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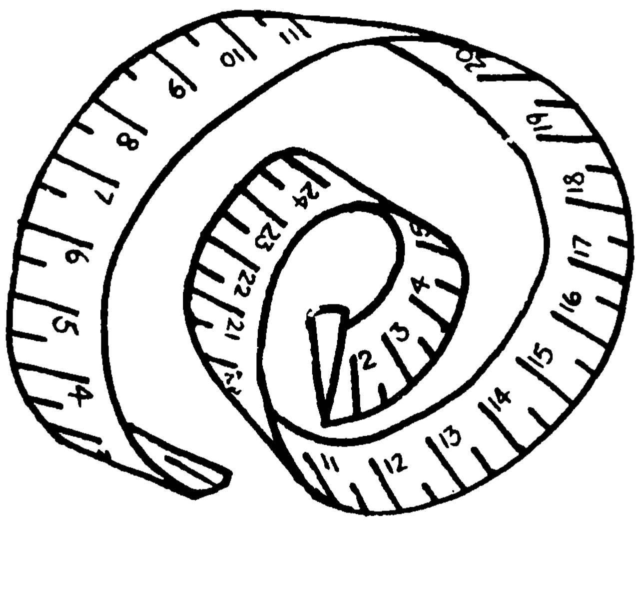
ABSTRACT

This booklet contains a series of worksheets on the metric system to be used with students at the elementary school level. Twenty of the worksheets are concerned with linear measurement, four with area, ten with mass, and four with capacity. (DT)

metric activities

for

Elementary Grades



Sheila [illegible]

the board of education for the borough of york
september 1976

August, 1976

F O R E W O R D

This booklet has been prepared to supplement the measurement section of the mathematics program. It is not necessary to follow the order of topics, nor is it expected that all the activities in each unit be completed. It is hoped that teachers will select according to the ability and experience of their students.

The design of the activity units is based on the practice used by the authors with success whereby the class is divided into four groups. Each 'round' consists of four units, one unit for each group. All students are expected to complete and record as much of the unit as possible in one period. The groups rotate to the four units for the four consecutive measurement periods. Thus each round lasts for four measurement periods.

Grade levels have been omitted since it is recommended that the background and experience of the children should be the criterion.

The activities are designed to help students understand the metric units of length, area, capacity and mass. (The exercises may be made into stencils from the heat copier).

H. Deane
(George S... Junior Public School)

P. Panetta
(Rockcliffe Senior Public School)

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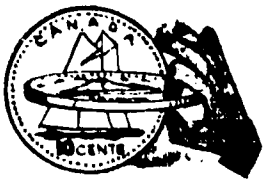
THE MILLIMETRE



mm (millimetre)

The thickness of a dime is about 1 mm.

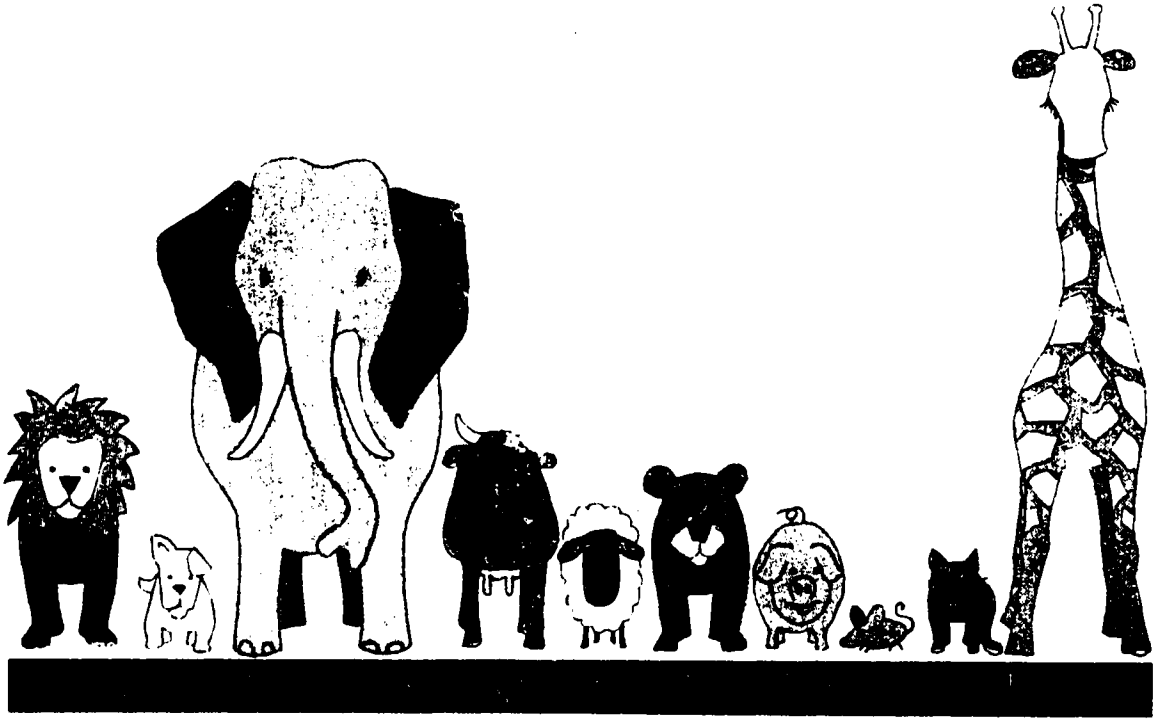
A. Circle all the objects that are about 1 millimetre in thickness.

8 sheets of paper | a finger | a paper clip

a dollar bill | pencil point | a ruler

a straight pin | cardboard | chalk | button

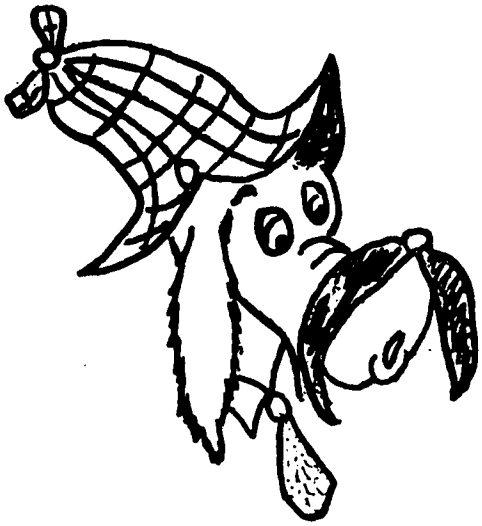
B. Estimate the height of each animal in millimetres, then accurately measure each using your mm ruler. Use the spaces below the animals for your answers.



Estimated height _____ mm

Measured height _____ mm

MYSTERY MILLIMETRE MESSAGE

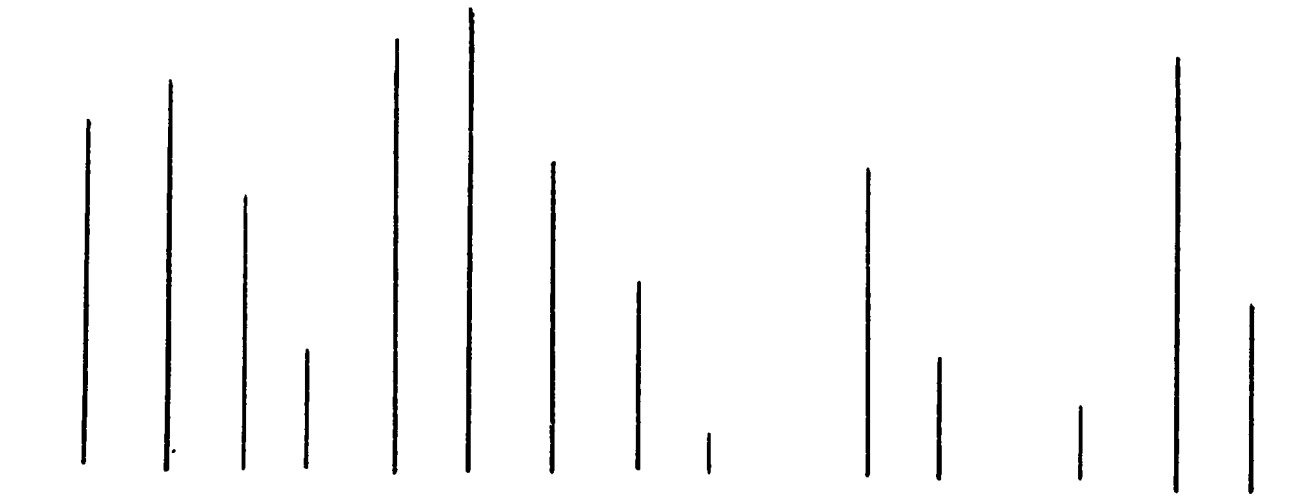


Measure the lines in millimetres to break this code and read the message

Make estimates before measuring

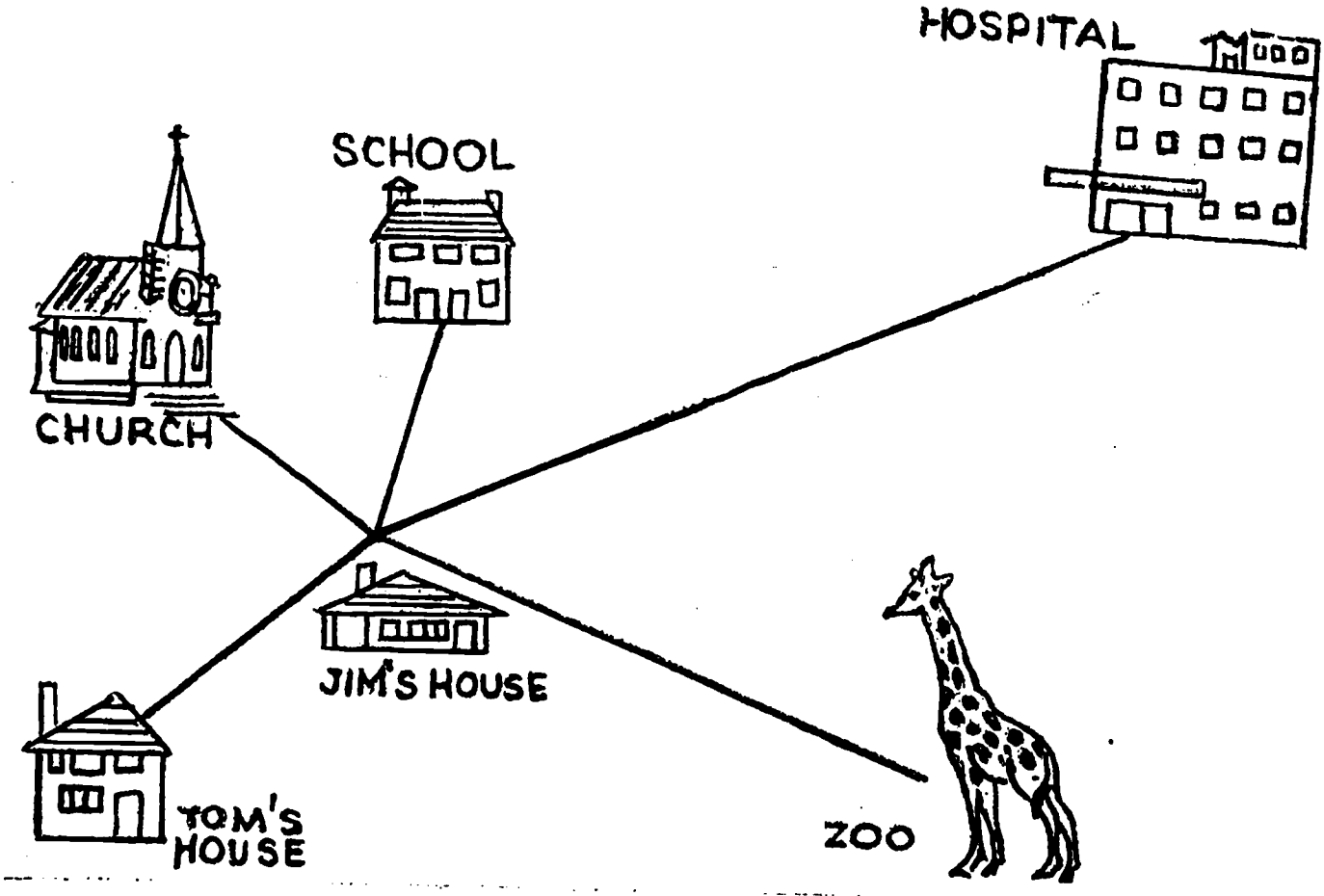
5 mm	10 mm	15 mm	20 mm	25 mm	30 mm	35 mm
G	F	S	T	N	H	A
40 mm	45 mm	50 mm	55 mm	60 mm	65 mm	
I	M	E	U	R	D	

MILLIMETRE CODE BOX



Now make up a millimetre OR centimetre mystery message of your own and give it to a friend to solve !!

Use the diagram to complete the chart. Measure to the nearest mm.



Guess the distance from:		It is about:	Measure it.
a)	Jim's House to the Zoo	_____ mm	_____ mm
b)	Jim's House to the Church	_____ mm	_____ mm
c)	Jim's House to the Hospital	_____ mm	_____ mm
d)	Jim's House to School	_____ mm	_____ mm
e)	Tom's House to the Zoo	_____ mm	_____ mm
f)	The Church to the Hospital	_____ mm	_____ mm
g)	The Zoo to the Church	_____ mm	_____ mm
h)	The School to the Zoo	_____ mm	_____ mm

THE CENTIMETRE

Estimating and Measuring in Centimetres

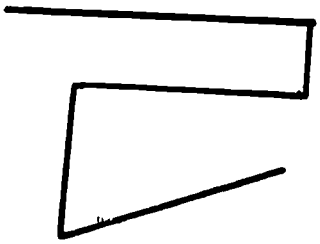
cm (centimetre)

A convenient unit for shorter lengths is the centimetre. The widest part of your little fingernail is about 1 cm wide.

