

## Measuring humidity levels

water is life

### SAFETY!

- Be careful not to break the thermometer
- This activity should be carried out with adult supervision

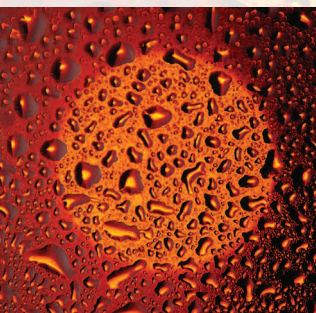
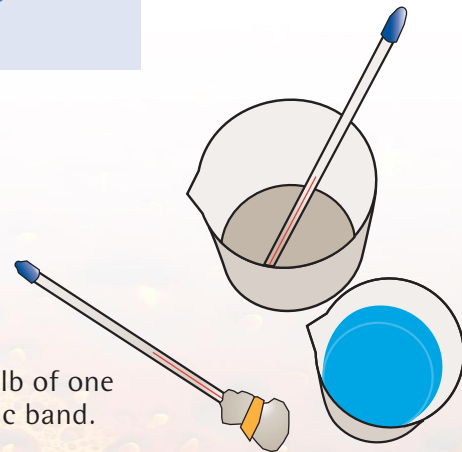
- Humidity level is measured by a hygrometer.

### How to make your own hygrometer

#### You will need:

- 2 thermometers, elastic band, beaker, water and muslin cloth

1. Carefully wrap a piece of muslin cloth around the bulb of one of the thermometers. Secure it in place with an elastic band.
2. Fill your beaker with water and then place the thermometer with muslin wrapped around into the beaker. This thermometer is your wet-bulb thermometer. You must keep your wet-bulb thermometer damp at all times.
3. Your thermometer is known as a dry-bulb thermometer. Together they are known as a hygrometer.
4. Carefully take your hygrometer into the Stove House, making sure the wet-bulb thermometer is kept moist at all times.



Wait 10 minutes before reading the temperatures of each thermometer. Record your findings below:

	Stove House	Walled Garden
Wet-bulb temperature		
Dry-bulb temperature		
Difference		
Humidity level		

Subtract the wet-bulb reading from the dry bulb reading. Write the difference in the table.

Use the Thermometer Hygrometer chart to find out the humidity level of the Stove House.

Now take your hygrometer into the Walled Garden and repeat the process.

**The area that showed less difference between the wet and dry bulbs has the more humid atmosphere.**

## Cloud Watch

Take a good look at the clouds in the sky today. Which type of cloud can you see?

Use the table below to record cloud shapes for the whole week. Put a tick next to the type of cloud you see each day.

Cloud	Monday	Tuesday	Wednesday	Thursday	Friday
 <b>Cumulus</b>	am	am	am	am	am
	pm	pm	pm	pm	pm
 <b>Cirrus</b>	am	am	am	am	am
	pm	pm	pm	pm	pm
 <b>Stratus</b>	am	am	am	am	am
	pm	pm	pm	pm	pm
 <b>Nimbus</b>	am	am	am	am	am
	pm	pm	pm	pm	pm
 <b>Cumulonimbus</b>	am	am	am	am	am
	pm	pm	pm	pm	pm
 <b>Stratocumulus</b>	am	am	am	am	am
	pm	pm	pm	pm	pm
 <b>Alto cumulus</b>	am	am	am	am	am
	pm	pm	pm	pm	pm

Use this table to make notes, describing the weather each day. Look at the glossary for useful weather words to use.

Day of the Week	Morning (am)	Afternoon (pm)
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		

Now compare your descriptions of the weather with the type of cloud seen on one of the days.

- Do you think you can predict the weather by looking at the shape of the clouds?

Meteorologists make a number of observations to predict the weather: temperature, humidity, air pressure, rainfall and wind speed.

