



## **WATER: Use, waste and save**

NINES ORTIZ GARRE, IES MAREMAR, EL MASNOU, FEBRUARY 2008.

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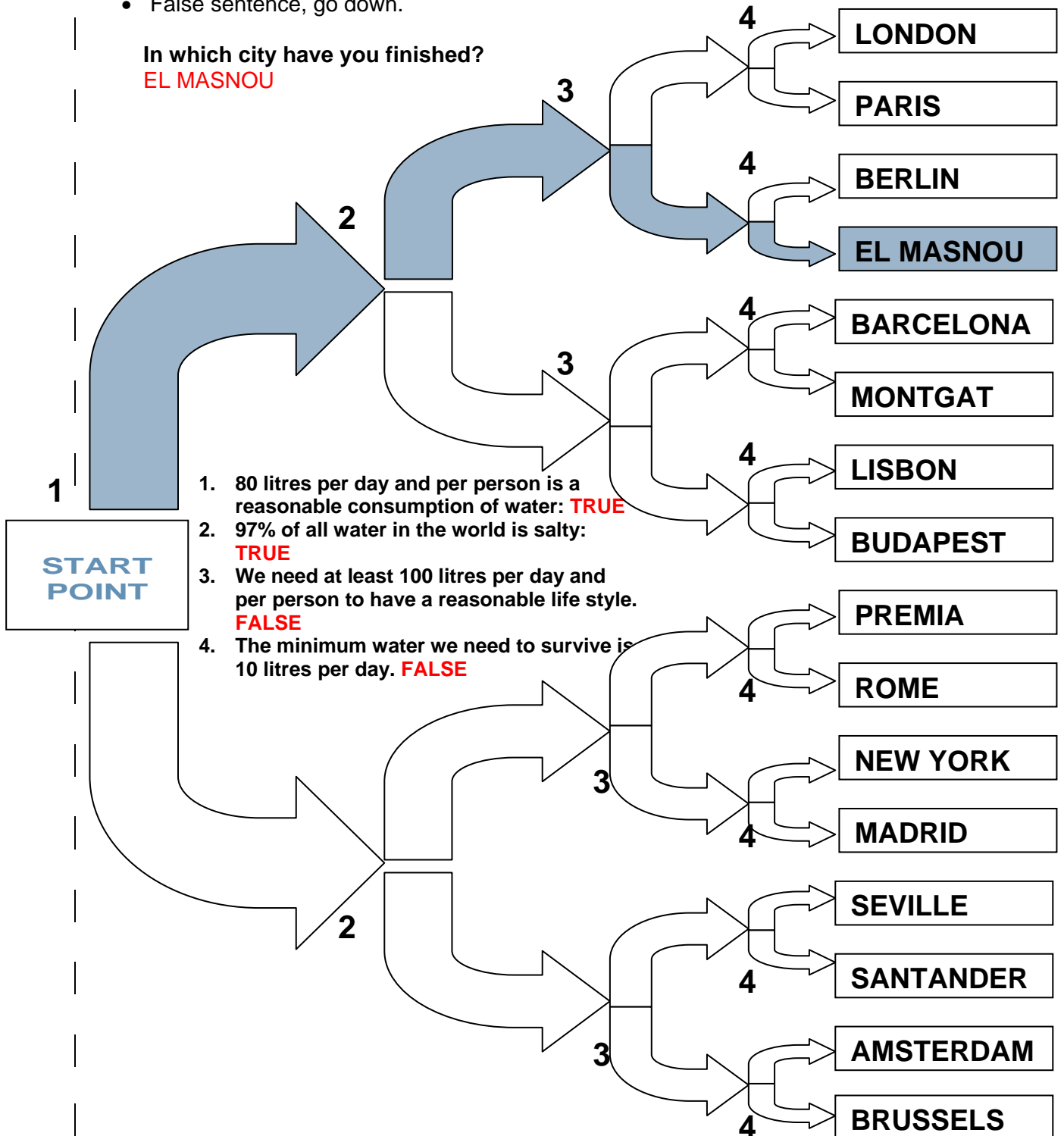
UNIT 0: WATER EVERYWHERE?