Find the lengths of each of the following lines:

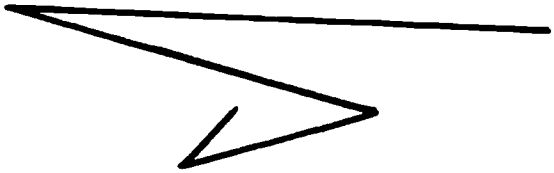
My estimate is _____ cm.

Measure. It is _____ cm.



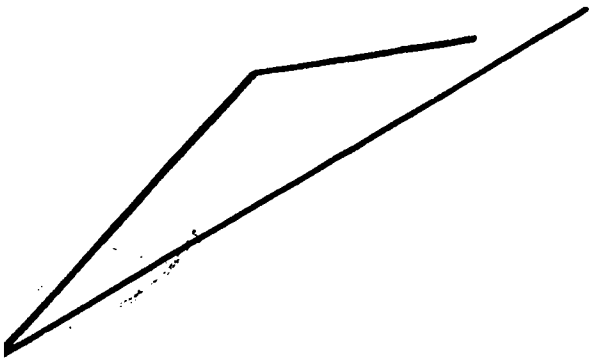
My estimate is _____ cm.

Measure. It is _____ cm.



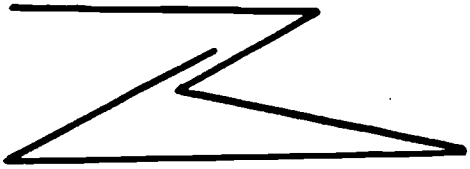
My estimate is _____ cm.

Measure. It is _____ cm.



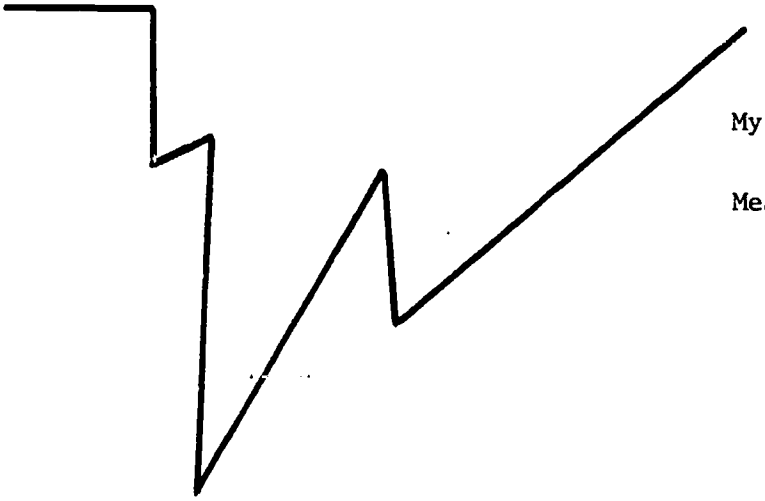
My estimate is _____ cm.

Measure. It is _____ cm.



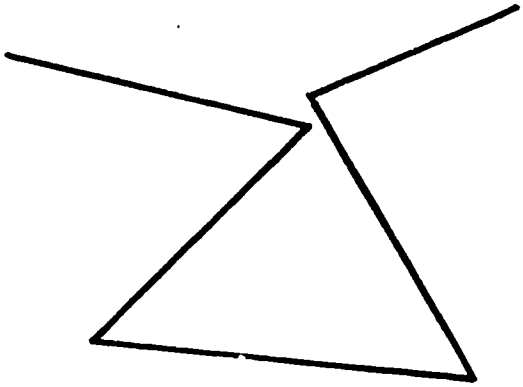
My estimate is _____ cm.

Measure. It is _____ cm.



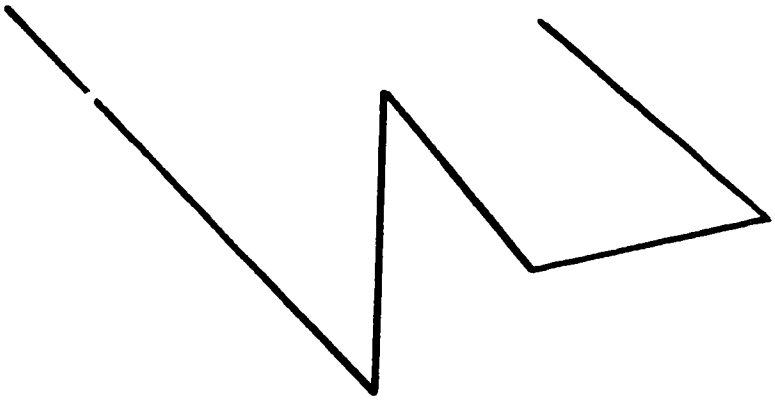
My estimate is _____ cm.

Measure. It is _____ cm.



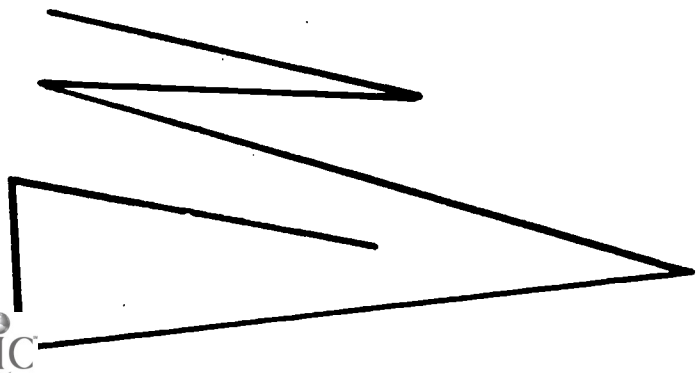
My estimate is _____ cm.

Measure. It is _____ cm.



My estimate is _____ cm.

Measure. It is _____ cm.

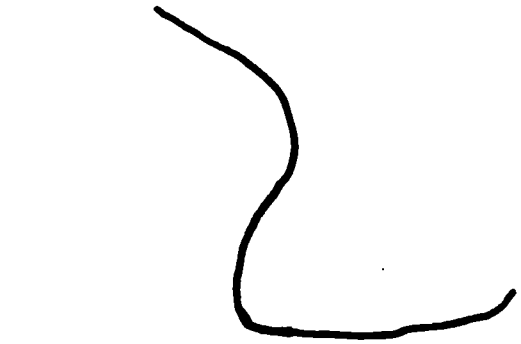


My estimate is _____ cm.

Measure. It is _____ cm.

1. Estimate the length of each line in centimetres.
2. Using a piece of string, trace the line.
3. Measure the string against your ruler. Write down the actual length.

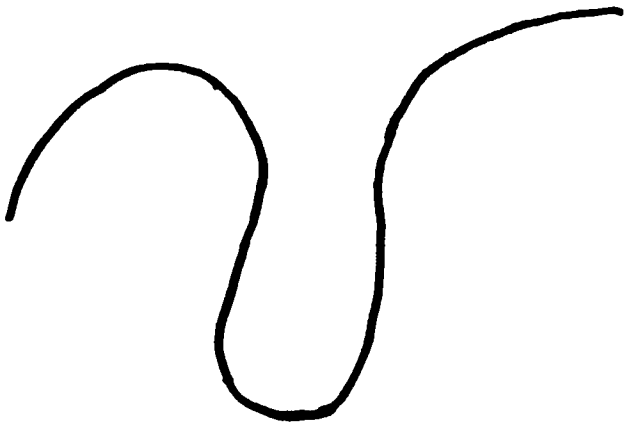
A.



Estimated length is _____ cm.

Actual length is _____ cm.

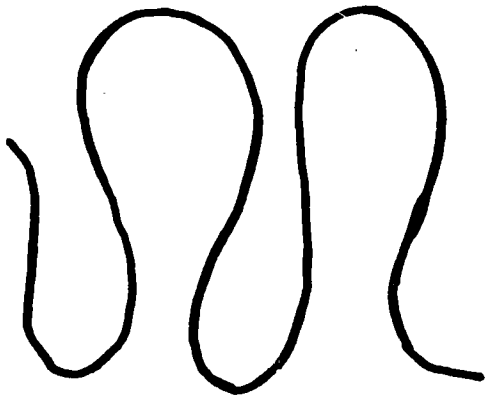
B.



Estimated length is _____ cm.

Actual length is _____ cm.

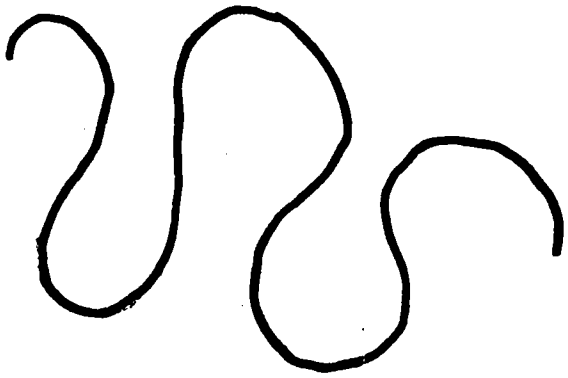
C.



Estimated length is _____ cm.

Actual length is _____ cm.

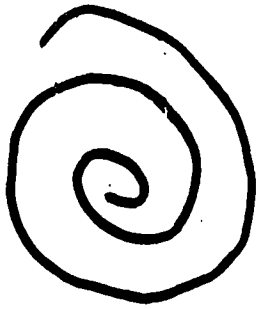
D.



Estimated length is _____ cm.

Actual length is _____ cm.

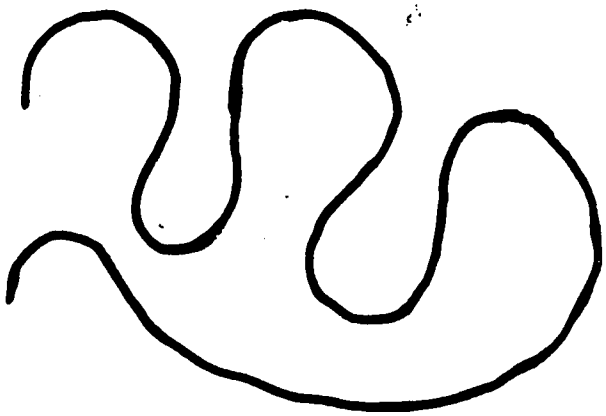
E.



Estimated length is _____ cm.

Actual length is _____ cm.

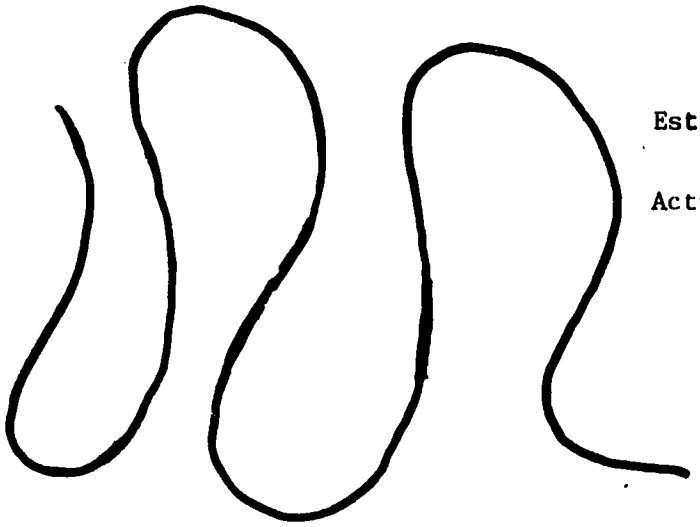
F.



Estimated length is _____ cm.

Actual length is _____ cm.

G.



Estimated length is _____ cm.

Actual length is _____ cm.