## Make a rain gauge

### SAFETY!

- Be careful when cutting the plastic bottle, the edges may be sharp
- Ask an adult to help

- Rainfall is measured in millimetres or inches
- You can record rainfall by making a simple rain gauge

### You will need:

- a transparent plastic bottle, permanent marker pen, scissors and a ruler
1. Draw a line around the middle of the bottle. Carefully cut along this line so that the top and the bottom of the bottle are separated. Ask an adult to help you with this task.
  2. Take the bottom end of the bottle and stand it upright with the opening at the top. Use the ruler to measure 5 millimetres (mm) up from the bottom, mark a line and label as 5mm. Measure 5mm from your first mark and label it as 10mm. Continue this process until you have measured up to 50mm.
  3. Now take the top part of the bottle and turn it upside down so that the neck of the bottle is pointing down. Place this inside the bottom part of the bottle. This will act as a funnel encouraging the water to remain in your gauge.
  4. Place your rain gauge in an open area that is not sheltered from the rain.
  5. Measure the amount of rain collected each day at the same time. When you have measured it remove the rain from the gauge so that you only measure new rainfall each day.

Use this chart to record rainfall over a week.

Day of the Week	Amount of rainfall (mm)
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

### Investigation:

Does the position of a rain gauge affect the amount of rain collected?

Plan an investigation to find out the answer to this question. Maybe you could carry it out with your friends so that you could use a number of rain gauges.

### Consider:

- Designing a fair test
- Where you will locate your rain gauges
- How you will compare the differences
- A way of recording your findings

### Explain your findings

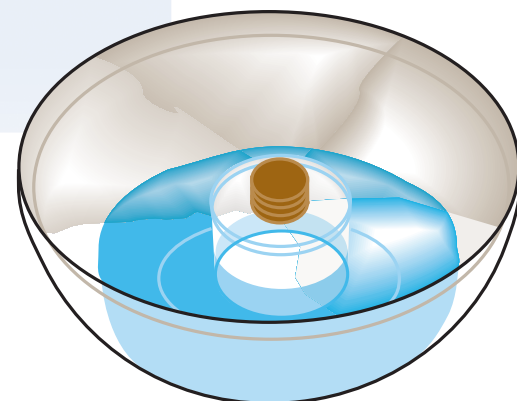
## Make your own Water Cycle

water is life

### You will need:

- A large plastic bowl, cling film, a weight, a smaller container (yoghurt pot), large elastic band, jug, lamp and clock.

1. Put the smaller container into the large bowl in the centre.
2. Put a little water into the large bowl, below the height of the smaller container.
3. Cover the bowl with the cling film and keep it in place with an elastic band.
4. Carefully put the weight into the centre of the cling film to weigh it down slightly.
5. Leave the bowl in the sun or under a desk lamp for a while.



### What will happen?

- The heat of the sun or lamp **evaporates** the water in the large bowl, which then rises and **condenses** on the cool cling film. This **vapour** will then fall into the smaller container. It will then **evaporate**, to then **condense**, just like Nature's Water Cycle!

Use a clock to measure how long it took for water to appear in the smaller container. Now place your water cycle in a shady area away from direct heat.

Does this affect the time it takes for water to appear in the small container?

Record your results here:

Conditions	Time at beginning of investigation	Time water appeared in small pot	How long did it take for water to appear?
<b>Investigation 1:</b> Water Cycle in a warm area			
<b>Investigation 2:</b> Water Cycle in shady area			



## Are you water wise?

Water is a valuable resource and it is very important that we do not waste it.

Below is your own water calculator which enables you to work out how much water your household uses every day and whether you are water wise.

