Show your working out.

Answers

Page 3

1) 1. L 2. C 3. M 4. L 5. C 6. L 7. M 8. C 9. L 2) Examples: Length: Measure where to place markings on football field; Mass: weigh ingredients to make a cake; Capacity: chlorine doses in a pool

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7) Children will notice minor discrepancies between estimated and actual lengths. Ask children to explain how these could occur.

Page 5

1) a. cm b. m c. cm d. m e. cm f. cm g. m h. cm i. cm j. m k. cm l. m 2) a. whale, boat, fence b. scissors, frog, phone, shell, ribbon (usually longer to tie), carrot c. about 25m d. about 22cm

Page 6

Average mass: 1. 35kg 2. 700g 3. 300g 4. 9kg 5. 20kg 6. 3g 7. 1kg 8. 10kg 9. 200kg 4 Tasmanian Devils 40kg = 10 Penguins/2 Pythons/a Wombat + 5 Penguins

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1) 735500 pts; 621000 pts; 4720 pts 2) 550g 3) banana (pear and lemon have equal mass, banana is heavier than the pear) 4) Ingredients X 3: 1.2 kg sugar; cocoa 135g; 750g butter; 540g flour 5) 3.4kg = 8 cans (3400g $\frac{0}{0}$ 8 = 425g each)

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1)kg (average weight: hippo 1500, seal 600, great white shark 1000)
2)gm (cereal 350, boots 600, DVD 22)
3)gm (rice 220, soap 125, jeans 550)
4)kg (fridge 80, washing machine 65, piano 140) **5)**gm (chocolate snack bar 85, banana 120, orange wedge 30)

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1)3.7kg
2)1400g
3)5.8kg
4)180g
5)a, c, d
6)280g
7)Unpack boxes and place half in box d and the other half box a - save $11.60

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1)a.3,210cm^3 **b.**1,092cm^3 **c.** 2,880cm^3 **d.**240cm^3 **e.**1,152cm^3 **f.**10,890cm^3
2)b, e, c, a, d, f

Page 11

1)tier 1 (9000cm^3) + tier 2 (7500cm^3) + tier 3 (3888cm^3)= 20,388 cm^3
2)9000 ÷ 30 = 300cm^3 3. 7500 ÷ 24 = 312.5cm^3 each slice, 312.5x5=1562.5cm^3