THE METRE

m (metre)

A door opening is about 2 m high and a door handle is approximately 1 m from the floor.

m

1. Underline all the things that are <u>less than a metre</u> in red.
2. Circle all the things that are <u>about 1 metre</u> in black.
3. Underline all the things that are <u>more than a metre</u> in green.

desk

building

stove

width of door

bathtub

workbook

your stride

bed

your height

refrigerator

waste-paper basket

telephone pole

your arm span

pencil

car

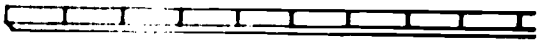
height of table

bicycle

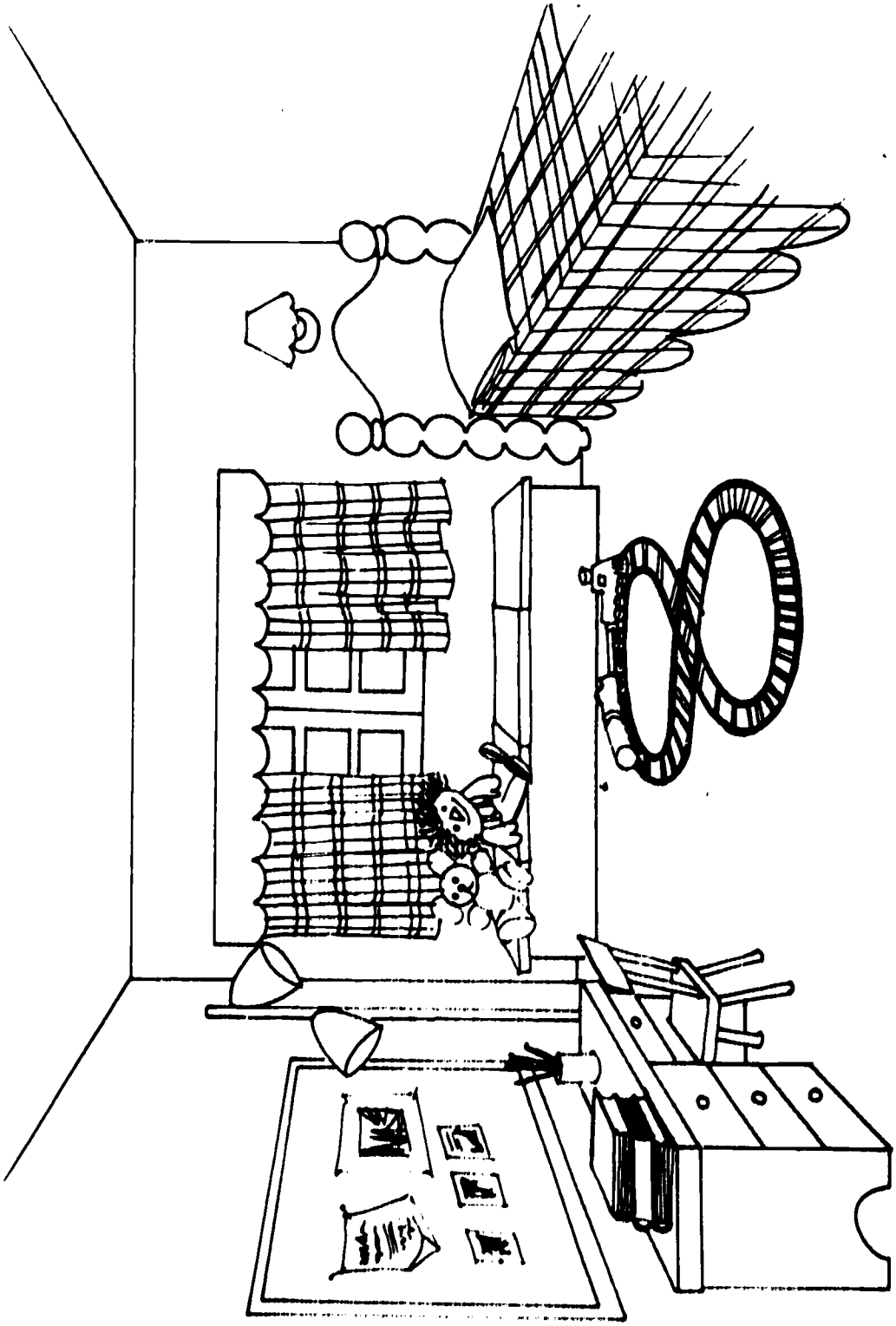
wagon

tennis raquet

metre stick

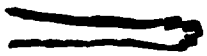


Colour the shapes in the picture that are longer than one metre.



A. About how many of each are as long as your metre stick?

your stride



your arm

your foot

your span

	Guess	Measurement	Difference
stride			
arm			
foot			
span			

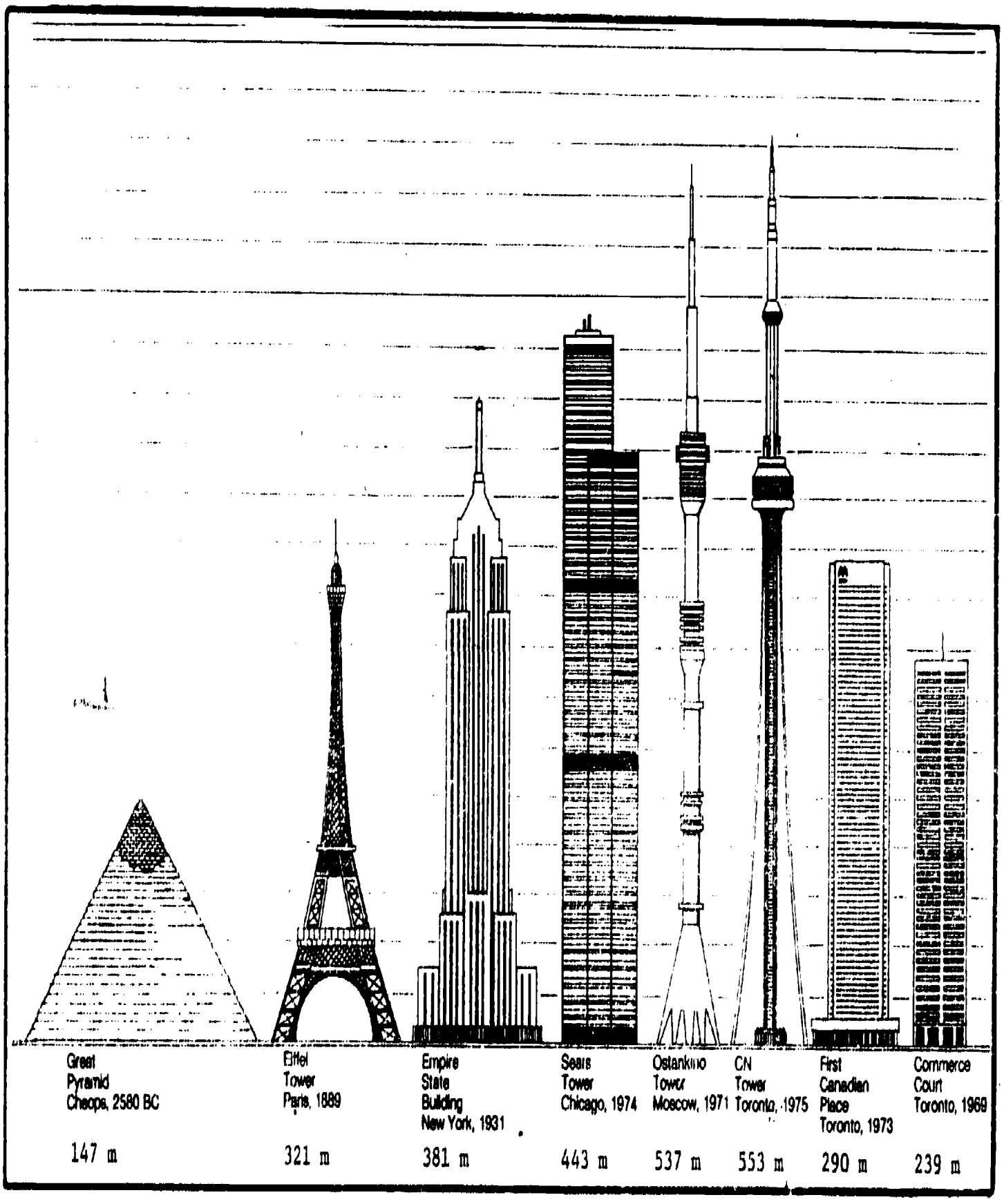
B. Find things in the classroom that are:

less than one metre (< 1 m)	about one metre (≈ 1 m)	more than one metre (> 1 m)

C. Use a metre stick to measure the following objects.

Object	Guess in Metres	Measurement in Metres	Difference
Length of board			
Length of room			
Height of door			
Length of desk			
Length of window			
Height of table			
Partner's height			

TALL STRUCTURES FROM AROUND THE WORLD



TALL STRUCTURES FROM AROUND THE WORLD

1. How much taller is the C. N. Tower than the Ostankino Tower?

2. How tall is the tallest building?

3. How much would you have to add to the First Canadian Place to make it as tall as the C. N. Tower?

4. What is the difference in height between the Great Pyramid and the Eiffel Tower?

5. Find the total height of the four structures built in the 1970's.

6. A kilometre is 1 000 metres. Which two structures are more than half a kilometre in height?

7. Which two structures total 620 metres?

8. The highest mountain in the world, Mt. Everest, is almost 20 times higher than the Empire State Building. How high is Mt. Everest?

KILOMETRES

km (kilometre)

We use km which is 1 000 m to measure longer distances.

km

The table below shows distances between cities. The distance is in kilometres. The distance between Montreal and Winnipeg is 2 341 km. It is circled. Trace your finger over the dotted lines to see how the chart works.

DISTANCES

	Toronto	Ottawa	Montreal	Winnipeg	Niagara Falls
Toronto		397 km	544 km	1 029 km	128 km
Ottawa	397 km		202 km	2 099 km	522 km
Montreal	544 km	202 km		2 341 km	670 km
Winnipeg	1 029 km	2 099 km	2 341 km		2 182 km
Niagara Falls		522 km	670 km	2 182 km	

1. How far is it from Toronto to Montreal? _____

2. How far is it from Niagara Falls to Winnipeg? _____

3. Which is farther, Montreal to Toronto or Montreal to Ottawa?

_____

4. How far is it from Winnipeg to Ottawa? _____

5. Which is closer, Niagara Falls to Montreal or Niagara Falls to Ottawa?

_____

6. How far is it from Toronto to Ottawa? _____

KILOMETRE CHECK

1. Think of the size of the following and put each in the proper column below:

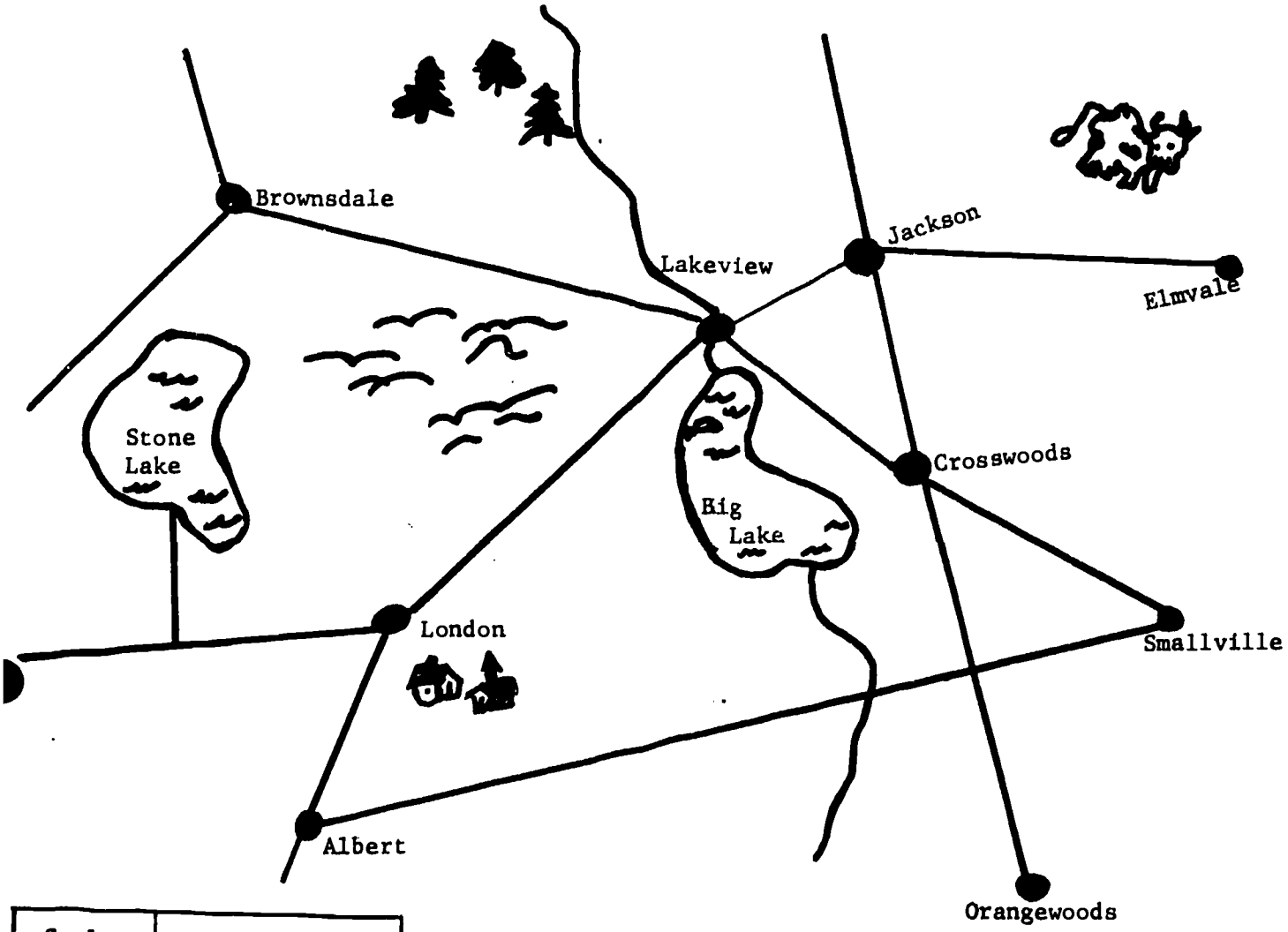
   The Exhibition, Centre Island, Niagara Falls, schoolyard, golf course, C. N. Tower, school, Toronto-Dominion building

2. Think of the distance from your school to each of the following places and put each in the proper column:

   City Hall, your house, Hamilton, nearest plaza, Lake Ontario, nearest store, Italy, public library, fire station, nearest park, Jamaica

It is less than a kilometre	It is about the same as a kilometre	It is more than a kilometre

LET'S TRAVEL!



Scale	1 cm = 10 km

1. Measure all the roads between the towns and on the map write down their distances in kilometres. REMEMBER 1 cm = 10 km.