### Water Use Calculator

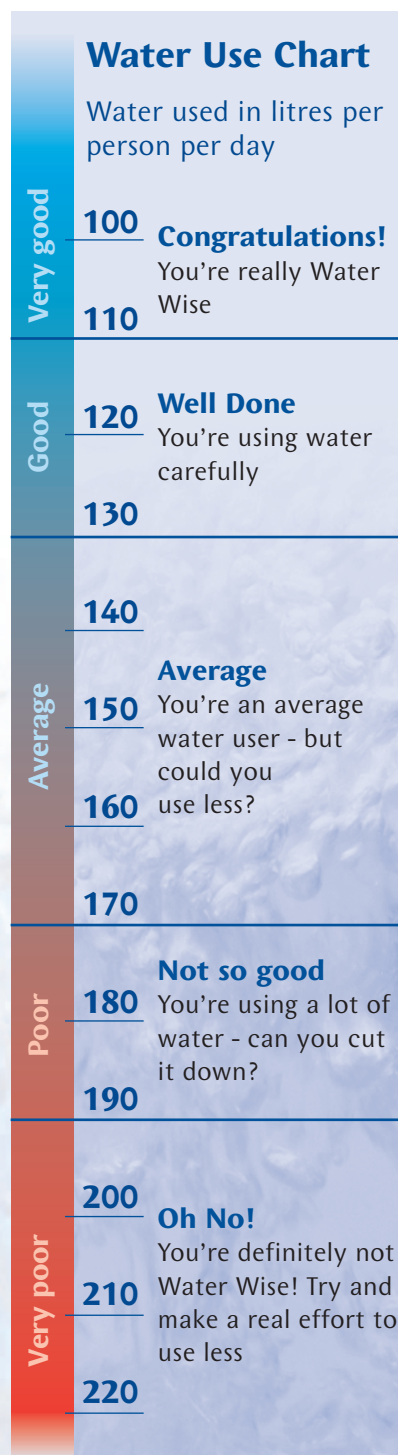
Household activities	Amount of water	Number of times per day	Total Litres
Taking a Bath	80 litres	x	=
Taking a Shower	35 litres	x	=
Flushing a Toilet	9 litres	x	=
Washing your Face	9 litres	x	=
Having a Drink	1 litre	x	=
Brushing your Teeth	1 litre	x	=
Washing Machine	65 litres	x	=
Dishwasher	25 litres	x	=
Garden Sprinkler	17 litres per min	x min	=
Hosepipe	10 litres per min	x min	=
<b>Total use per Household</b>			<input type="text"/>
Divide above figure by the number of people in your household			<input type="text"/>
<b>Water used in litres per person per day</b>			<input type="text"/>

*Check with the Water Use Chart to see if you are water wise*

To calculate the amount of water used on a typical day, simply enter the number of times each activity takes place in your household during the day. You will then need to multiply by the amount of water for each activity.

Now add up all the totals and divide by the number of people in your household and hey presto you have the amount of water used in litres per person per day.

Finally all you have to do is complete this with the Water Use Chart to see if you are Water Wise!





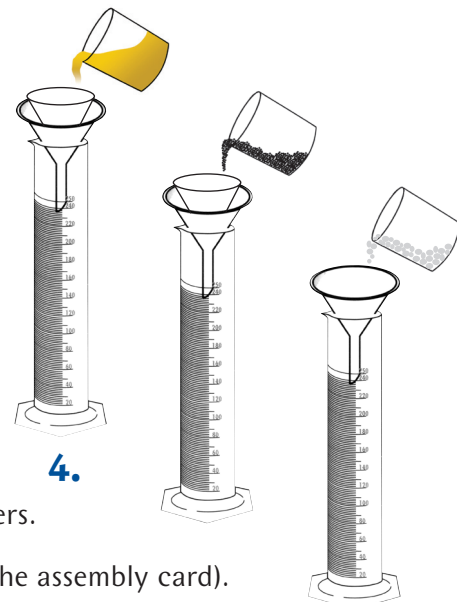
## Make a Filter



### To find a way of cleaning dirty water

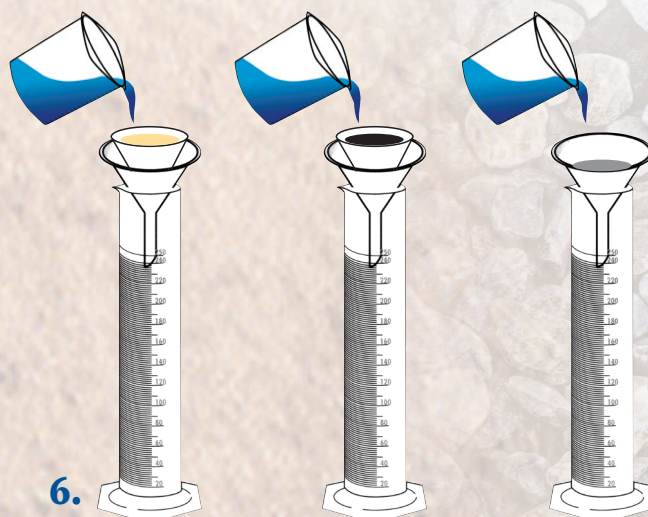
#### Materials you will require:

