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CHILDREN AND WATER

Jos Elstgeest

Introduction

Water is a common yet exciting material, freely available almost everywhere, which lends itself to an endless variety of genuine science activities. Common as it appears to be, water can be a source of wonder to children and to adults who have kept up the habit of questioning and wondering. Water play is one of the earliest forms of children's exploration. At normal temperatures water is pleasant to work with. Some of its properties are easily revealed and these early experiences - the start of more detailed and sophisticated ideas. "Water makes things wet" is one of those early experiences, but that this high adhesive power is due to its molecular structure giving it a strong negative polarity is an idea which requires many more experiences and related ideas formed by reflection and thought.

All investigations of water at primary-school level can be carried out with the simplest of materials, readily available or made or improvised. Providing materials for the study of water is by itself an inviting challenge. For example, a zigzag gutter system of split bamboo stalks or banana leaf stalks to convey water from one place to another was initiated by a practicing student-teacher and carried out by a class of children in order to solve the problem: "How can we make it easier to water our garden from the well above?" This chapter indicates many simple materials, which can be used for qualitative as well as for quantitative work. Most of the things demand only the effort of collecting them. Some, however, require more careful, though simple, fashioning; for instance the making of little wooden floats of different shape, but of the same area, or the waxed cardboard shapes made to test surface tension.

Within this chapter are various activities comprising a certain sequence of experiences which are related to a particular aspect of the science of water. An example of this is "surface tension". This phenomenon is introduced as a first experience, where the surface tension makes a meniscus and supports a "floating" paperclip. Little, if any, explanation of the phenomenon itself is required here. At best this may be a good time to introduce the proper term "surface tension", but it will only stand for a still hazy concept. The concept, however, may well gain in sharpness when children have been "heaping drops" when they have experienced the problem of "how full is full!" and have measured its "strength" with a balance. Constant referring to and fro - to previous experiences from present ones - consolidates the idea, and helps to test whatever new notion arises from fresh experience, such as the adhesive property of water resulting in the phenomenon of capillary and "soaking up". By the time children have undergone and discussed various experiences of surface tension, their concept may be rich enough to make a relation between their observations, so that they can begin to seek for, and discover, a satisfactory explanation, even though it remains incomplete at this stage.

The actual sequence of activities related to surface tension is rather arbitrary, of course, but every fresh experience provides a new angle or a different point of view which is a step forward towards a better understanding of this property of water. The explanation of it in terms of the electromagnetic forces prevailing in the lopsided structure of the water molecule will still be well beyond the gasp of children (and most teachers). But if they do recognize relationships between their observations and the outcomes of their "what happens if.. ." Experiments, they will begin to construct a pattern, which gives momentary satisfaction, which is correct though inconclusive and which leaves the search open for further hypothesis and investigation. Those who later continue the quest for deeper understanding will find that the mental ground has been well prepared to foster further insight.

This chapter on the science of water brings out another important aspect of scientific activity: the recognition, use and control of variables. This ability is rather difficult to "teach", as it requires some insight and hindsight into one "s own investigative work, which makes critical appraisal possible.

A first acquaintance with variability is presented. Objects of various shapes and materials float on water in a different way: some deep in the water, others high up; some fall on their side, others stay straight up. Children are asked to observe and describe these variations. So far the children are only asked to make observations, but the observations include the different properties of the objects they use, as well as the consequent difference in behavior while floating. Something similar is called for when they compare how different shapes of wooden floats of the same area can hold different loads.

The idea of varying shape and size in turn is not included in the activity yet. Some intuitive agreement that the area should remain the same while the shape may vary is all that is suggested.

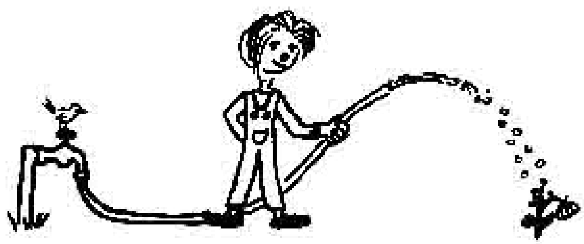
A further step is taken when children start “heaping drops” of various liquids onto various substances. Although “heaping drops” basically, asks for “what happens if...” observations, these variables become important when results are to be compared. What can be varied are the liquid, the surface on which it is dropped and the number of drops. The results are to be found in the shape and sire of the drops as they lie on the surface material. Children can see, and sometimes even measure, differences in diameter and vertical height, and they can compare the curvature of the surface of the drops. This is about as far as one can go with primary-school children: good observation and accurate recording. Nevertheless, part of the accurate recording is the mentioning of the variables: the liquid, the surface and the number of drops. Now they can establish certain facts on the basis of evidence collected. The fact that different liquids have different “heaping” properties and the fact that different surface materials interact differently with water, spirit or whatever other liquid, are probably all that the children can conclude at this stage. But that is sufficient.