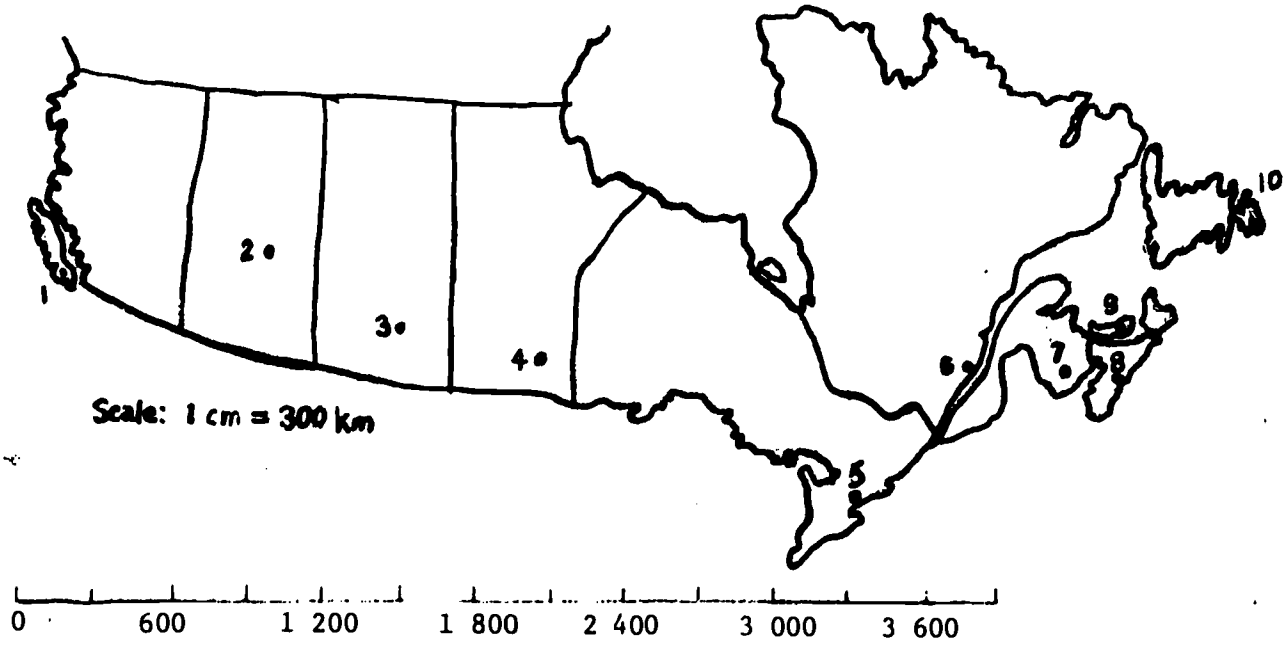
2. If you had to go from London to Smallville which way would be the shortest?

3. Mr. Jack is a salesman who lives in Brownsdale. One day he visited customers in Crosswoods and Jackson. Then he returned home by 5 o'clock. How many kilometres did he travel altogether?

4. One week Mr. Jack made 7 trips to Elmvale and back. How many kilometres did he travel?

5. If you flew from Elmvale to Albert in a straight line, how far would that be?

6. How far would you have to drive if you drove around Big Lake?



Key

1. Victoria, B.C.
2. Edmonton, Alta.
3. Regina, Sask.
4. Winnipeg, Man.
5. Toronto, Ont.
6. Quebec City, P.Q.
7. Fredericton, N.B.
8. Halifax, N.S.
9. Charlottetown, P.E.I.
10. St. John's, Nfld.

FIND THE DISTANCE:

FROM	TO	DISTANCE IN cm	DISTANCE IN km
2. Edmonton	3. Regina		
5. Toronto	8. Halifax		
2. Edmonton	4. Winnipeg		
4. Winnipeg	6. Quebec City		
1. Victoria	8. Halifax		
4. Winnipeg	9. Charlottetown		
3. Regina	7. Fredericton		
6. Quebec City	9. Charlottetown		
2. Edmonton	10. St. John's		
1. Victoria	4. Winnipeg		
1. Victoria	6. Quebec City		
7. Fredericton	9. Charlottetown		
8. Halifax	10. St. John's		

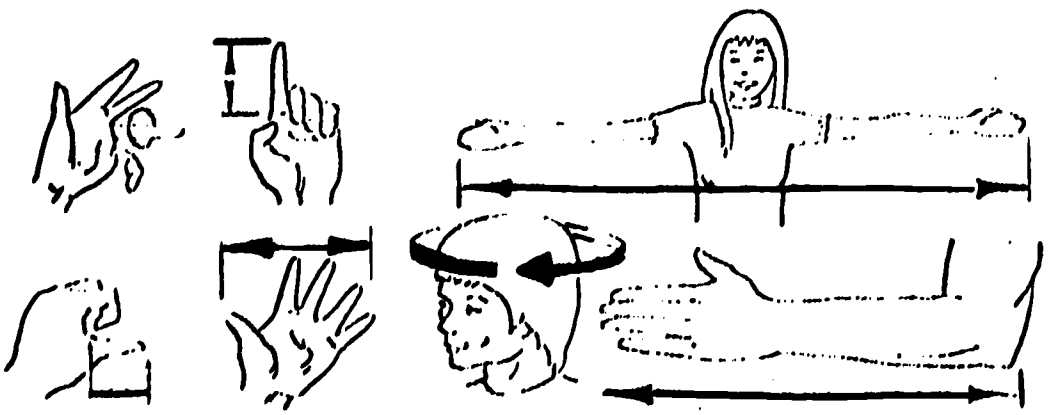
Estimating and Measuring Me in Centimetres

MATERIALS: centimetre ruler, metric tape, metre stick

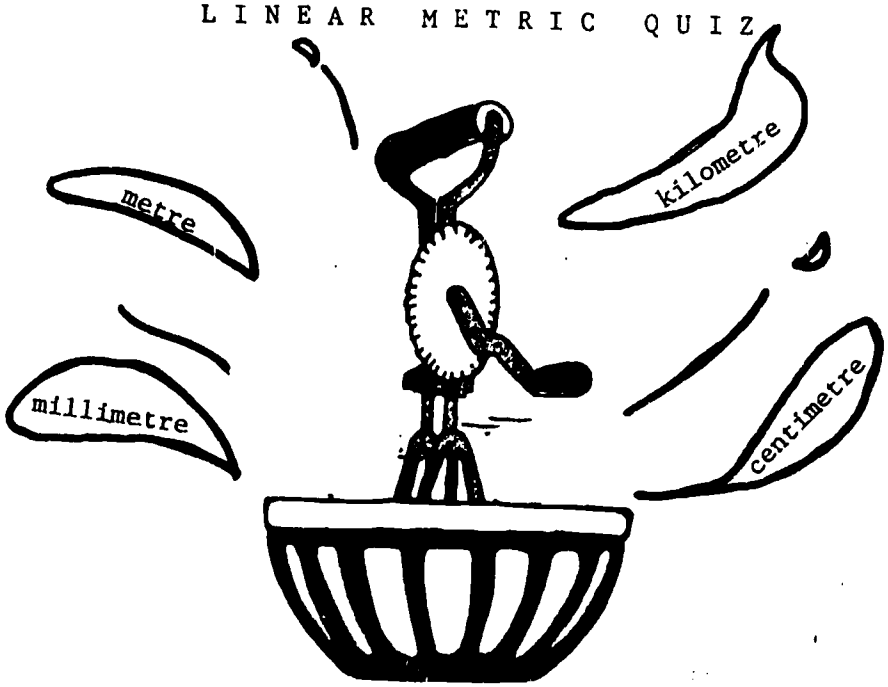
Estimate the length in centimetres of each of the following and then measure the length.

		Estimated Length in cm	Measured Length in cm
1.	length of your foot	_____	_____
2.	length of your thumb	_____	_____
3.	length of your hand span	_____	_____
4.	distance around your wrist	_____	_____
5.	distance around your elbow	_____	_____
6.	distance around your ring finger	_____	_____
7.	distance from finger tip to elbow	_____	_____
8.	length of your arm	_____	_____
9.	length of your arm span	_____	_____
10.	distance around your ankle	_____	_____
11.	distance around your knee	_____	_____
12.	height of your knee above the floor	_____	_____
13.	distance around your neck	_____	_____
14.	distance around your head	_____	_____
15.	distance around your waist	_____	_____

16. Find other parts of your body to measure and write them on the back of this sheet.



LINEAR METRIC QUIZ



Use one of the metric units to complete the sentences below. (kilometre, metre, centimetre, millimetre)

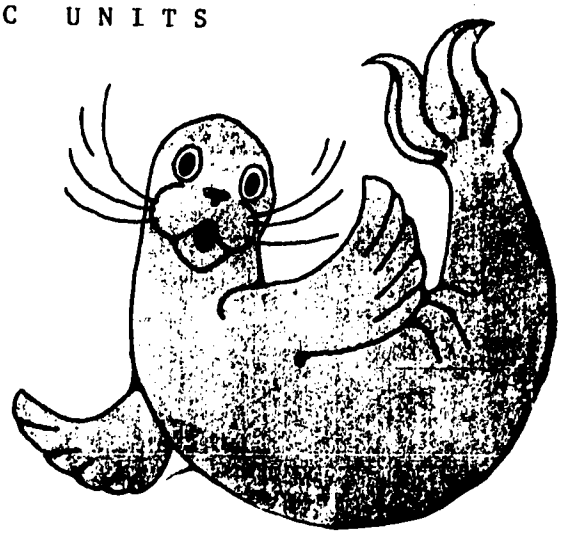
1. The width of a dime is about 1 _____.
2. Niagara Falls is about 50 _____.
3. Your hand is about 7 _____ wide.
4. You could walk a distance of one _____ in about 15 minutes.
5. A jet plane might fly 7 _____ high.
6. A book is about 20 _____ tall.
7. The height of a door is about 2 _____.
8. The distance from Edmonton to Calgary is about 300 _____.
9. A basketball hoop is 3 _____ high.
10. A man might be 2 _____ tall.
11. The distance from the earth to the moon is about 454 144 _____.
12. The thickness of your ruler is about 3 _____.
13. A football field is 96 _____ long.
14. A postage stamp is about 2 _____ high.
15. The length of your little finger is about 40 _____ long.

COMPARING METRIC UNITS

10 millimetres = 1 centimetre

100 centimetres = 1 metre

1 000 metres = 1 kilometre



A. Write >, <, or = in the circle.

1.	1 m	◯	24 cm	11.	7 cm	◯	163 mm
2.	50 cm	◯	1 m	12.	19 km	◯	19 000 m
3.	4 000 m	◯	2 km	13.	4 000 m	◯	4 km
4.	200 cm	◯	2 m	14.	37 cm	◯	280 mm
5.	80 mm	◯	7 cm	15.	13 m	◯	700 cm
6.	7 000 m	◯	9 km	16.	1 000 mm	◯	1 m
7.	30 mm	◯	3 cm	17.	300 mm	◯	28 cm
8.	2 cm	◯	14 mm	18.	3 000 mm	◯	272 cm
9.	124 cm	◯	1 m	19.	519 m	◯	1 km
10.	6 km	◯	6 000 m	20.	96 cm	◯	1 km

B. Complete the following:

1.	60 cm = _____	mm	6.	219 m = _____	cm
2.	35 m = _____	cm	7.	32 km = _____	m
3.	6 000 cm = _____	m	8.	100 mm = _____	cm
4.	14 km = _____	m	9.	90 cm = _____	mm
5.	390 mm = _____	cm	10.	9 000 m = _____	km

THE ESTIMATION GAME

This game is played with a partner. From the object box choose one object and guess its length. Be sure to include the units. Then have your partner do the same. Now measure accurately the length of your object. The closest estimation wins a point. Be sure to record all this on the chart.

Good Luck!

OBJECT	GUESS	GUESS	ACCURATE MEASUREMENT	WINNER'S NAME

After you finish this game, challenge someone else in the group and start a new game.

WORD PROBLEMS

A. Cut out a problem.

B. Paste it onto your work sheet.

C. Show your calculations and write a sentence to solve the problem.

1. The penguin is a bird that does not fly. Some penguins can swim as fast as 32 km per hour. How far might a penguin travel in 9 hours?

2. If the bus travels 6 000 metres in one hour, how many kilometres will it have travelled in the same time?

3. A goose can fly as high as 8 000 metres. Many modern jet aircrafts fly as high as 11 000 metres. How much higher can a jet fly?

4. A humming bird is about 5 cm in length. How many hummingbirds would I have to lay end-to-end in order to cover 1 metre stick?

5. My car travelled 16 km on Monday, 363 km on Tuesday, 427 km on Wednesday, 1 204 km on Thursday, and 8 km on Friday. How many kilometres did I travel during that week?

6. The Eiffel Tower stands 321 m high. The C. N. Tower stands 553 m high. Find the difference between the two heights.

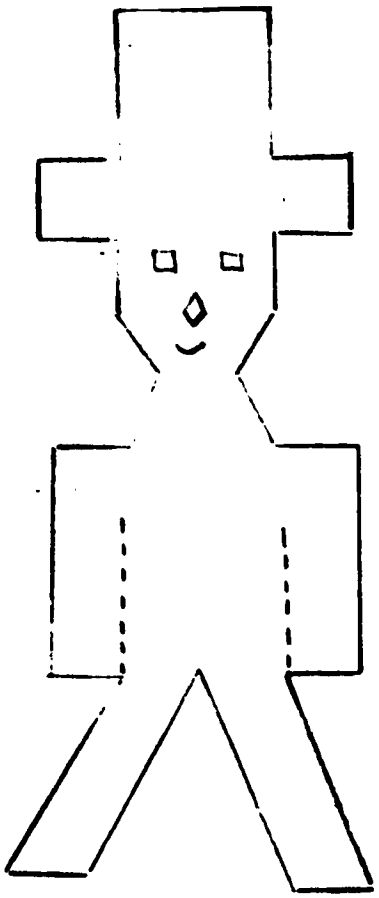
7. A metre of ribbon costs 18 cents. How much would it cost to buy 7 metres of ribbon?

8. I drive at an average speed of 90 kilometres per hour. How many hours would it take to reach Montreal which is 560 kilometres away?