- 2 filters
- Sand
- Gravel
- Activated carbon
- Food colouring
- 3 funnels
- 3 graduated cylinders
- 1 pipette
- 1 stirrer
- 1 beaker
- Earth (collect a small potful from school grounds)

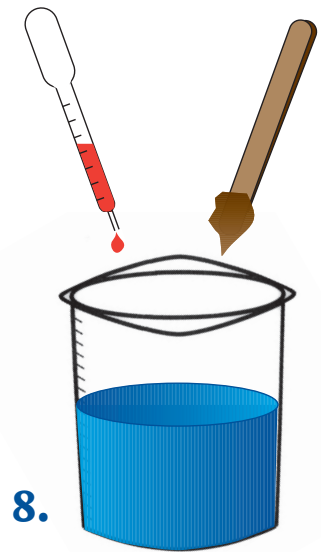


#### Step by step:

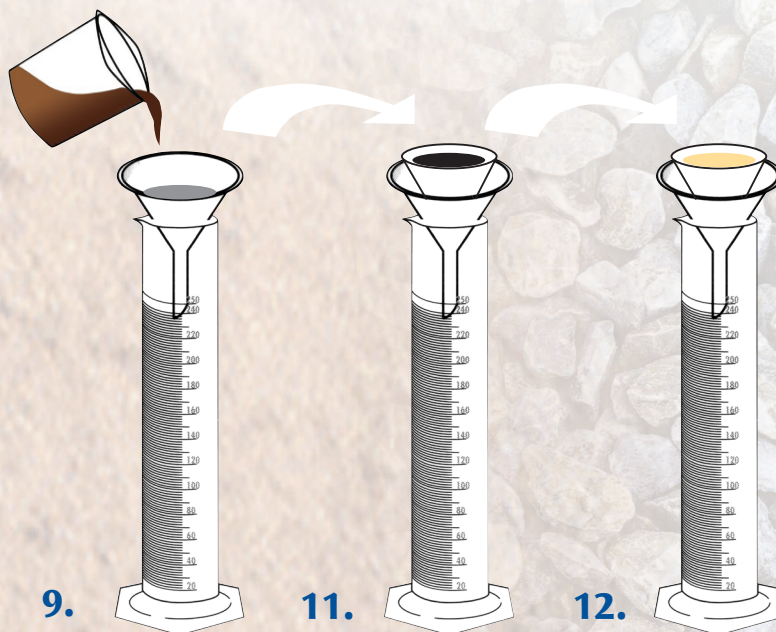
1. Place a funnel in each of the three graduated cylinders.
2. Prepare two filters (following the instructions from the assembly card).
3. Put a filter in two of the funnels.
4. Fill these funnels three-quarters full: sand in the first, activated carbon in the second.
5. Fill the third funnel three-quarters full with gravel (no filter).
6. Slowly pour 60 ml of water in each funnel to clean the gravel, sand and activated carbon.
7. Leave the cylinders to stand until the water stops dripping from the funnels, then throw the water away.



8. Pour 60 ml of water into the beaker. Using a stirrer, add two measures (about two teaspoons) of earth. With the pipette, add only one drop of food colouring.
9. Using a stirrer, mix the liquid and earth together and pour it over the gravel and leave it to stand.
10. What can you see happening?
11. Pour the mixture, which has just been filtered, over the sand and leave it to stand.
12. When the entire mixture has been filtered by the sand, examine it closely. What has happened?
13. Pour the mixture which has been filtered through the sand over the centre of the activated carbon. Leave it.
14. When the mixture has been filtered examine it. What has happened?
15. Clean the gravel, sand and activated carbon as you did in step 6 so that everything is ready to put away.
16. Now wash your hands thoroughly.