In connection with the experiments on capillary where the “natural how” of water appears to be reversed, the need to *control* variables can be made obvious. This is a good opportunity to pay special attention to it, to point out once more what variables ale, how this idea applies to these situations and how necessary it is to recognize and to control variables in order to get reliable results. Apart from such a discussion, it will pay off in later work to keep referring to the idea by reminding the children to look for possible variables and to take them into account in experimental work.

CHILDREN AND WATER

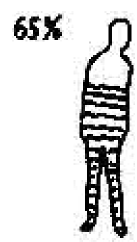
Jos Elstgeest

Did you ever drop a stick down into the water of a canal or a river?
How did it come up again?
Did you ever watch rings going forth from a plunged in stone,
and see them rippling back again?
What happened where outgoing and reflected ripples meet?
Did you ever play with a jet of water?



Did you ever fall into a ditch?
Did you ever stomp hard in a puddle?
(And was your mother nearby?)
Did you ever make mud pies?
Did you ever watch water boiling in a glass vessel?
Did you ever walk in a downpour?
Did you ever race sticks down the gutter?
Have you ever thought about:

- How dependent we are on water?
- How much water there is all around us?
- How much water we use daily?



Or about how much water you are?
(65%)

Then you can understand
Why this was written.

WHAT DO YOU NEED?
WHAT CAN YOU USE?

Firstly you need WATER

Secondly you need **WATER**

Thirdly you need **WATER**

And other liquids: spirit, oil, ink.

And things to put into water: salts, soap, sugar, detergent, coloring.

And things to put water into:

Tins,
Jars, Jugs
Droppers,
Pails,
Basins,
Hose, Piping, Spouts, Troughs, Corks, Pins, Needles, String, Thread, Filter paper, Blotting paper, Squared paper, Newspaper, Tissue paper, Razor Blades, Plastic Foil, Aluminum Foil, Plasticine, Spoons, Trowels, Pieces of Wood, Wax Paper, Sponges, Mop and a floor cloth.

Did you know that you could make all kinds of useful equipment out of plastic household bottles? Just cut and snip away, and you get tall and fat containers, troughs and spouts, boats and buoys, sprinklers and funnels, strips and snippets, squeezers and squirters, measures and measuring jars and much more perhaps. Be resourceful?

INFANTS AND YOUNGER JUNIORS

They have no use for lessons about water.

They would promptly stop learning.

What they need is water, a little supervision and

Materials:	to	do:
Funnels	to	pour
Tubes	to	fill
Straws	to	empty
Jars	to	spatter
Jugs	to	sprinkle
Vessels	to	let run
Basins	to	count
Bottles	to	drop
Tins with holes	to	drip
With one hole	to	carry
With no hole	to	shake
Plastic Bottles	to	hold
Squeeze Bottles	to	keep tight
Medicine Bottles	to	squeeze
Plates	to	squirt
Saucers	to	siphon
Spouts	to	mess about
	to	play
	to	try
	to	watch

To suck up

Can we really mess about

And mud to make pies.

And soap to blow bubbles!

Colors to make the water beautiful.

To sink and float.

And many more things….
And odd bits and pieces….

To plunge and plop!

To smudge and to smear.

FLOATING AND SINKING

When children work with water and things,
one of the first questions usually is:

What happens if you throw a. ……………(*Fill in what you fancy*)…………. into the water?

Or:
What will float?
What will sink?

A very good question to start with!


However: do not leave it at that:
Go beyond the question and **WATCH:**

How does a

- Block of wood float?
- Or a plank?
- A tin (empty)?
- A tin (half-full)?
- A cork?
- A jar?
- A piece of Styrofoam?
- A sponge?
- A ping-pong ball?

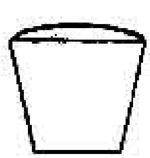
Draw it nicely.


How much of it is above the surface of or below the surface of water?

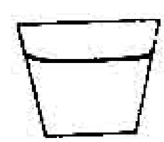
Is it lying straight? Or tilted? How much?

Where does a cork (or a pin) float:

a) In a full cup?



b) In a half-full cup?

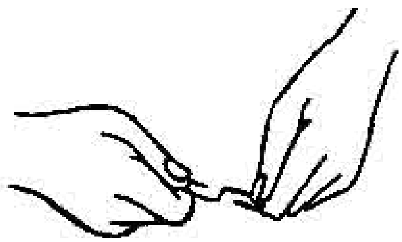


Can you make:

- A pin
- A paperclip
- A needle
- Or a razor blade float?

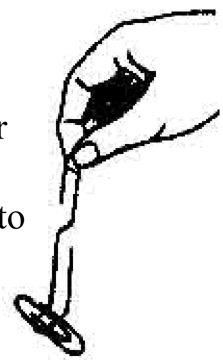
With a simple instrument and a little, patience, everybody can do it

Open a paperclip



Use pliers to make a little foot

And lower the object gently on to the water



Once you get it afloat, watch carefully once more.

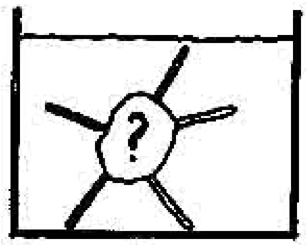
How it floats?
Where it floats?

Think of the cups, full and half-full.