9. If the C. N. Tower is 553 m in height, how many centimetres would that be?

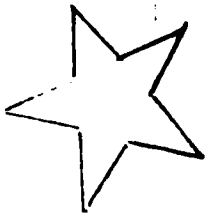
10. One line measured 4 232 mm. The second line measured 9 214 mm. The third line measured 17 042 mm. If I joined all the lines, how many mm would this line measure?

FINDING THE PERIMETER BY MEASURING



The perimeter of something is the distance around it.

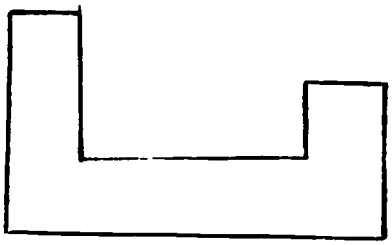
Measure the distance around this star to find its perimeter.

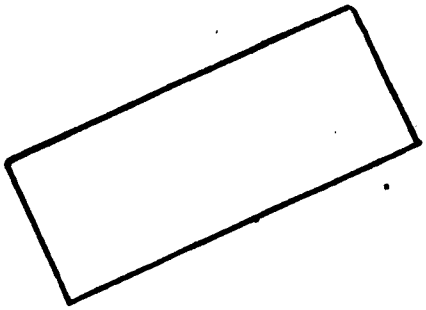


Did you get this answer?

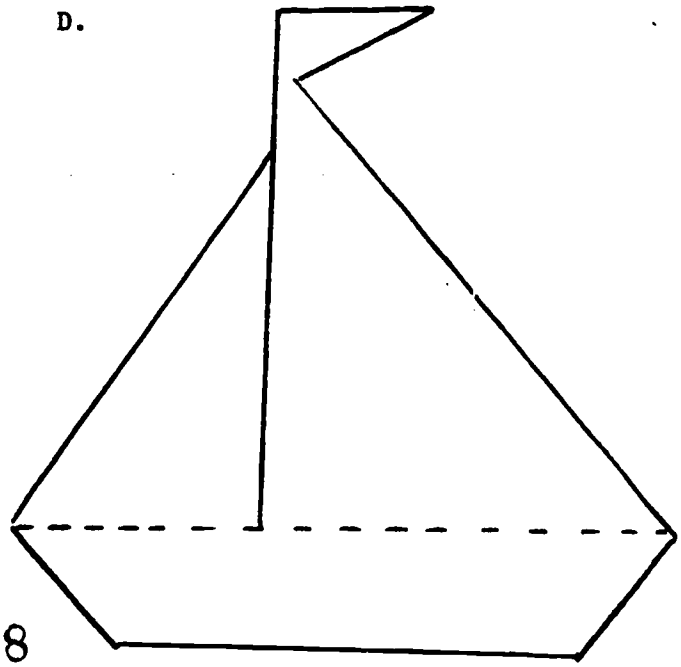
The perimeter is 10 cm.

Now find the perimeter of each picture on this page.

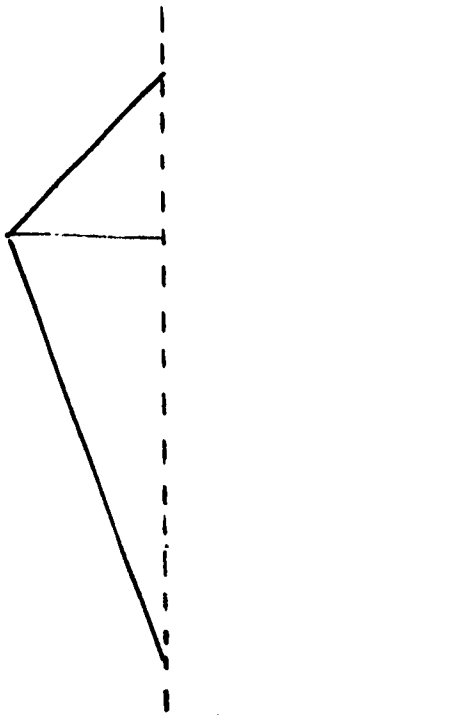




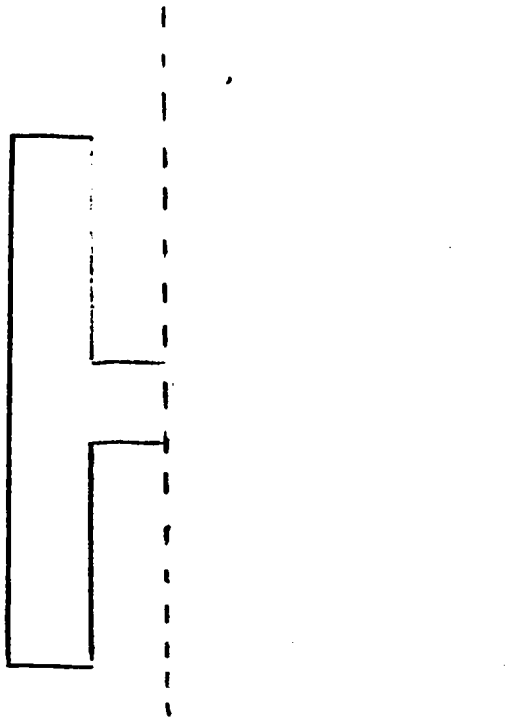
D.



A. Complete each picture so that the other side is identical. Then find the perimeter.

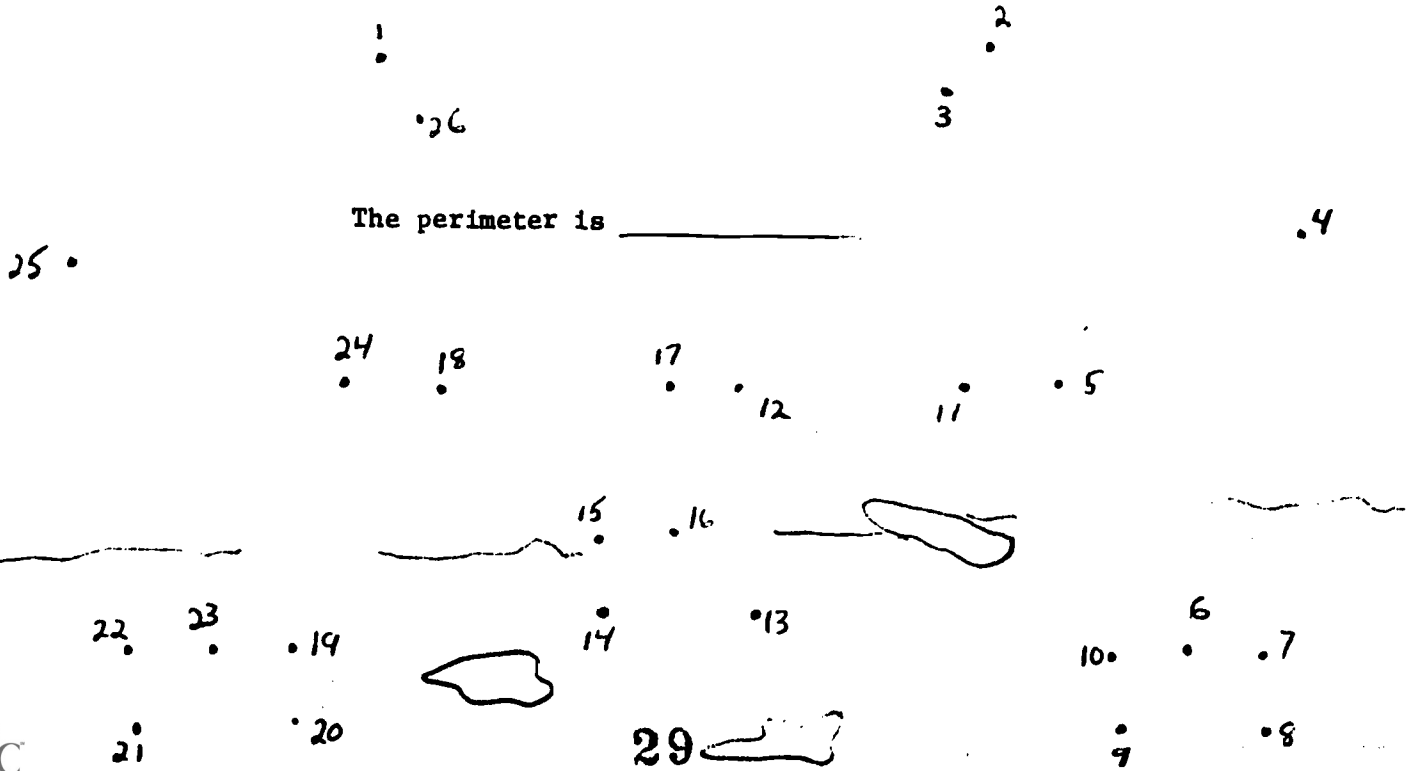


The perimeter is _____



The perimeter is _____

B. Follow the dots and find the perimeter of this planet probe. Use a ruler to connect the dots.



The perimeter is _____

FINDING AREA

When you measure the surface of something you are finding the area.

Use the plan of the school and its grounds to find the area of the different sections. Remember that 1 square centimetre represents 5 square metres on our scale diagram.

1. Calculate the area of the following:

   a) shrubs

   b) playing field

   c) wading pool

   d) sand area

   e) baseball diamond

   f) climbing apparatus

   g) parking lot

   h) school

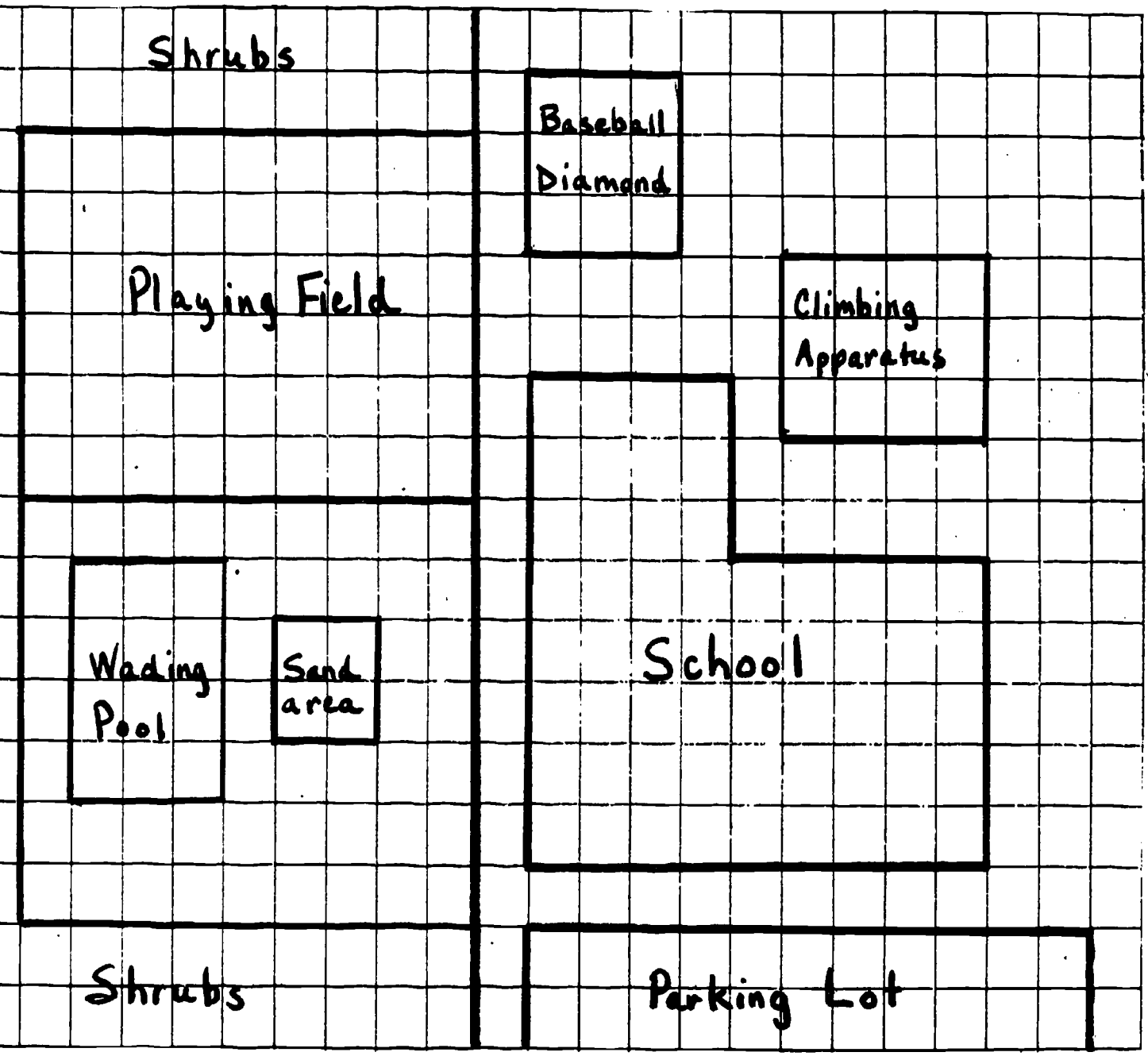
   i) school and its grounds

2. a) Which section has the largest area?

   b) Which section has the smallest area?

   c) What is their difference in square metres?

This plan of a school and its grounds has been drawn to scale.