**Make sure all equipment is clean before returning it to the box.**



## Is the water Soft or Hard?

water is life

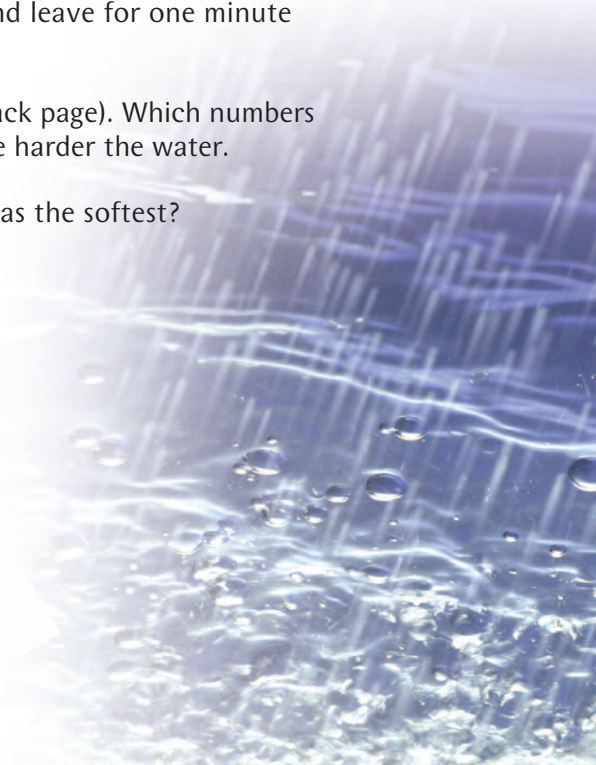
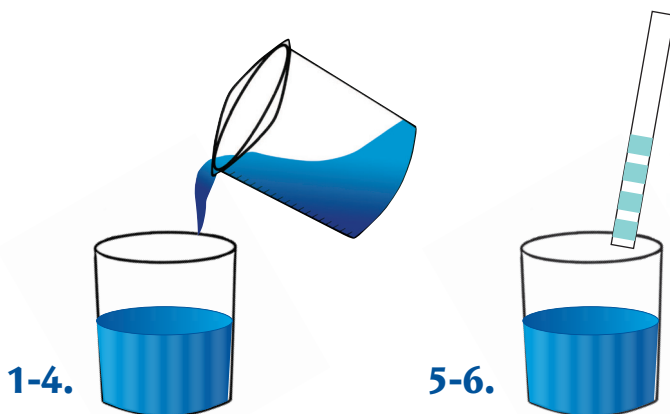
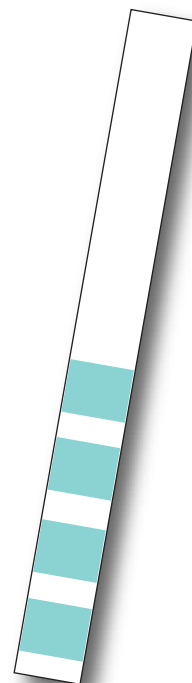
### Finding out about water 'hardness'

#### Materials you will require:

- 4 pots
- Calcium acetate
- 2 pipettes
- 1 beaker
- Water hardness strips
- 1 felt pen
- Rain water or distilled water (from classroom resources)
- Tap water
- 6 aluminium dishes
- Liquid soap

#### Step by step:

1. Pour 100 ml of rain water or distilled water into one of the pots.
2. Label the pot: rain water or distilled water.
3. Pour 100 ml of tap water into the second pot.
4. Label the pot: tap water.
5. Put a water hardness strip into each pot for one or two seconds.
6. Put each strip in a different aluminium dish and leave for one minute before continuing.
7. Carefully compare each strip with the chart (back page). Which numbers do the strips match? The higher the number the harder the water.
8. Which water was the hardest? Which water was the softest?



*A learning experience with the  
Sir George Staunton Country Park & your local water supplier*

9. Using a pipette, add 1 ml of liquid soap to the pot containing rain water.
10. Using a pipette, add 1 ml of liquid soap to the pot containing tap water.
11. Close both pots and shake them.
12. What happens? Does it make any difference to the hardness?
13. Repeat steps 1 to 4.
14. Using a clean pipette, add 3 ml of calcium acetate to a fresh pot of rain water.
15. Close the pot and shake it.
16. Measure the hardness. What do you notice now?
17. Using a clean pipette, add 3 ml of calcium acetate to a fresh pot of tap water.
18. Measure the hardness. What do you notice now?
19. Does calcium acetate do anything to soft water?