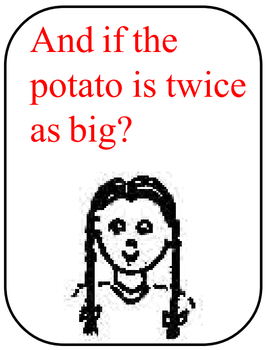
Try soapy water!

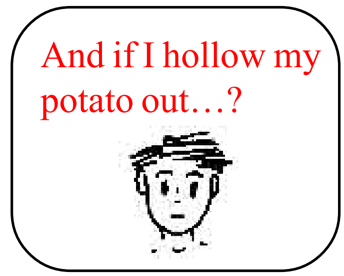
Compare a cork or piece of wood, which floats in water with the floating paperclip; Look where floating object and water touch!

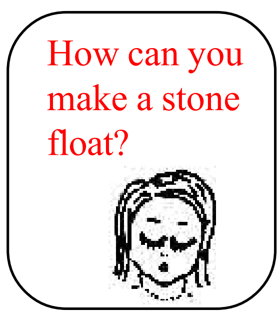
CAN YOU MAKE A SINKING OBJECT FLOAT?

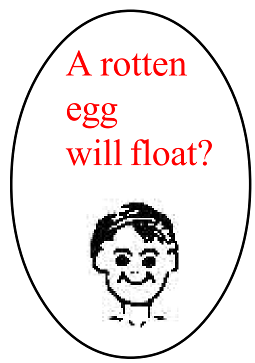


This is a potato with matchstick stuck into it…
How many matchsticks or tooth-picks (and perhaps you can think of other buoyant things) are needed to make a potato float?

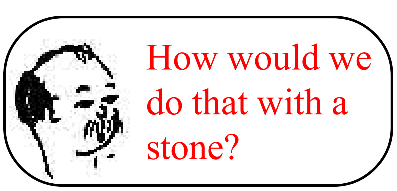


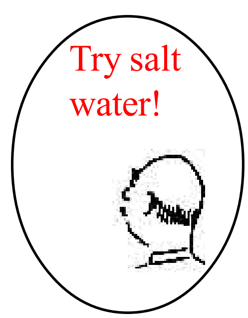




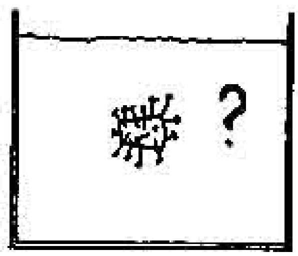


Whatever children suggest is worth trying out…. Although….





CAN YOU MAKE A FLOATING OBJECT SINK?

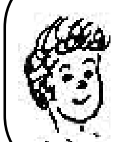


This is a small cork with pins stuck into it.
Small nails, or tacks can be used, too.
How many pins (nails, or tacks) are needed to make a cork sink?
At what pin does the cork begin to sink….
And does it sink to the bottom?

At the umpteenth!

Could you make the cork float in the middle of the jar…? Half-way down, I mean.

Pieces of balsawood are easy to stick pins into, and one can make measurements quite easily. A piece of wood sinks with 15 pins stuck into it. How many pins would you need to make a piece of wood sink that is twice its size?



What size do you take twice?

Please, Miss, could you repeat this question?

How do you make a balloon sink?

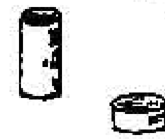
Look at what my piece of chalk does when I put it in water! Then it floats, of course! Perhaps….

Food – Fruit – Fish – and soup tins
should never be thrown away,
really before having been put to good (scientific) use:
What happens if you place an empty tin on the water surface?

Perhaps...But how?

Then it floats, of course!

- How will it float if it is high and narrow?
- How will a low and wide tin float?
- Can you make them all float straight up?



How?

How much
Water
Sand
Peas
Marbles
Paperclips
Pebbles
Corks
Rubbers

Can you load into your floating tin, before it (just) sinks?

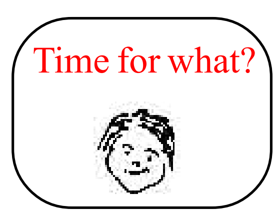
Is that the same for every tin?

How come?

With a hammer and a nail I make
A hole
Two holes
More holes in a tin.... And float it on the water.
Does it still float? For how long?
What happens?
What do you see in the tin?
Measure the time for One hole, Two, Four, Eight holes.

What happens if you put marbles or pebbles into your tin (with one, two, four, eight holes?)

1) Measure times
2) Tabulate or graph
    a) number of holes vs. time
    b) number of marbles vs. time

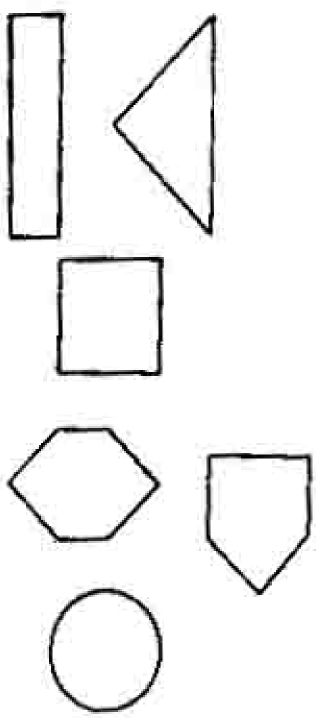


Sardine Tins
Bottle Tops
Shoe Polish Tins (or lids)
Jam Jar lids
ARE ALL TOO GOOD TO BE THROWN AWAY.