LESSON 1

ACTIVITY 1: PRIOR KNOWLEDGE JOURNEY

- True sentence, go up the tree.
- False sentence, go down.

In which city have you finished?  
EL MASNOU



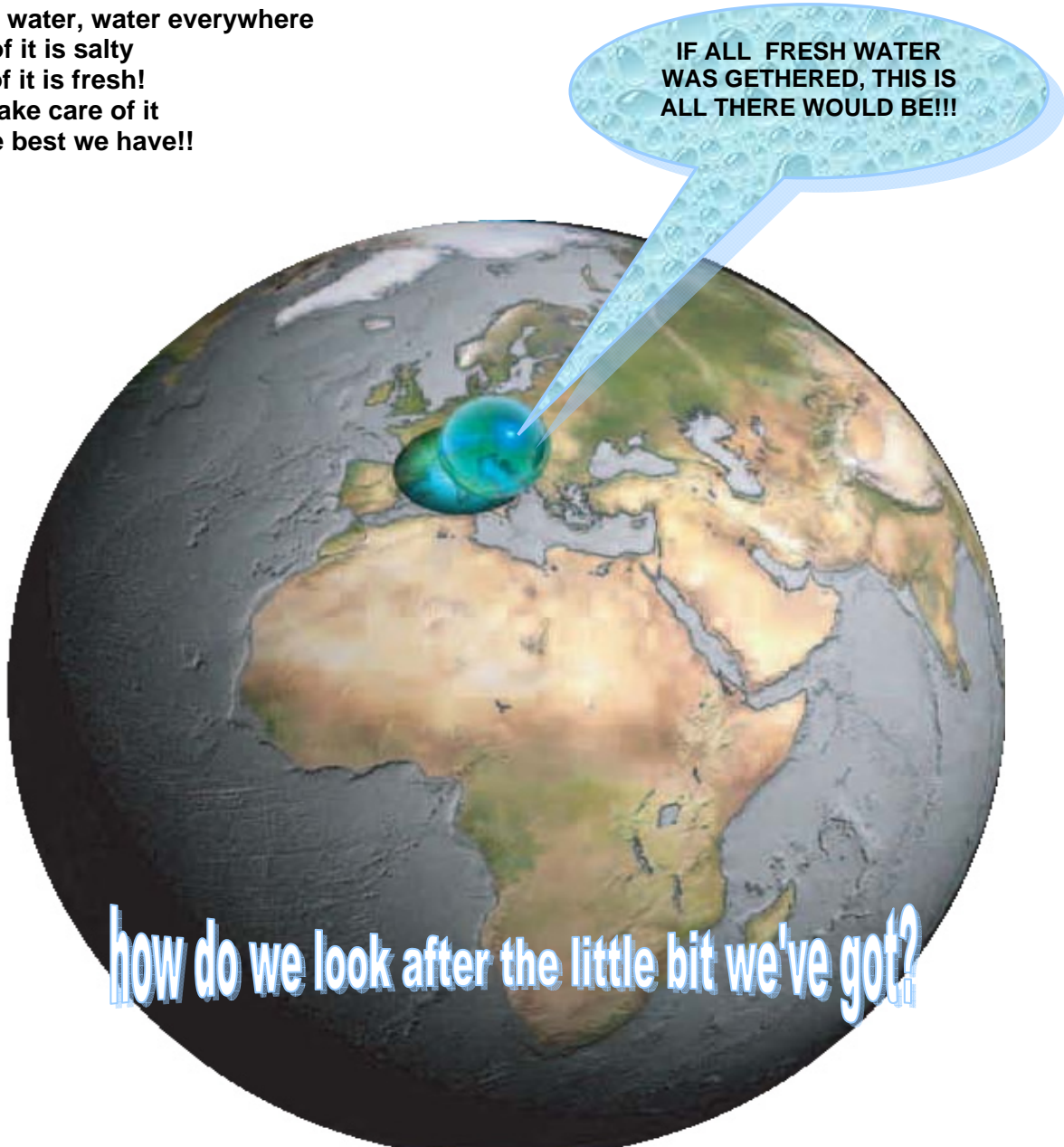
**ACTIVITY 2: PREDICTION AND READING**

**Working in pairs**, they have to make a prediction of the figures,( building the correct answers)  
They should write some sentences if they are confident enough.

