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Book 5 - Ages 9/10

Measurement in Mathematics Series

Practical measuring activities for the classroom.

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CONTENTS

SUGGESTIONS FOR TEACHERS

The following suggestions relate to the various worksheets in each section.

LENGTH

Page 8 - Ribbon Riddles
Discuss how curved lines can be measured. Help will be needed to complete the recording stage of the activity. A suitable scale for recording the length of the ribbons in mm and cm will need to be discussed. The horizontal axis of the graph is used to record the number of ribbons that have a particular length; i.e. if there are two ribbons at 5 cm in length, then two 5 cm columns will be recorded on the graph. Children will need access to string for measuring.

Page 9 - Do You Measure Up?
Children will need to decide on a way of measuring the length of arms from shoulder to tip of middle fingers, face perimeter and waists.

Page 10 - Measuring Made Easy
Teachers will need to discuss the type of table and column headings needed to complete the activity. Also the function of a trundle wheel will need to be revised.

Page 11 - String Struggles
Children will need to work in pairs to complete a display chart showing estimated perimeter and actual perimeter of a closed curve using a method other than a ruler.

Page 12 - Using Circumference
Teachers will need to ensure children understand that perimeter is the distance around any shape and that circumference is a special term used for the perimeter of a circle.
At this stage, string used to measure circumference is appropriate, as are flat shapes like lids and bases of circular containers for initial measuring.
A large sheet of squared paper can be made by joining four A4 sheets together.

Page 13 - Using Squares
Children should record the shapes they have made onto squared paper, along with estimates and information about actual area and perimeter.

AREA

For most of the activities in this section, if wooden cubes are not available, paper or card squares cut from grid paper are appropriate.

VOLUME AND CAPACITY

Page 23 - I Wonder?
This activity requires three different containers with similar capacities but different shapes.

Page 25 - Lost In Space
When an object is placed in a container of water, the amount of water displaced is the volume of the object. Displacement is an easy way to measure the volume of an irregular object. Similar sorts of activities as these can be undertaken later using a beaker calibrated in millimetres.
This activity examines the three ways to measure displacement:

1. Partly fill a container, mark the water level, place in the object and measure the distance the water level has risen.
2. Place the object in an empty container, fill or partly fill the container, mark the water level, remove the object, mark the new water level and measure the difference.
3. Fill a container to the top with water, place in the object, catch and measure the overflow.

MASS

Page 31 - Mystery Parcels
The concept here is to examine the relationship between surface area and mass. Choose containers that have roughly the same surface area but a different shape (single serve cereal boxes, margarine/butter containers with taped on lids, are ideal). Place a 'mystery object' inside each 'parcel' e.g. a lump of Plasticine will give a heavier result than an eraser. Allocate a red or blue spot to each container as a means of identification.

TIME

Page 37 - 24 Hours In Every Day
Verbalisation of readings using the 24 hour clock must be approached carefully. Children will need to be encouraged to find common usages of the 24 hour clock (e.g. bus timetables, police messages etc.). Reasons for the use of a 24 hour timetable need to be explored.

Name .....

USING CIRCUMFERENCE

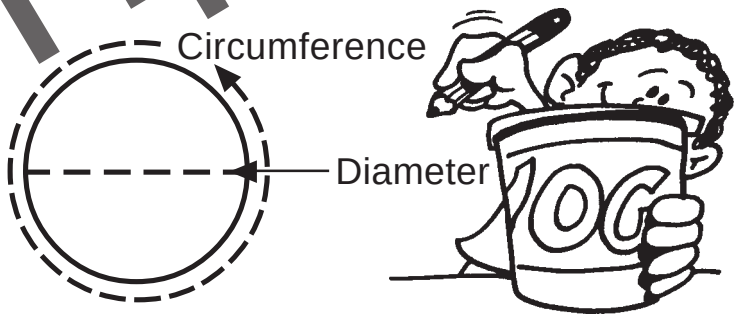
❑ You will need: a number of circular lids and containers to trace around, a yoghurt or similar container, grid paper

1. Measure the circumference of each shape and record the results in the table below.

Estimate your answers first.

SHAPE	ESTIMATED CIRCUMFERENCE	ACTUAL CIRCUMFERENCE

2. Draw around a yoghurt container onto a piece of grid paper.



Measure the circumference then measure the distance across the circle. Record your results on the grid paper.

What do you notice? .....

.....

3. Try two more circle shapes. Trace around them onto grid paper.

Estimate, then measure the circumference and diameter of each circle.

What rule can you use to describe the size of the circumference and the size of the diameter? .....

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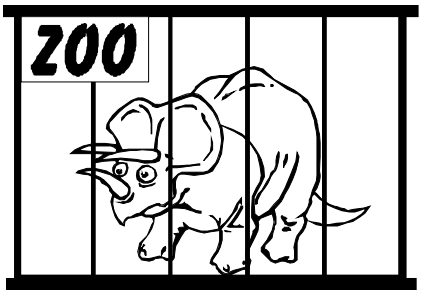
Name .....

Concept: Area

DINOSAUR DANGER



❑ You will need: ruler,
pencil,
grid paper

Jurassic Zoo has just acquired a new dinosaur. But there is a problem - what type of enclosure should be built? They have 20 spare fence units to use.

This is one fence unit: ⊢⊣ *(n.b. it is 1 cm)*

❑ Your task is to:

1) Make as many different shaped enclosures as you can using all the fence units;
2) Find out the area of each enclosure;
3) Discover the pens with the biggest area and the smallest area.

Record your results on the grid paper and answer the questions below.

Good luck!

How many enclosures did you make? .....