They are first class scientific equipment for a variety of experiments.

They can be used as cargo-boats.
How many marbles, pebbles, sand, clay, things can the boat carry without toppling, keeling over, capsizing or sinking?

What else can you load?



How can you load your boat in equilibrium?

It would be nice to make little wooden "boats" cut out in different shapes, but of equal area.

Would the shape of the "boat" make any difference to its loading capacity?

Can you pile as many marbles on a square as on a triangle?

And dry sand?

And when these loaded boats move?

In how many ways can you make your boats move without touching them?

DROPS

How do you make drops?

Or should one ask: How does a drop form itself?

If you drew it with care, then you know how well you observed:

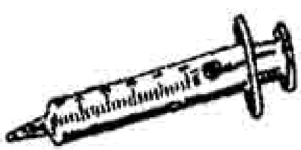
What exactly do drops look like?
What is the drop's shape?

Observe very closely:

- A hanging drop.
- A falling drop.
- A lying drop.
- A running drop.
- A fallen drop.

How do you measure a drop?

How big is a drop?
Are all drops equal in size?



Drop, drops into a measuring cup.
How many drops make 1 or 2 ml?
So, count and divide.

Would nobody think of this?

Once you know how to "measure-drops" you can compare which liquid makes larger or smaller drops –

- Water?
- Milk?
- Spirit?
- Seawater?
- Oil?
- Vinegar?
- Soapy water?

I wonder!

Heaping Drops

You can heap drops….
But what happens if you do?

Try heaping one drop onto the other:

Using		On to	
	Water		Plastic
	Spirit		Glass
	Soapy water		Your arm
	Oil		Metal
	Milk		Foil (aluminum)
	Seawater		Rubber
	Vinegar		Paper
			Waxed paper
			Mackintosh cloth

Water
on plastic?

Soapy water
on glass?

Water on
waxed paper?

Different liquids on waxed paper –
water, spirit, soapsuds, oil.

Whatever it is?
On whatever it is?

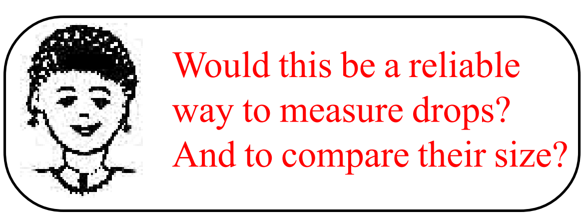
Look, Compare and draw accurately what you get:

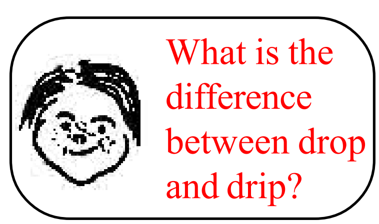
a) Water on plastic?
b) Soapy water on glass?
c) Water on waxed paper?

1 drop, 3 drops, 5 drops, 10 drops

d) Different liquids on waxed paper – water, spirit, soapsuds, oil.
e) On aluminum foil?
f) Whatever it is? On whatever it is?

Drops soak into blotting paper and make rings
Newsprint or coffee filter can be used, too.





How full is full?

Collect some small vessels
like bottle caps:

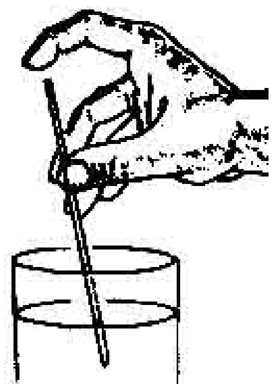
Screw tops, small cups, and lids of jars

or even penholder caps:

Then try and see how many drops

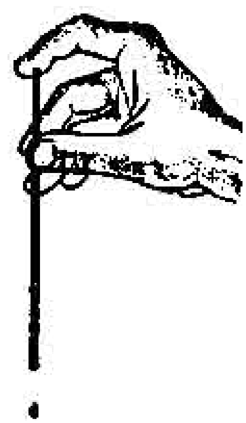
- of water
- of soapy water
- of spirit
- of vinegar
- of oil

you can add to a "full" vessel before it overflows.
How high can you "heap" the liquid above the rim?
You can make use of
- Eyedroppers
- Injection syringes



They are good for measuring I told you!

Or if you are clever enough then you can use ordinary drinking straws.
Which drop makes the bucket overflow?



The last one I guess?

What happens if….
You "heap" ordinary water above the rim, but not quite as high as you dare, and then add a tiny drop of. …soapy water?
Or any other liquid.

Racing Drops

Let drops drip and run…

- Along little slopes of
- Different angles
- And made of (sheets of)
- Different materials, such as
  - Plastic
  - Wood
  - Formica
  - Glass
  - Slate
  - Metal

And watch well!