**WATER, THE LIQUID OF LIFE**

MAKE THE STUDENTS SING THE WATER RAP.

Water, water, water everywhere  
Most of it is salty  
Less of it is fresh!  
Let's take care of it  
It's the best we have!!



IF ALL FRESH WATER  
WAS GETHERED, THIS IS  
ALL THERE WOULD BE!!!

how do we look after the little bit we've got?

STUDENTS LOOK AT THE PICTURE AND EXPLAIN WHAT THEY THINK IT REPRESENTS

Image 1: [www.scienceacrosstheworld.com](http://www.scienceacrosstheworld.com)

**EACH STUDENT WILL READ A PARAGRAPH OF THE TEXT****Water, water everywhere,  
but it's incredible how little of it is directly usable.**

We live on the water planet. From space, the blue of the water is its dominant colour.

**Nevertheless, over 97% of all water is salty.**

**Less than 3% is fresh, most of which is in the ice caps. The atmosphere, rivers, lakes and underground stores hold less than 1%.**

Yet hundreds of millions of human beings have difficulty in getting the 5 litres a day needed for survival. In countries with piped water, consumption is much higher than in developing countries, where a 2Km walk to find water is not unusual.

In fact, as we become more "advanced", so we use ever-increasing amounts of water.

The **absolute minimum** a person needs for domestic use is **5 litres a day**, with a more realistic figure around **20 litres**, a developed world citizen consumes well **over 100 litres**. When we add in industry, this total can jump up to **500 litres**.

We should remember that **according to the UN, everyone needs a minimum of 20 litres of water a day for healthy living, to sustain a reasonable quality of life we require about 80 litres of water per person and per day.** And that this amount can go from the 5,4 litres per day of a Madagascar citizen, to the **500 litres** per day of a US citizen, or exorbitant amount of **3.000 litres** per person a day in some other rich places.

**Our lifestyles depend of the availability of fresh water.**

If for whatever reason, our taps ran dry, our daily routines would collapse, our health would be at risk, factories would stop and agriculture would be in dire straits.

This is an immediate danger, increased by the constant reduction in the ice caps, as a consequence of global warming, caused by **the greenhouse effect** for an excess of CO<sub>2</sub> in the atmosphere.

But we can do something to maintain this valuable resource, if **we change our behaviour urgently.**

Our governments have to look for more acceptable uses of water for industry and agriculture.

**But every citizen that uses more than 80 litres per day in domestic use should find a way to save those extra litres.**

**Let's find out if this is possible!**

### ACTIVITY 3: SUMMARISING DATA

Working in pairs, they can NOW match the numbers in the correct sentence.

3000				salty
97				is not unusual in some developing countries
2				for a healthy living
5			is the water consumption of	for domestic use
80	%	a day	is the minimum need of water	fresh
20	km	of all water	is	Madagascar citizen
500	litres	walk	to find water	some unreasonable rich people in certain part of the world
3			is the water we require to	a developed world citizen
100				stored in rivers, lakes and undergrounds stores
5,4				a us citizen
1				sustain a reasonable quality of life

These are the correct answers:

- **3000 litres a day is the water consumption for some unreasonable rich people in certain part of the world.**
- **97 % of all water is salty**
- **A 2 Km walk to find water is not unusual in some developing countries**
- **5 litres a day is the minimum need of water for domestic use**
- **80 litres a day is the water we require to sustain a reasonable quality of life**
- **20 litres a day is the water we require for healthy living**
- **500 l litres a day is the water consumption of a US citizen**
- **3 % of all water is salty**
- **100 litres a day is the water consumption of a developed world citizen**
- **5,4 litres a day is the water consumption of a Madagascar citizen**
- **1 % of all water is stored in rivers, lakes and undergrounds stores**

To summarise the text they have to use at least **3 sentences from the table above**.

.....

.....

.....

.....

To summarise the text in **only one very important sentence**, they should write an original sentence with some figures of the table:

.....