What type of enclosure had the largest area? Describe it. .....

.....

.....

Challenge:

If the zoo has seven dinosaurs in its collection, and all require the same area, how many new fence panels will the zoo have to buy? (Remember they already have 20 units to use). Explain your answer below.

Answer: ..... Why? .....

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Name .....

I Wonder?

❑ You will need: 3 different containers, water, a measuring jug

Estimate how many millilitres (mL) of water each container will hold.

Check your estimates with the measuring jug and record your results in the table below.

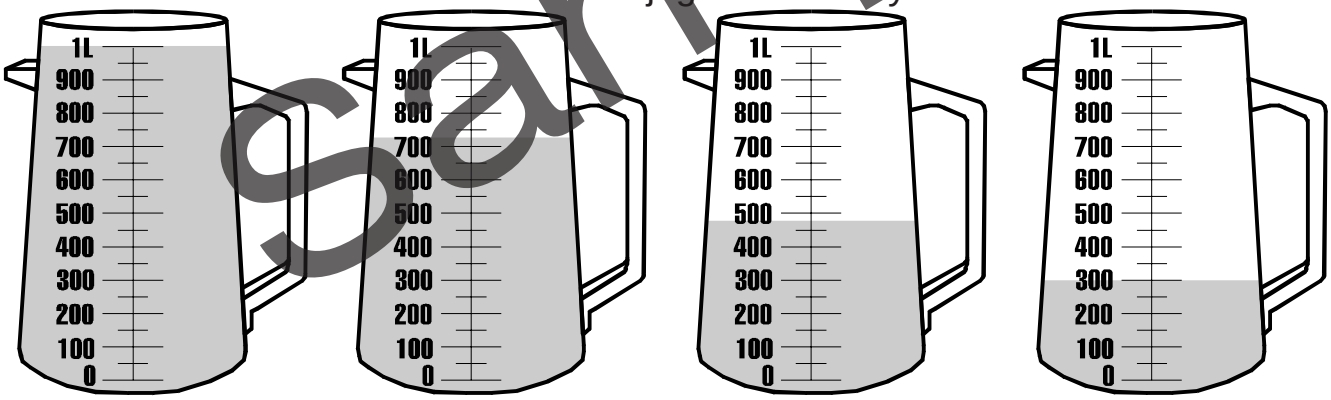
CONTAINER	ESTIMATE OF CAPACITY	ACTUAL CAPACITY

Does the tallest container always hold the most? .....

What rule can you write about the shape of a container and how much it holds (its capacity)? .....

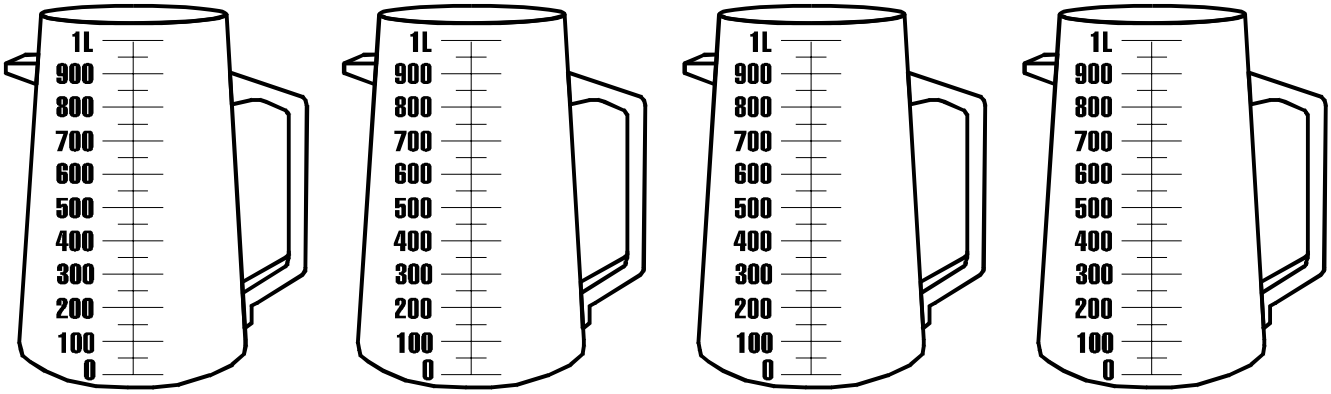
.....

Read how much water is held in these jugs and write your answer below.



a) ..... b) ..... c) ..... d) .....

❑ Draw in the correct water level on these jugs.



a) 900 mL b) 325 mL c) 50 mL d) 175 mL

Name .....

Concept: Mass

CAN YOU MEASURE UP?

❑ You will need: a set of balance scales, 2 cm cubes, rice or sand,
2 small cardboard boxes of different shapes,
1 m lengths of a variety of substances e.g. wool, paper, tape, wire, rope, a blackboard ruler, fabric

❑ Measure 1 metre lengths of all the things that you have collected.
Estimate and list the order of your 1 metre lengths from heaviest to lightest.

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Why did you put them in the order that you did? .....

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Now weigh the 1 m lengths using the balance scales. Fill in the gaps below using your actual results. (The arrow means 'is heavier than'.)

..... > ..... > ..... > ..... >

..... > ..... > ..... > ..... >

Were your estimates correct? If not, why not? .....

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Write a rule about weight and length and different substances. .....

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Try this!

Fill the two boxes with sand. Estimate which one will be heavier. .....

Check this on the balance scales. Were you correct? .....

Now cut the boxes so that the measuring area will lay flat. Do you think that the box that held the most sand will also need the most cubes to cover the measuring area?

Yes / No. Check it out.

Where you correct? .....