Racing What?

Observe: how the drops run.

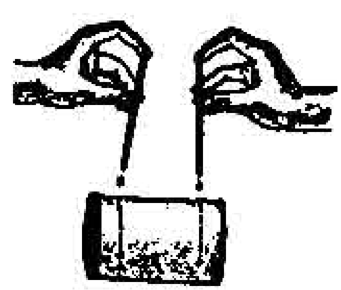
- Do they run straight?
- Do they run fast?
- What does their speed depend upon?

And if you change the angle of the slopes?

Or, if you use different liquids? Oil? Spirit?

AND NOW FOR THE RACES!

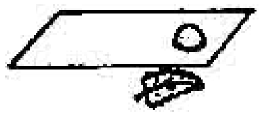
Take sizeable tines, pots, buckets, bottles, or vats, and let drops race each other down the curved sides.



Which drop of which liquid becomes champion?

- Can you find a way to make a drop win?
- Could you use straight-sided vessels?
- Could you use sloping sheets?
- How could you make drops run straight?
- Have you tried drops of ink?

WHAT MORE COULD YOU DO WITH DROPS?

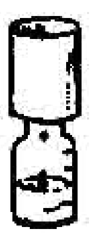


You could make a pretty good hand lens:
Place a nice, clear, drop on a piece of transparent plastic (overhead projector sheet)

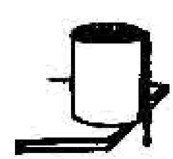
Try it out as a lens:

- At what distance above the object should you hold it to get it into sharp focus?
- How much (or little) can you see of your object through the water lens?
- Can you make your drop-lens any bigger? Better? Rounder? Clearer?
- Would another liquid (e.g. oil) make a better lens?
- Whatever you find: a water drop lens comes in handy when you have no hand-lens on you.

A dripping tap is a clock.
How can you adjust such a clock?
How can you measure time.. with a dripping tap?



Out of tins you can make water clocks:
A tin with a hole?
But…wouldn't you get a stream of water?
And if you cover the hole with a filter paper?



You could let the water siphon through a cotton thread over the rim into a measuring jar (home-made?

How do you wind these clocks?
How do you keep them running?

SPATTERS

Are splashed drops
Use colored water

- Beetroot juice is cheap
- Inks and dyes are dear
- Watercolors are expensive
- Food coloring "clean" but rather forbidding.

What happens with drops, which are dropped from a height of:

- 10 cm.
- 25 cm.
- 50 cm.
- 100 cm.
- 150 cm.
- 200 cm.

Onto

- Paper?
- Glass?
- Plastic?
- Stone?
- Linoleum?

Goodness me!
Shouldn't you
rather go outside?
The mess!

Or … into a pan of water? Or dry sand?

Colored spatters you can save.
They "write" their own records…
….but you should write the "what happens if…" question next to them, otherwise you save answers without questions.

You can also measure them and make a graph

Look at the question above and the spatter below?

Measure what, Sir? Graph, what, Sir?

If it rains, you get many drops for nothing!

USE THEM!

Watch how the rain falls:

- Straight down?
- Slanting?
- How obliquely?
- What would make the rain slant?

WHAT HAPPENS TO THE RAINDROPS WHEN THEY DROP DOWN?

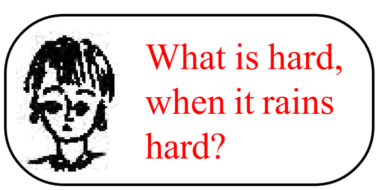
Look low, just above the ground, where they hit the earth. What precisely, can you see happening where a drop hits the water in a puddle? (Or a pan?)

Could you describe “a puddle in the rain”?

- Or paint it?
- Or draw it?
- Or sing it, if you wish?

What color has the water in the puddle?

- Can you copy that color?
- Go and stand somewhere else, what color has the puddle now?
- Can you copy this color, too?
- Look around and see if you can find something else of the same color.



IF IT KEEPS RAINING…

What does the rain, or the rainwater **do** to the ground?

Look

- On the path
- On a bare patch
- In the sandpit
- Under the tree
- In the grass

What would cats and dogs do to the ground?

- Where does the rainwater leave the clearest track?
Did you look where the ground slopes?

Could you make a mini-river system yourself on a sloping sandy patch of ground? Even on a dry day?

Where does all the rainwater go?
How do you know?
Can you think of some way to "follow" the water.

Are all raindrops equal in size?

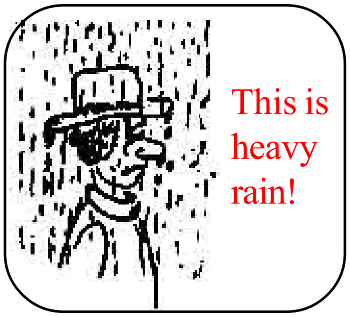
Stick a piece of paper outside, hold it, flat into the rain… for just one second…
What can this bespattered paper tell you? … about equal or unequal sizes?
How many drops did you catch?
Could this small experiment tell you something about (what is) "gentle' rain or "hard" rain?