**Make sure all equipment is clean before returning it to the box.**

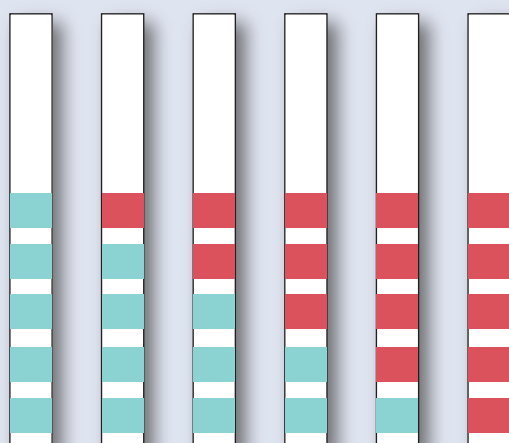


9-10.



11.  
15.

0 mg/l    90 mg/l    180 mg/l    270 mg/l    360 mg/l    450 mg/l



Soft

Hard

**Key:** mg/l = milligrams per litre  
 NB: Hardness is measured in the amount of calcium carbonate in the water

*A learning experience with the  
 Sir George Staunton Country Park & your local water supplier*

## How far can you carry water

water is life

**Safety – Use the towel to clear up any spillages before the next person has a go**

Do you remember how far children on other parts of the world have to carry water? Some as young as 10 years have to carry water weighing 20 kgs up to 3 to 4 miles. Can you do this?

### You will need:

- 2 buckets with handles filled \_ with water
- A towel
- A Clear space to walk up and down (5 metres minimum, if possible)

### Step by step:

1. Stand with the bucket either side of you
2. Bend your knees and grab the bucket handles
3. Gently lift both buckets and walk up and down

### Safety – Put the buckets down if they become too heavy

How many times can you do this – can you do it over 600 times? That's how far some 10 years old have to carry their water. Just think what would happen if you got tired and spilt the water? The family would have no water to cook or clean so you have to go back and get some more.

4. When you have finished put the bucket down and let someone else have a go

Aren't we lucky that we do not have travel 3 to 4 miles to get some water? How far do you go to get some water?

***When you have finished this activity do not waste the water. Put it on some plants or in the garden.***

*A learning experience with the  
Sir George Staunton Country Park & your local water supplier*

## Is all water the same?

**Are there any differences between different types of water?**

**Materials you will require:**

- Clear glasses for observing water (from classroom resources)
- Water brought from home (in a container labelled with your name for identification)
- Bottled water from different locations (from classroom resources)

**Step by step:**

### Test A - Taste test

1. Pour a small amount of each type of water provided into separate glasses and label them to show where each type of water has come from.
2. Do they look the same?
3. Do they smell the same?
4. Do they taste the same?
5. Which do you prefer?