1 square centimetre: 5 square metres

AREA MATCH-UP

1. Make 4 columns with these headings:

square millimetres	square centimetres	square metres	square kilometres

2. Match the object with the correct unit of measure.

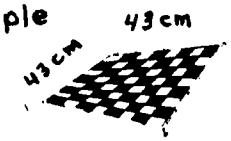
hockey stick blade	desk top	classroom floor
Province of Ontario	window shade	square of butter
cigarette pack	Centre Island	match book
coffee bean	kleenex box	baseball park
checkerboard	butterfly wing	shirt button
sail	bench top	dollar bill
carpet	ticket	fingernail
book	town	stamp
school yard	blackboard	magazine

3. Add <u>four more</u> things to each column that could be measured in the specified units.

Area of a Rectangular Shape = Length x Width

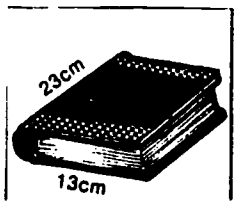
Find the area of each and write your answer in a sentence.

example

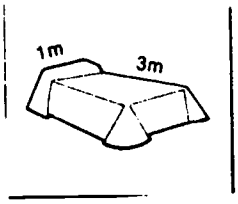


Area of chess board = 43 cm x 43 cm
= 1 849 cm^2

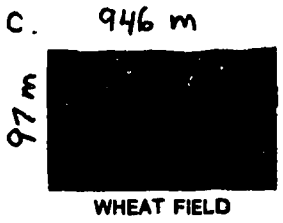
a.



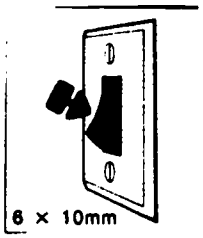
b.



c.

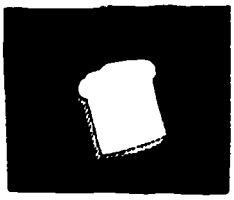


d.

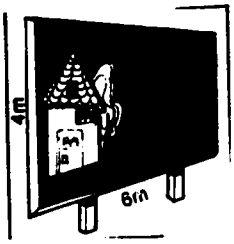


e.

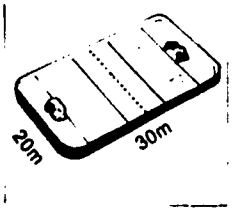
f.



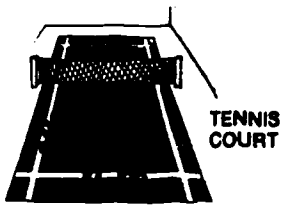
g.



h.

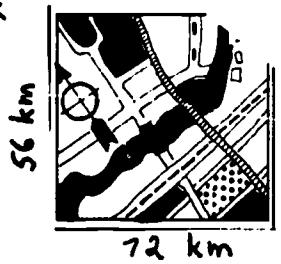


i.

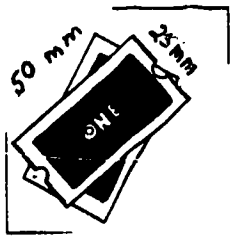


j.

k.



l.



AREAS AROUND YOU

Find the area of the following objects in your classroom.

OBJECT	LENGTH	WIDTH	AREA IN SQUARE UNITS (l x w)
floor tile	15 cm	8 cm	15 cm x 8 cm = 120 cm^2
math book			
desk			
piece of foolscap			
a notebook			
board			
teacher's desk			
window			
classroom floor			
door			

Add some more things to the list and find their area.

MILLIGRAM

Druggists and chemists use this small unit of mass in their work with drugs.

An aspirin tablet has a mass of about 300 mg.

1 000 milligrams = 1 gram

A. Make a list of different things that might be weighed in milligrams.

_____ _____ _____

_____ _____ _____

_____ _____ _____

B. Word Problems

1. A vitamin tablet has a mass of 218 mg. Find the weight of 9 tablets.

2. A bowl of Raisin Bran contains 15 mg of iron. My doctor said that I must have 850 mg of iron per day. How many bowls of Raisin Bran must I have in order to get the amount of iron I need?

3. A headache tablet contains: 300 mg of acetaminophen
   30 mg of caffeine
   8 mg of codeine

   i) Find the total weight of 1 tablet.

   ii) Find the difference between the weight of acetaminophen and the codeine.

4. A bowl of Happy Cereal contains: 8 mg of niacin
   106 mg of phosphorous
   17 mg of iron
   2 mg of riboflavin

   i) If I ate 8 bowls of cereal, how much iron would my body get?

   ii) Find the total mass of all the vitamins and minerals.

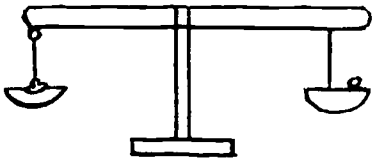
   iii) How much more phosphorous than niacin is contained in one bowl?

GRAM

g (gram)
A paper clip has
a mass of about
1 gram.

A. Make a 1-gram weight using plasticine.

Check by balancing it with a 1-gram mass.



B. Use your 1-gram mass and the balance to measure the following:

Object	Number	
beans	_____	= 1 gram
thumbtacks	_____	= 1 gram
rice	_____	= 1 gram
paper clips	_____	= 1 gram
pins	_____	= 1 gram

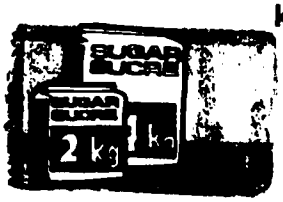
C. Make your own plasticine set of gram masses of the following weights: 5 g, 10 g, 25 g, 50 g, 100 g, 250 g.

Use the standard set of masses to check the accuracy of your weights.

D. From the mass table select different objects that you wish to weigh. Weigh the object using your own set of gram masses. Check the correct weight column under which the object belongs.

Name of Object	about 5 g	about 10 g	about 25 g	about 50 g	about 100 g	about 250 g
5 paper clips						

USING THE KILOGRAM



kg (kilogram)

Another useful unit for mass is the kilogram. Packages of **2 kg** and **4 kg** will likely be the common sizes for sugar.

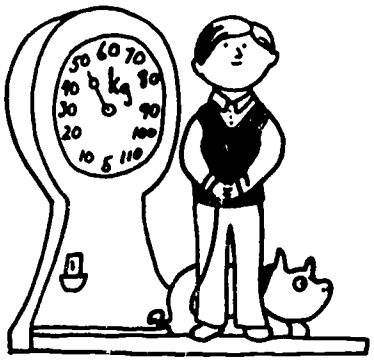
a. Make a 1-kilogram mass of plasticine, books or stones and then feel how heavy it is.

b. Find some objects and estimate if they weigh more or less than your kilogram mass. Record your answers in chart form. Then weigh them on a scale to see if you were right.

Object	My Estimate (More or Less) than 1 kg	Actual Mass (More or Less) than 1 kg

c. People, animals, and larger dry goods are weighed in kilograms. Find the weight of each person in your group. Record your answers on the next page.

THE KILOGRAM AND YOU



WEIGHT CHART

	NAME	WEIGHT
a)		
b)		
c)		
d)		
e)		
f)		
g)		
h)		
i)		
j)		

A. Have each person in the group weigh themselves on a kilogram scale.

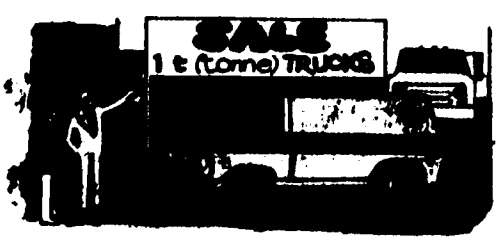
B. Write their name and weight on your weight chart.

C. Answer the following questions using your weight chart:

1. Who weighs the most?
2. Who weighs the least?
3. What is the difference in weight between these two people?
4. How many children weigh less than 25 kilograms?
5. How many children weigh more than 30 kilograms?
6. If you could weigh your whole group, what would the scale read?
7. What is the total weight of the girls?
8. What is the total weight of the boys?
9. Find your group's average weight.

   (Divide the total weight of your group by the number of children in your group).

IT TAKES THE TONNE (t)



t (tonne)

In measuring larger masses, the unit is the tonne, which is **1000 kg**. A mass of 1 t is what a van or pickup could carry.

1 tonne (t) = 1 000 kilograms

Solve the following:

1. The three heaviest animals at the zoo are the elephant, 4 561 kg, the rhinocerous, 2 519 kg, and the hippopotamus 3 920 kg.
   a) What is their total weight in kilograms?
   b) What is their total weight in tonnes?

2. If a blue whale weighs 122 tonnes, how many tonnes will six whales weigh?

3. A Boeing 747 weighs 322 tonnes. Could 4 of these jets be parked on a runway which could only take a weight of 1 148 tonnes?

4. A cement truck can carry 5 tonnes of cement. How many kilograms is that?

5. A transport truck delivered 8 new cars to a car dealer. Each car weighed 2 500 kilograms.
   a) What was the total weight of the cars in kilograms?
   b) What was the total weight in tonnes?

6. A large truck weighs 7 tonnes when empty. The maximum weight for the truck and its load on a highway is 21 tonnes. What is the maximum weight of goods that the truck is allowed to carry?

7. A truck loaded with 20 tonnes of lumber was going down the highway when the holding chains broke and 400 pieces of lumber spilled on the road. Each piece of lumber weighed 30 kilograms.
   a) What was the total weight of the spilled lumber in kilograms?
   b) What was the total weight in tonnes?
   c) Was there more lumber on the truck or on the road?

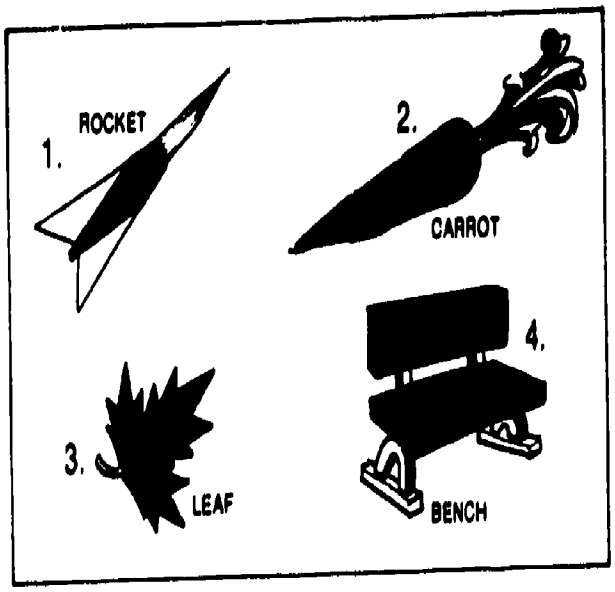
METRIC MATCH-UP

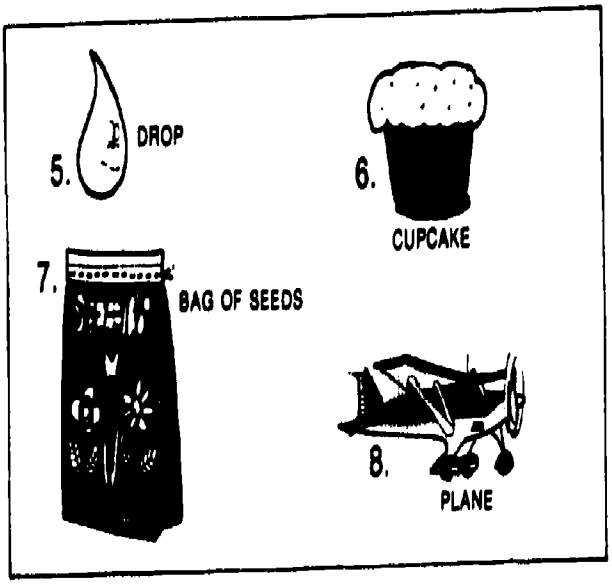
A. On a sheet of paper make four columns and label them milligrams, grams, kilograms and tonnes.

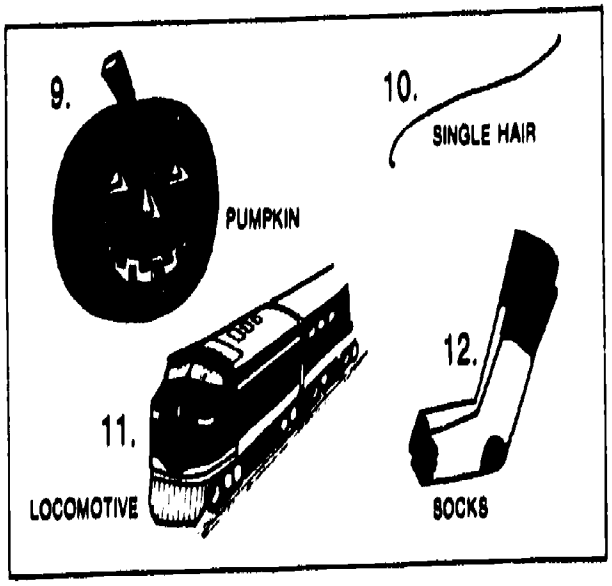
B. Choose an object on this page and decide in which unit it would be weighed.

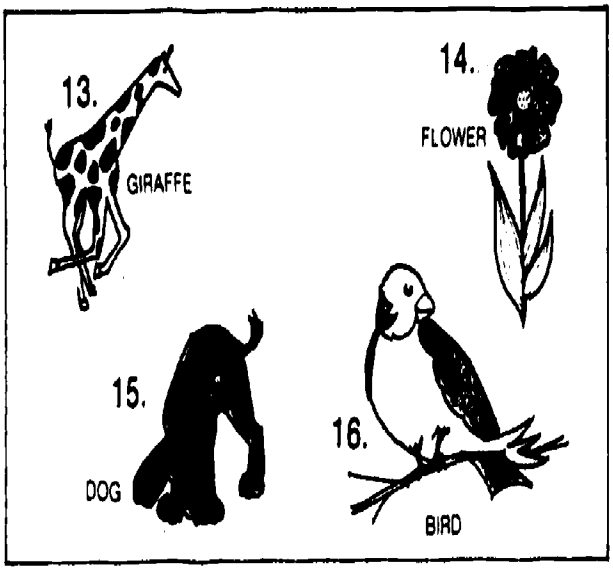
C. Write its name in the proper column.