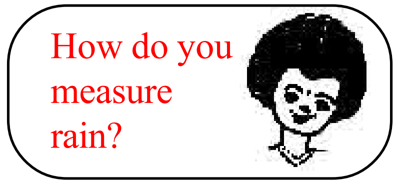
Measure

- The biggest spatter
- The smallest
- The one, which occurs most

What exactly happened to the raindrops hitting the paper?
Does this also happen when they hit glass? Plastic? Stone? Dry sand?
A mackintosh? A handkerchief? Bare skin? Kinky hair?

THE MATHEMATICS OF A SHOWER OF RAIN…





How "of course" is the rain gauge?

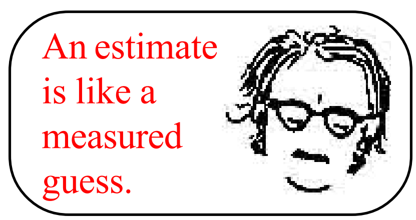
What do you want to measure?

- The size of the drops?
- The amount of drops?
- The quantity of water that has fallen?
- The amount of rainfall at a given time and place?

What can you measure

- With a rain gauge?
- With a good, straight-sided tin?
- With your spatter-paper?

What means: "3 mm rainfall?"
The rest you have to calculate or estimate.



NOW CALCULATE:

a) the area of the school's playground.
b) If the rain gauge measured 2 mm of rainfall, how many liters of water fell on the playground?

And if the whole shower fell on an area of 1.5 square kilometers, and measured 2 mm, how heavy was that shower?

If n drops drop on your paper (A4 size) in one second, how many drops, then, drop on your playground from a shower lasting 10 minutes.

WATER AND DYE

Water is a fluid…
…but how does it flow?

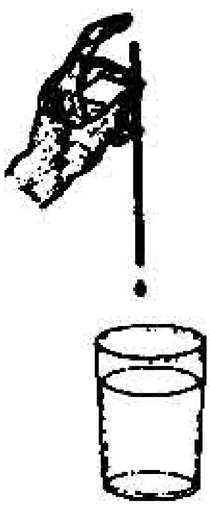
Movements and currents in the water are usually invisible… until you drop a crystal of dye, or a drop of coloring (or ink) into the water.

What does happen if you drop a drop of dye or ink in a glass, or a basin, of water?

TRY and WATCH

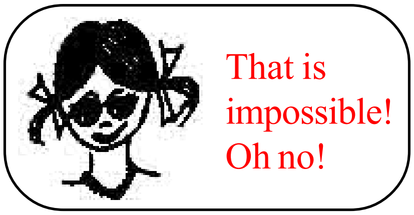
By this simple technique (or trick) you can draw quite a few secrets from the water:
How does water move?
How does water mix another liquid?
How do currents run, or flow?
How does the water at the top of the kettle heat up?
How long does water which has been stirred turn round and round?
Or how long does water "remember" in which direction it was stirred?
How does a crystal dissolve in water?
How does a dissolves – or a dissolving substance (solute) spread through water?

Through moving water?
Through still water?
Through cold water?
Through hot water?
Heating water?

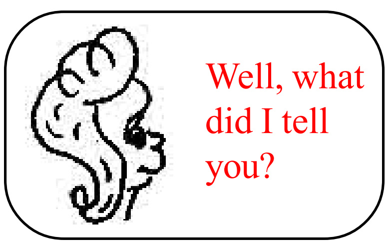


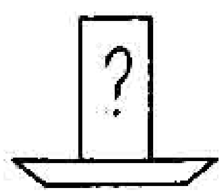
Water and dye help you solve these problems.

WATER RUNNING UPWARD?



Take two small glass plates,
And at one end, you stick a matchstick between them.
Next tie them together with rubber bands.
Now touch, with the underside of this contraption, the surface of the water in a basin…
What happens to the water between the glass plates?
Draw it?
Describe it?





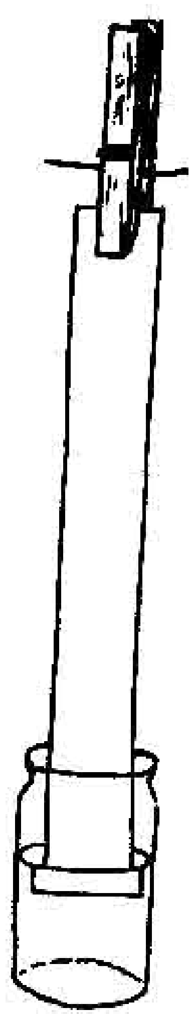
What happens if you stand a brick in a plate, pan or pot of water?

- Or a rock?
- Or a broomstick?
- Or a piece of chalk?

Let water climb up a strip of paper and you will find many problems to be solved by as many experiments:

In what paper does the water climb highest?

- In blotting paper?
- In newspaper?
- In copybook paper?
- In kitchen paper?
- In wrapping paper?
- In wallpaper?
- In toilet paper?
- In filter paper?
- In doesn't matter what paper?