### Test B - Blind taste test

1. Cover your eyes with a scarf?
2. Drink from each glass once again?
3. Can you recognise them?



## Reservoirs & Water Pressure



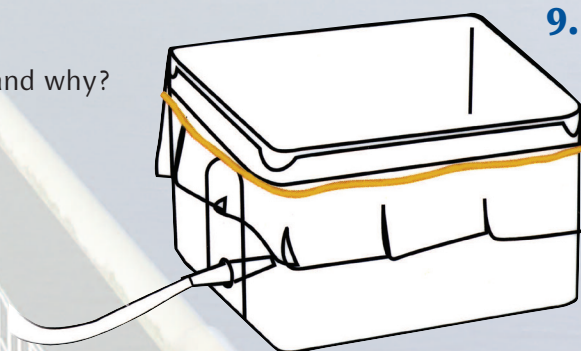
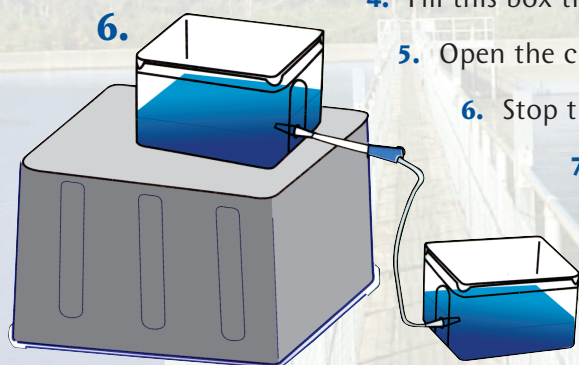
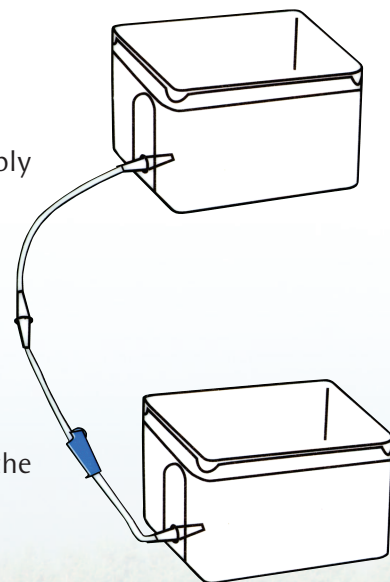
To find out what happens when water flows from one container to another.

### Materials you will require:

- The storage locker
- 2 boxes with holes and with tubing connected (see assembly instructions if not already connected)
- 1 extra tube connector
- Plastic film
- Large strong elastic band (from classroom resources)
- Watch with second hand (from classroom resources)

### Step by step:

1. Join the two boxes using the tube connector to connect the two tubes.
2. Close the tube clamp.
3. Place the first box on top of the upturned storage locker.
4. Fill this box three-quarters full with water.
5. Open the clamp and begin timing.
6. Stop timing as soon as the water stops flowing.
7. How long was the water flowing?
8. Pour out the water from the boxes and cover the lower box with plastic film allowing the film to sag slightly into the box. Fix a strong elastic band round the rim of the box to make an airtight seal.
9. Repeat the steps from 4 to 7
10. How long did it take?
11. What has happened to the plastic film and why?



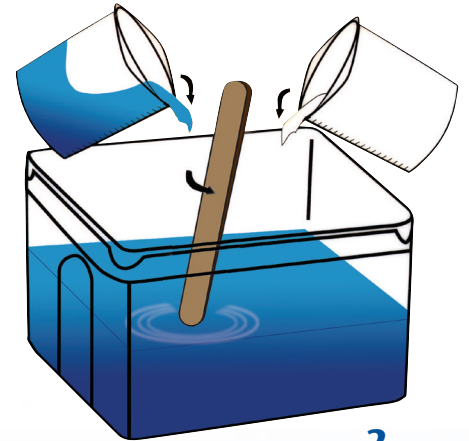
**Make sure all equipment is clean before returning it to the box**

## Fresh water

### How to get water you can drink from salty water.

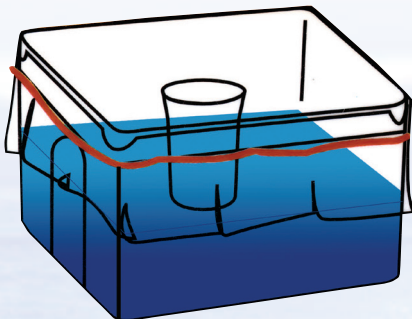
#### Materials you will require:

- Salt
- 1 stirrer
- 1 box without holes
- 2 beakers
- 1 glass that can withstand hot water (from classroom resources). The glass needs to be higher than the water level but not touching the film
- Plastic film
- Ice cubes (from classroom resources)
- Hot water (from classroom resources)
- Strong rubber band to go around box (from classroom resources)



2.

#### Step by step:

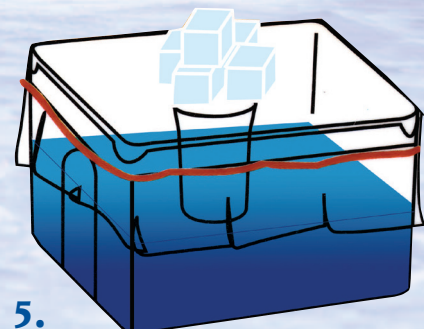


3-4.