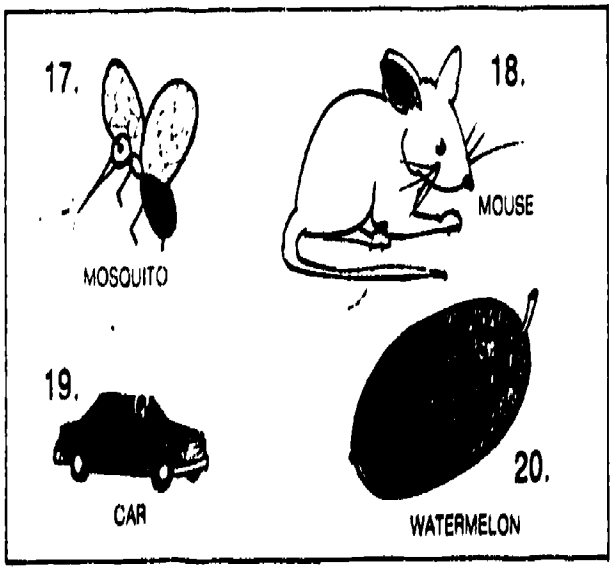
D. After you have finished choose one object from each column and explain why you put it in that column.











1. 

APPLE = 180 _____

2. 

ASPIRIN TABLET = 300 _____

3. 

BOX OF DETERGENT = 2 _____

4. 

CAR = 1 _____

5. 

FLOWER = 120 _____

6. 

PIECE OF CHEESE = 25 _____

7. 

HAM = 42 _____

8. 

TRUCKLOAD OF SAND = 6 _____

9. 

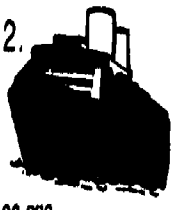
CHOCOLATE BAR = 34 _____

10. 

BUTTERFLY = 45 _____

11. 

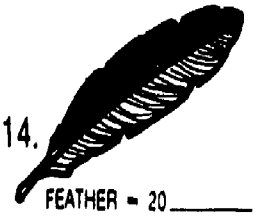
BOY = 30 _____

12. 

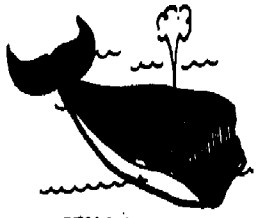
SHIP = 26 000 _____

13. 

CAN OF SARDINES = 122 _____

14. 

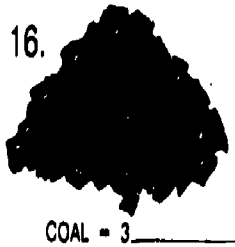
FEATHER = 20 _____



WHALE

15. 

RABBIT = 3 _____

16. 

COAL = 3 _____

HOCKEY PUCK

17. 

BALLOON = 45 _____

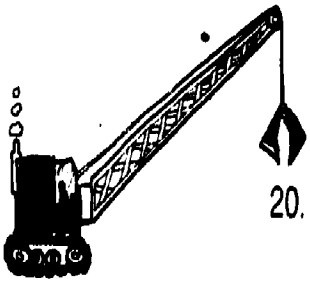
18. 

BOX OF CEREAL = 226 _____

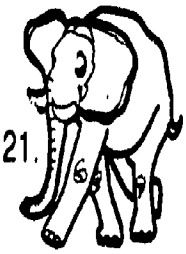
MAN

19. 

RAKE = 6 _____

20. 

STEAM SHOVEL = 12 _____

21. 

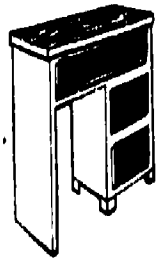
ELEPHANT = 3 _____

22. 

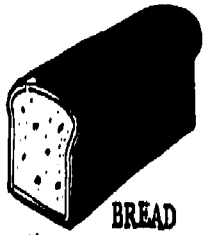
CAPSULE = 84 _____

23. 

BAR OF SOAP = 80 _____

24. 

DESK = 25 _____

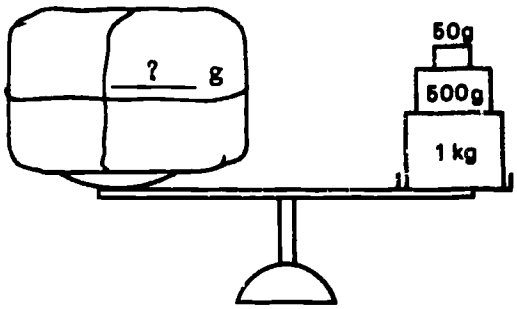


BREAD

BALANCING MASSES

1 gram = 1 000 milligrams
1 kilogram = 1 000 grams
1 tonne = 1 000 kilograms

1. Balance the following:



a) 1 kg = 500 g + _____ g

b) 1 g = 300 mg + _____ mg

c) 1 tonne = 500 kg + _____ kg

d) 60 g = 5 000 mg + _____ mg

e) 10 kg = 6 000 g + _____ g

f) 2 tonne = 1 000 kg + _____ kg

g) 9 000 g = 3 kg + _____ kg

h) 22 kg = 20 000 g + _____ g

i) 3 tonnes = 3 000 kg + _____ kg

j) 4 000 mg = 1 g + _____ g

2. a) 2 kg + 600 g = _____ g

b) 3 000 t + 200 kg = _____ kg

c) 1 000 mg + 200 g = _____ g

d) 4 000 kg + 3 t = _____ t

e) 4 g + 2 000 mg + _____ mg

3. What must be added to each to make <u>a gram</u>?

a) 500 mg b) 320 mg c) 460 mg d) 987 mg

4. What must be added to each to make <u>1 kilogram</u>?

a) 650 g b) 25 g c) 980 g d) 362 g

5. What must be added to each to make <u>a tonne</u>?

a) 500 kg b) 630 kg c) 2 kg d) 930 kg

AT THE STORE

1. Write the things shown in order from heaviest to lightest.

2. Sam bought butter, bread, bacon, coffee, and salt. What was the weight of the bag of groceries that he carried home?

3. How much heavier is the bread than the jelly?

4. How much would 6 cans of salmon weigh?

5. 1 kg of potatoes costs 32¢. How much will 4 kg cost?

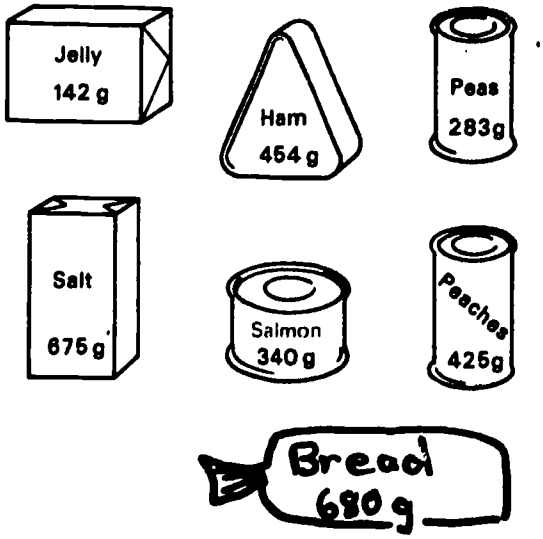
6. One can of ham costs $1.96. How much will 5 cans of ham cost?

7. What is the total weight of all the canned foods?

8. How many grams must you add to the bacon to make 1 kg?

9. Which weighs the least from the peas, salmon and cheese?

10. What is the total weight of all the groceries not canned in grams?



METRIC FISH GAME

Teacher Directions

1. Paste each problem on a blank playing card or bristol board cut to size (9 cm x 6 cm). You will end up with a deck of 50 cards.
2. The Metric Fish Game is to be played in a group. The cards are shuffled and then set in the centre. A group member fishes for a card. The number at the bottom of the card corresponds with the number on the answer sheet. One group member may do the scoring. If the player answers the card correctly, he gets to keep the card. When all the cards have been fished, they are talleyed, and the winner is announced. The game may be repeated.
3. Make out an answer sheet as follows for the score keeper.

1. 1 kg of feathers
2. b) 10 kg of meat
3. True
4. False
5. True
6. c) 1 kilogram
7. True
8. False
9. b) 2 kg
10. 500
11. 6 500 g
12. c) equal to 1 g
13. 1 000
14. 2 g of sugar
15. 5 g of steel
16. False
17. 17 921 g
18. True
19. b) 500 g of jam at $0.49
20. a) dime
21. False
22. True
23. 1 100 g
24. a) 1 kg of cheese at $3.00
25. They weigh the same
26. False
27. Yes
28. False
29. 2 kg box of soap
30. False
31. b) 1 kg of chocolate at $3.50
32. A cat at 3 000 g
33. False
34. 3 kg
35. 1 200 mg
36. True
37. True
38. 325 mg
39. False
40. 500 mg of iron
41. b) 3 000 kg
42. 104 g
43. 3 000 kg
44. 2 000 kg
45. 9 tonnes
46. They both have the same mass
47. 72 g
48. 102 kg
49. 80 mg of sodium
50. c) 4 tonnes

METRIC FISH

1. What is heavier, 1 gram of sugar or 1 kilogram of feathers?

2. Which weighs the most:
   a) 100 grams of gum
   b) 10 kilograms of meat
   c) 9 999 grams of water

3. 300 grams + 700 grams are equal to 1 kilogram.
   True or False

4. 1 200 grams + 800 grams are equal to 2 000 kilograms.
   True or False

5. 1 001 grams are greater than 1 kilogram.
   True or False

1 000 grams are equal to:
   a) 10 kilograms
   b) 100 kilograms
   c) 1 kilogram

7. 1 000 grams are less than 2 kilograms.
   True or False

8. 1 300 grams + 90 grams are greater than 2 kilograms.
   True or False

9. 2 000 grams are equal to:
   a) 20 kilograms
   b) 2 kilograms
   c) 200 kilograms
   d) 1 000 kilograms

10. The smallest watch in the world weighs 2 grams. How many watches would it take to weigh 1 kilogram?

11. Bill weighs 30 kilograms. Joe weighs 35 kilograms. How many grams do the two of them weigh together?

12. 1 000 mg is:
   a) less than 1 g
   b) more than 1 g
   c) equal to 1 g

13. The world's smallest motor weighs about 1 gram. How many are needed to weigh 1 kilogram?

14. Which is lighter, 2 grams of sugar or 1 kilogram of steel?

15. Which weighs the least:
   a) 10 grams of water
   b) 1 kilogram of gum
   c) 5 grams of steel

16. 1 001 grams are less than 1 kilogram.
   True or False

17. What is the total mass of 17 000 grams and 921 grams?

18. 1 000 mg are less than 1 kilogram.
   True or False

19. Which is the better buy:
   a) 1 kilogram of jam at $1.00
   b) 500 grams of jam at $0.49

20. A gram is about the mass of:
   a) a dime
   b) an apple
   c) a 2-kilogram bag of sugar

1 000 grams are greater than 2 kilograms.
True or False

22. 1 000 grams are less than 2 kilograms.
True or False

23. Sue bought 100 grams of gum. Joe bought 1 000 grams of chocolate.
What was the total mass of the candy?

24. Which is the better buy:
a) 1 kilogram of cheese at $3.00
b) 500 grams of cheese at $2.00

25. Jane weighs 28 kilograms and Bill weighs 28 000 grams. Who weighs the most?

26. 3 000 grams are equal to 4 kilograms.
True or False

27. Are 300 grams and 700 grams equal to 1 kilogram?
Yes or No

28. 200 grams and 200 grams are greater than 2 kilograms.
True or False

29. A box of soap weighs 2 kilograms. A can of peas weighs 250 grams. Which product is the heaviest?

30. 2 000 grams + 1 001 grams are equal to 3 000 grams.
True or False

31. Which is the better buy:
a) 500 grams of chocolate at $2.00
b) 1 kilogram of chocolate at $3.50

32. A rabbit weighs 2 kilograms. A cat weighs 3 000 grams. Which animal weighs the most?

33. A kilogram has a greater mass than a tonne.
True or False

34. A newborn baby weighs about:
a) 3 kilograms
b) 30 kilograms
c) 300 kilograms

35. An aspirin tablet has a mass of 300 mg. What is the mass of 4 tablets?

36. 1 000 mg is equal to 1 gram.
True or False

37. 3 000 mg is equal to 3 grams.
True or False

38. What is the total mass of 8 mg, 17 mg and 300 mg?

39. 6 001 mg is less than 6 grams.
True or False

40. One tablet contains 2 mg of iron. How much iron is contained in 250 tablets?

41. [illegible] are equal to:
a) 300 kg
b) 3 000 kg
c) 30 kg

42. What is the total mass of two books that each weigh 52 grams?

43. A truck carries a load of steel which has a mass of 3 tonnes. How many kilograms is it carrying?

44. How many grams are there in 2 kg?

45. How many tonnes are there in 9 000 kg?

46. Joe weighs 28 kg. Bob weighs 28 000 g. Who has the greatest mass?

47. A chocolate bar has a mass of 12 g. What would the mass of 6 bars be?

48. What is the total mass of 60 kg and 42 kg?

49. 8 mg of sodium are contained in a tablet. How much sodium would be found in 10 tablets?

50. 4 000 g are equal to:
    a) 40 tonnes
    b) 400 tonnes
    c) 4 tonnes

LIQUID MEASURES

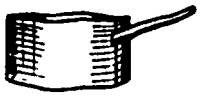
The capacity of a bottle, a bowl, or a bucket is the amount of liquid it will hold. Small amounts are measured in millilitres and bigger amounts are measured in litres.

1 000 ml = 1 litre

1. Find some large containers which have different shapes.

Bucket

Bowl



Pan

Fish tank

Using a litre measure pour 1 litre of water into a bucket.