And if you hang these strips in a row, you automatically get a graph.

And how does water climb high or low in strips of

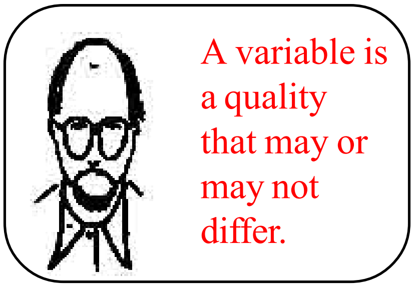
- Cotton cloth?
- Wool?
- Nylon?
- Plastic?
- Felt?
- Canvas?
- Muslin?
- Linen?

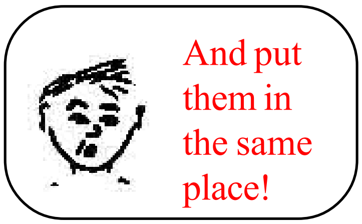
And in strips

- Of trousering?
- Of shirtsleeves?
- Of coat tails?
- Of an old sock?

I try it in
Colored water
Sugar water
Salt water
Oil
Spirit
Lemonade
Milk
…If I am allowed to…

VARIABLES



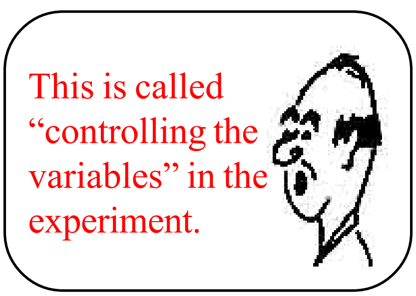


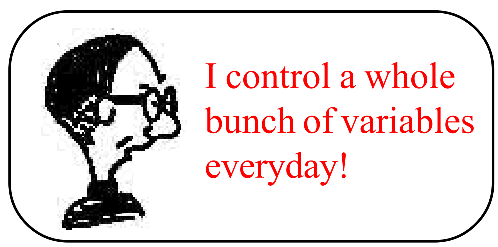
If you want to make valid comparisons, and so assure yourself of dependable solutions to your problems, you should compare only one possibly different quality at the same time.

Example I: to solve the problem:
"WHICH LIQUID RISES HIGHEST?"
you may use:
different liquids.
But the same paper
Of the same width
Dipped to the same depth in the liquids.

Example 2: to solve
"HOW DOES THE WIDTH OF THE STRIP AFFECT THE RISE OF THE WATER?"

You must use the same kind of paper
And the same liquid, and dip
The strip to the same depth in it.
Only the width of each strip may differ.





KEEP THIS IN MIND, AND YOU CAN SOLVE MANY PROBLEMS.

Like: How fast does a liquid rise in

- different papers?
- different textiles?
- different bricks?

And: How fast do different liquids
rise in...........papers?
textiles?
bricks?

How would you control variables here?

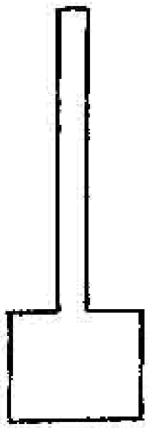
HOW STRONG IS WATER?

You can "heap" water drops.
It carries paperclips, needles, and razorblades.
Water "pulls" itself up.

And have you ever tried to separate two wet plates of glass?

Is water "strong"?
How "sticky" clinging or tenacious is it?

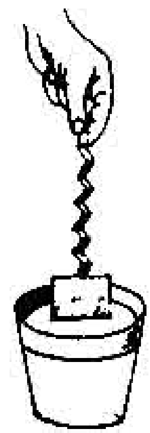
Cut this shape out of paper



and fold the tail zigzag

and you get a water surface tension meter.

It also "measures" possible surface tension of other liquids: at least you can compare.



Just touch the surface and gently pull upward: how far does the zigzag spring extend?

Can you think of a more reliable instrument?

I would try a light spring balance.

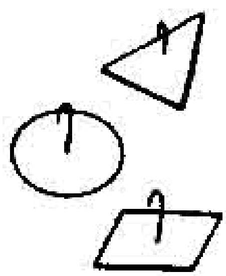
Wouldn't it be better to use something flat with it?

Yes, because there is more surface for the water to hold on to!

Or, shall we use a proper balance?

How about adding washers to a floating razor blade?

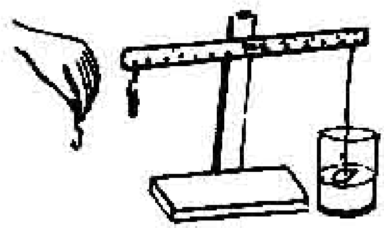
THE SURFACE TENSION BALANCE



Cut regular shapes out of a strong paper or card – which you can make waterproof by dipping it in hot candle wax – or out of plastic or metal sheeting.

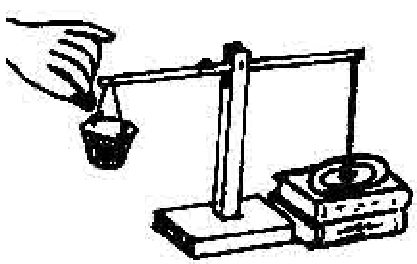
Fix a pin through each figure's center point, and bend it, to make the shape suspend able, and keep it in balance.