1. Fill the box halfway with hot water.
2. Pour 20 ml of salt into the box, mix with the stirrer.
3. Stand the glass right side up in the centre of the box.
4. Cover the box with two layers of plastic film. Make certain that all the edges are well sealed. Use a strong rubber band to hold the plastic film in place.

5. Put the ice cubes on top of the film directly above the glass.
6. Place the box in a safe place where it will not be disturbed.
7. When the ice cubes have melted, taste the water in the glass. What do you notice? Can you explain what has happened?

**Make sure all equipment is clean before returning it to the box**



5.

## How is Water moved?

**Finding out how to move water from one container to another.**

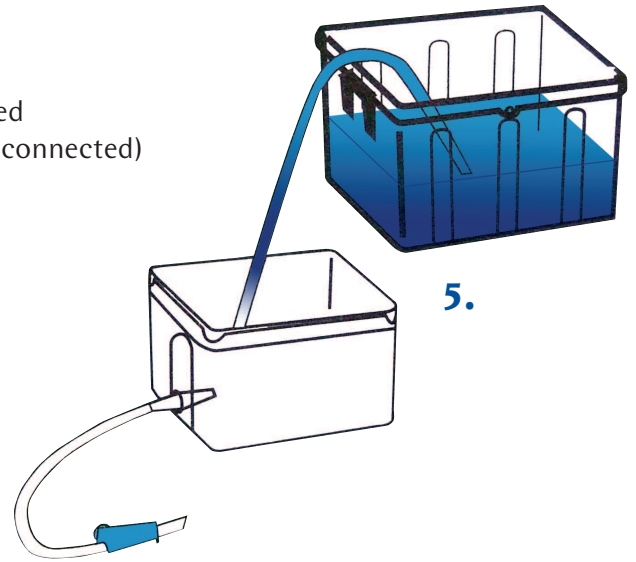
**Materials you will require:**

- The storage locker
- 2 boxes with holes, with tubing connected (see assembly instructions if not already connected)
- 1 90 cm tube
- 1 tube connector

**Step by step:**

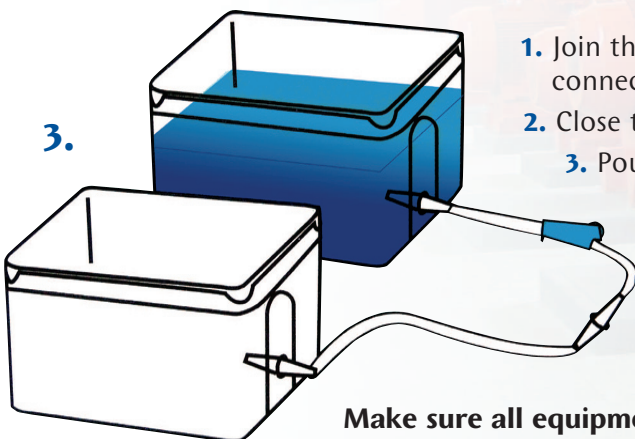
### Test A

1. Close the clamp on the tube attached to one of the boxes with a hole and tubing.
2. Fill the storage locker halfway to the top with water.
3. Place the 90 cm tube completely in the water and keep squeezing the tube gently under the water until no more bubbles come out.
4. Squeeze one end of the tube with your index finger, leaving the other end submerged in the locker.
5. Place the end of the tube being squeezed into the box. Now release the tube, but make sure that the other end of the tube in the storage locker stays under water.
6. What happens?
7. Remove the tube when the box is half full.
8. What have you found out? Empty the box of water.



### Test B

1. Join the two boxes with holes and tubing by using a tube connector.
2. Close the clamps.
3. Pour water into one of the boxes until it is three-quarters full.
4. Open the clamps.
5. What happens to the water?



**Make sure all equipment is clean before returning it to the box**

*A learning experience with the  
Sir George Staunton Country Park & your local water supplier*