MATHS EXTENSION 4:

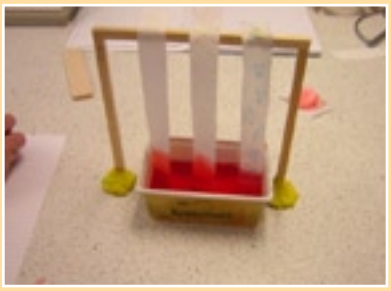
WHICH PAPER ABSORBS BEST?

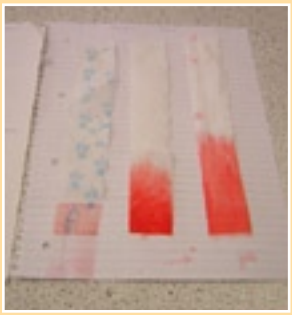
MATHS: STRAND UNITS AND OBJECTIVES

Length	*Estimate and measure length using standard and non-standard units*
Weight	*Estimate, measure and record the weight of objects using appropriate units*
Data	*Representing and Interpreting Data*

In these exercises absorbency is measured in two ways:

1. *The **distance** the liquid travels along the paper*
2. *The **weight** of water which is absorbed*





1) Measuring Absorption by Distance the Liquid Travels

Predict, Estimate/Measure

(a) In the above activity, the children could:

(i) predict which paper they think will absorb the best, giving reasons for their predictions. They should feel the paper to help them in their predictions;

(ii) then predict how far they think the water will travel up each piece of paper. (They could put a mark on the paper and have a competition to see who predicted the best).

(iii) after a certain length of time, estimate the distance which the water travelled up the different strips of paper.

(iv) measure the distances the water travelled and compare with their estimates.

A chart could be made with the results:

Type of paper	Distance Travelled	Ranking (1st, 2nd, 3rd)	Notes
Newspaper			
A4 paper			
Tissue paper			

(b) Predict, estimate, measure

Using this method the children should also predict which paper absorbs best, then estimate and measure as above.

With a pipette or dropper slowly allow a drop of water onto a sheet of paper.
(*A little food colouring in the water will help to show up the wet part*).

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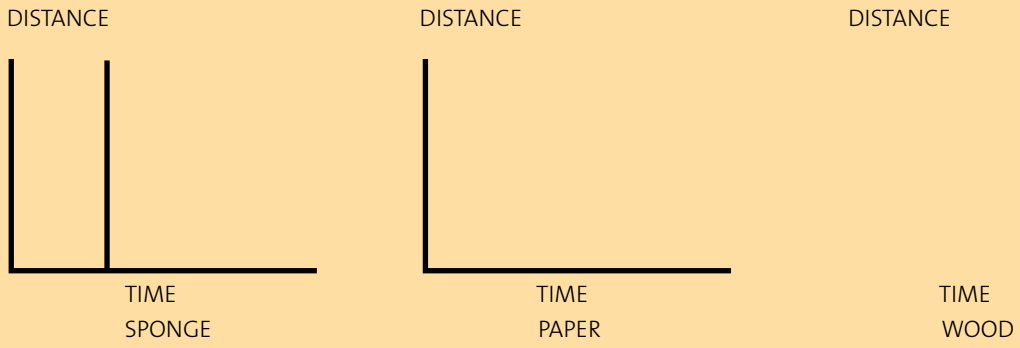
The children can predict how far the liquid will spread; then after the liquid has stopped spreading estimate the diameter of the circle, then measure the diameter of the wet circle.

They can also estimate the area of the wet circle and then perhaps measure it using squared paper.

This can be tried with other liquids, e.g. cooking oil, and the diameters/areas compared.

Follow-up Activity (6th class):

Graphs could also be made to compare the absorbencies, by measuring and recording the distance the water traveled up each paper at 30 second or 1 minute intervals.



2) Measuring Absorption by Weighing

In this exercise the children weigh things when they are dry, and then weigh them again after they have absorbed water.

By subtraction they find out how much water was absorbed.

Subtraction and Percentage Increase

(a) Weigh a dry sponge and write down the weight (remember to write down the units, e.g. grams)

Dip the sponge in water, weigh it again and write down its new weight.

How would you work out the increase in weight?

Now try to work out the percentage increase in weight. $\frac{\text{Actual increase in weight}}{\text{Dry weight}} \times 100$

(b) Take a small block of wood and predict whether there will be a smaller or bigger % increase in weight than the sponge; i.e. will the wood absorb more than the sponge?

Now carry out the same activity using the wood instead of the sponge. Was there a bigger or smaller % increase in weight? (*It is possible that a sensitive balance e.g. an electronic one if available, would be useful here, depending on the type of wood*).

What does this tell you about the wood and sponge for absorbing?

N.B. There can be many variations on this theme: e.g. compare absorptions of:

natural vs man-made sponges
treated and untreated wood
soft and hard wood
rough and smooth wood, etc.

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Remember FAIR TESTING!

What will you keep the same?
What will you change?

The effect of using warm water could also be investigated, keeping the material the same.

IT Exercise

IT could be used to help work out which material is the best absorber. The children could use different materials of the same size, weigh them before and after trying to mop up a water spillage with them. They could enter their results in a spreadsheet which was set up for them. The spreadsheet will work out the amount of water soaked up, and could sort the table or draw a bar graph.

	A	B	C	D
1	Material	Dry Weight	Wet Weight	Weight of Water
2	Towel			
3	Newspaper			
4	Plastic			
5	Kitchen paper			
6	Cotton rag			
7				
8				

3) Measuring Absorption by Weighing

(a) Jack carried a basket of wet clothes weighing 5 kg out to the clothes line. When he took them in at the end of a sunny day the basket of clothes weighed 3 kg.

(i) How much water did the clothes absorb in the wash?

(ii) What was the percentage increase in weight?

(b) If it takes half an hour for a wet nylon sheet to dry on a washing line, how long will it take for 4 nylon sheets to dry? (*Ans; 30mins*)

If the sheets were made of cotton which is 5 times more absorbent than nylon how long would it take them to dry? (*Ans: 2.5 hours*).