Suspend one figure on a thread, from the balance, and bring the balance to equilibrium first. Then let the shape just touch the surface of the water.



Now add units of weight (e.g. paperclips) to the other balance-arm, and count how many are needed to pull the shape free from the water's hold?

Now you can compare and find out to what extent shape, size (or area), or even kind of liquid affect the liquids (the water's) "holding power".



Try and make different shapes with the same area, and different areas of the same shape.

Mind the variables!

When you consider solving problems like:
Is soapy water stronger or?
Is one shape held more tightly than another?
How can you compare the water's pull on different areas?
Which variables should be kept constant, and which one may vary?

ICE, WATER, STEAM

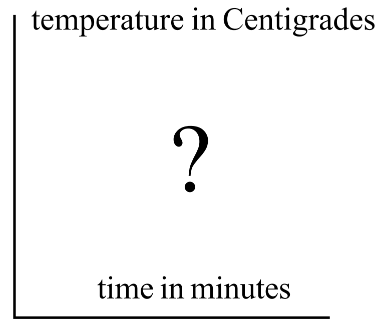
Where does boiling water go?

Can you retrieve it?
There is a classic experiment whereby a cold plate is held in the jet of steam coming from a whistling kettle…

I find this rather dangerous for children!
Even teachers burn their fingers!

A SURPRISING INVESTIGATION IS

What happens to the water's temperature between ice and steam?



Start with a pan of ice blocks (+ water)

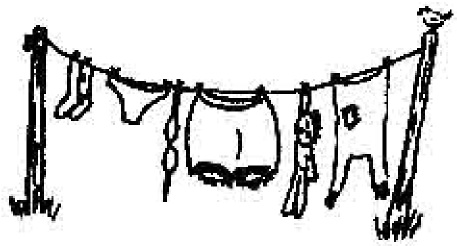
- Hold the thermometer in it and from now on take a reading every minute.
- Keep careful record of the temperatures.
- Heat the pan on a steady flame, or on a hotplate, and let the water boil for at least five minutes.
- Make a graph.
- What does this graph tell you?

My children love making ice cubes in the freezing compartment of a refrigerator.

I have sent them off with the problem of making ice balls, or ice eggs, or ice rings, or indeed any shape.

Miss, how can you keep the air bubbles out of the ice blocks?

EVAPORATION AND DRYING UP.



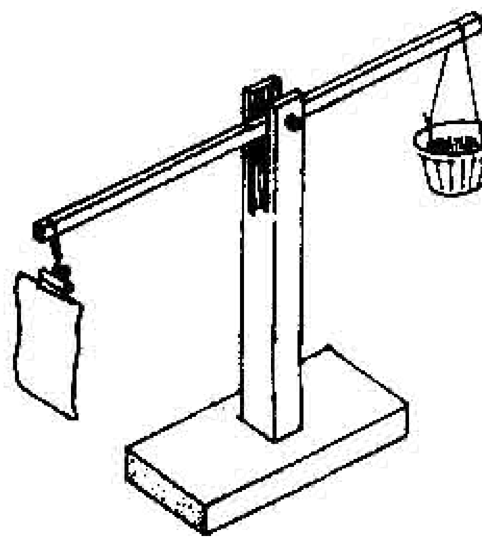
Drying the laundry seems so common, but what exactly happens when the wet clothes dry?

What is “drying up”?
How wet is wet?
How dry is dry?

Can you measure wetness?

Out of a simple balance you can make a good wet-and-dry meter. Suspend on one side a (measured) wet cloth or piece of blotting paper.

Bring the balance in equilibrium by adding small weights to the other side. When drying the object looses balance, looses equilibrium.



This enables you to measure the time it takes, as well as the quantity and the speed (or rate) of evaporation.

(P.S. Weigh the dry object first, then you know how much water it still retains – 1 cm^3 of water is 1 gm.) Now, thinking of variables (which ones?) you can solve:

1. Does the place (position) make any difference?
In the sun? The shade? The draught?
On the cupboard? In the corner? Under the table?
2. Does the shape make any difference?
Circular? Square? Triangular? Ribbon-like?
3. Does the area affect the rate of drying up?

N.B. Cut some shapes, different areas;
same areas, different shapes.

IS THIS THE END?

There is no end, of course, because many questions and problems remain.

There is much more to be done with, and much more to be learned from water.

Think of waterpower - Making turbines
- Study erosion
- Work on pressure
- Hydraulics

- Water cycle
- Water preservation
- Water works
  - make a water distribution map.
  - Dismantle and assemble a tap.

- Water pollution and purification – Filtering
- Solution and solvent(s) - How many sugar lumps dissolve in hot/cold water?
  - What do you get if you evaporate seawater?

And whatever Lives
Lives not,
Lives no more

Everything Is important
Is interesting
Is instructive
Is relevant.

Fit any topic, which catches your children's attention, or yours.

Just get started and see where it ends.