Look at the depth and estimate how many litres you will need to fill the bucket.

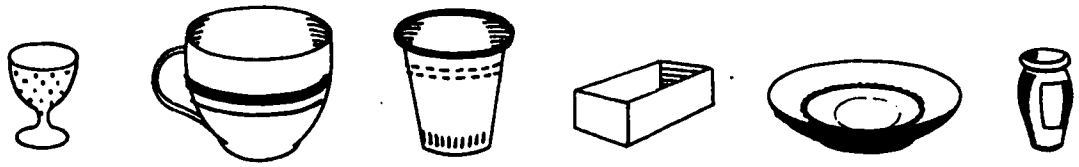
Check your estimate by measuring with water.

Make a table in your book.

container	estimate	capacity
bucket	_____ litres	_____ litres
bowl		
pan		

Add some more things to the list.

2. Find a set of small containers like this:



egg-cup cup paper cup tin saucer jar

We measure the capacity of small containers in millilitres.

Does each one of your small containers hold more or less than 150 millilitres?

Estimate first and then check by measuring with water.

Make a table in your book.

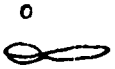
container	estimate more or less than 150 ml	actual capacity
cup	_____	_____ ml

Add some more things to your list.

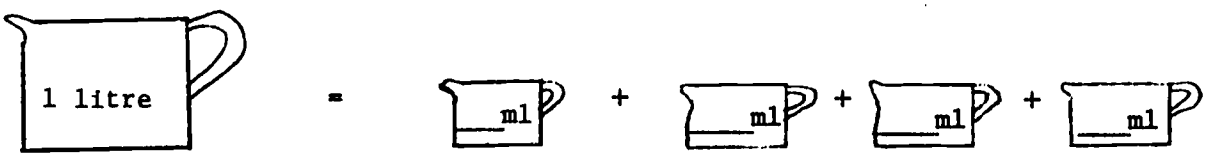
LITRES AND MILLILITRES

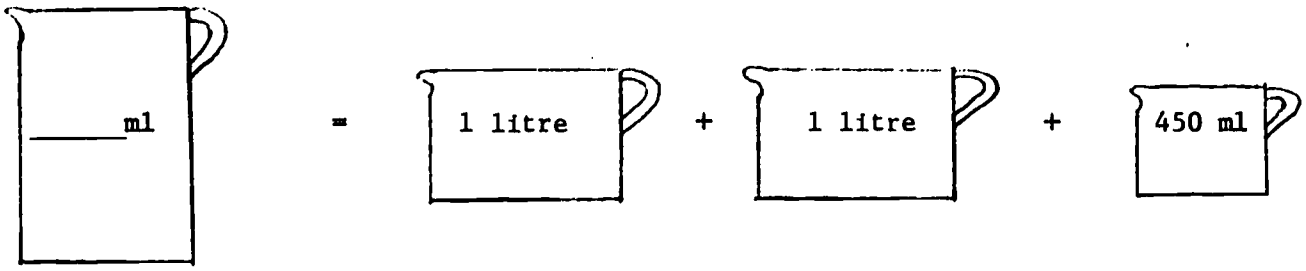
A. Complete the following:

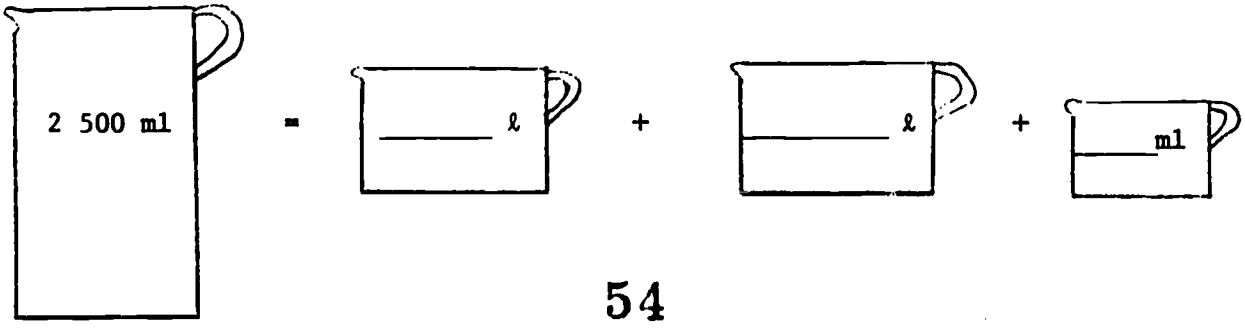
1 litre 	
litres	millilitres
4	
16	
38	
9	
10	
17	

1 millilitre 	
millilitres	litres
14 000	
8 000	
62 000	
19 000	
44 000	
2 000	

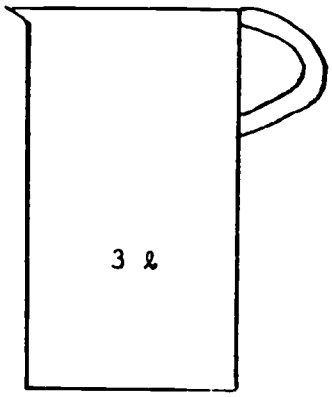
B. Balance the following:

1) 

2) 

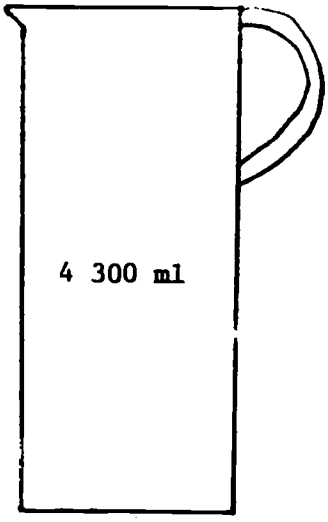
3) 

4)



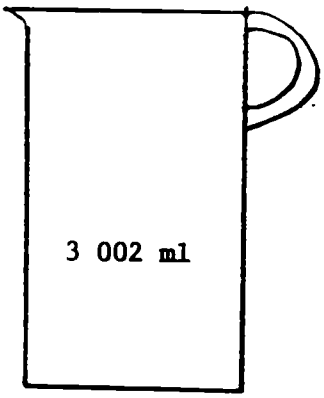
= ____ml + ____ml + ____ml + ____ml

5)



= _____ ℓ + _____ ml

6)

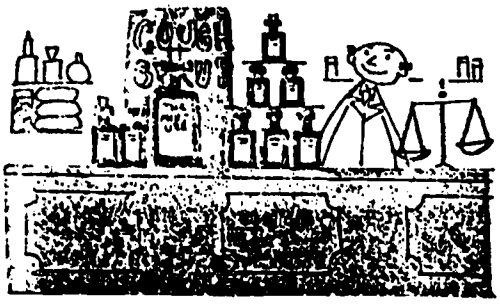


= _____ ℓ + _____ ml

C. How many millimetres of water must I add to each in order to get 1 litre?

a) 322 ml b) 674 ml c) 927 ml d) 802 ml

THE DRUG STORE



Goods in the drugstore are often sold in containers of different sizes. Some things are measured in litres or millilitres.

Solve the following:

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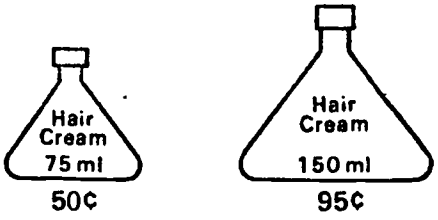
1. a) How many small jars of hair cream equal the large jar?

   b) Which jar is the better buy?



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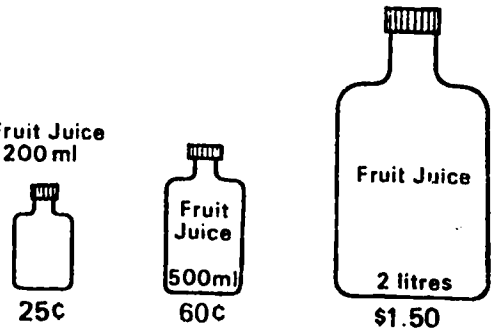
2. How much does it cost for:

   a) 1 litre of juice in 200-ml jars?

   b) 2 litres of juice in 500-ml jars?

   c) 6 litres of juice in 2-litre jars?



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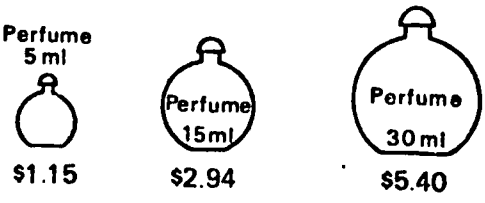
3. Find the cost of:

   a) 1 litre of perfume in 5-ml bottles.

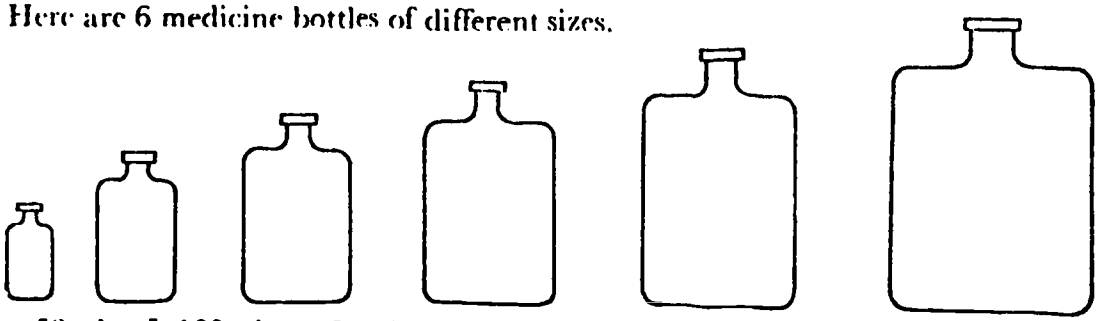
   b) 30 ml of perfume in 15-ml bottles.

   c) 30 ml of perfume in 5-ml bottles.

   d) 3 litres of perfume in 30-ml bottles.

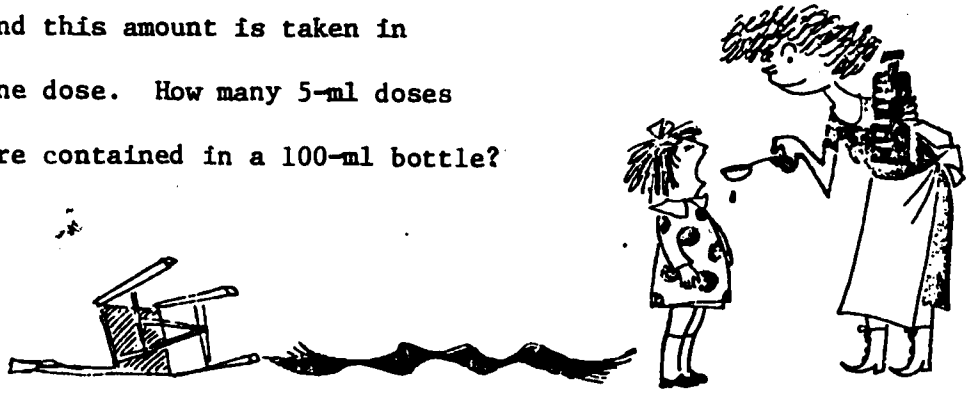


4. Here are 6 medicine bottles of different sizes.



How many times can you fill each bottle from 1 litre of medicine?

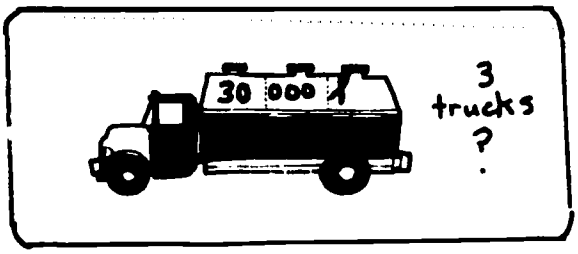
5. A medicine spoon holds 5 ml, and this amount is taken in one dose. How many 5-ml doses are contained in a 100-ml bottle?



IT'S YOUR PROBLEM!

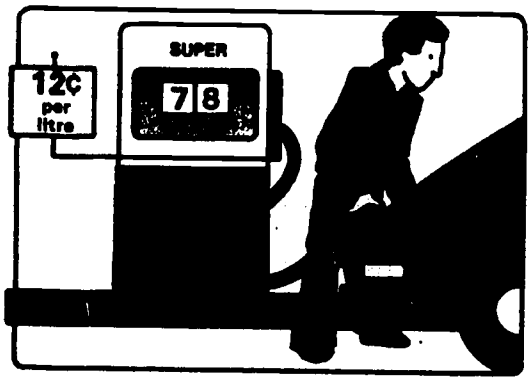
Make your own problems for other people to solve. Use the numbers given.

Example:

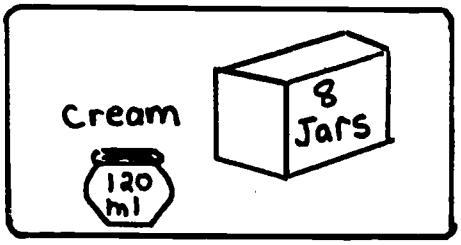


A milk truck carries 30 000 litres of milk. How many litres of milk will 3 trucks carry?

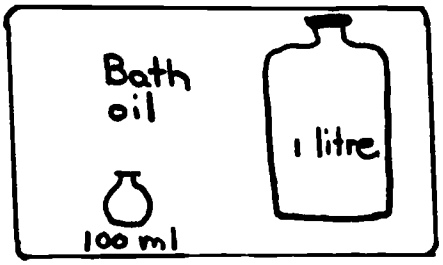
1.



2.



3.



4.