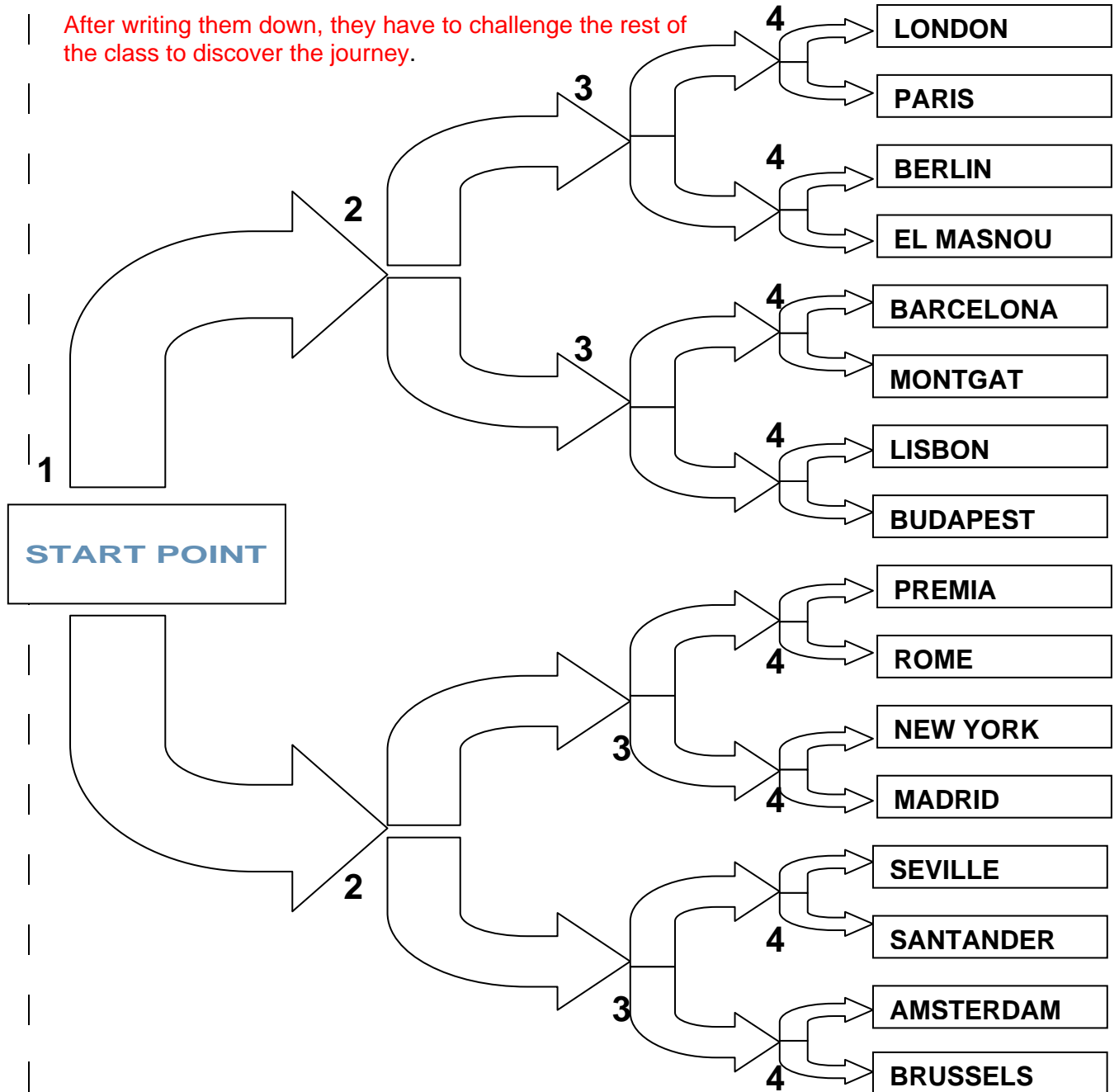
.....

### ACTIVITY 4: ASSESSMENT JOURNEY

Working in pairs, the students have to write 4 sentences, true or false about water use.

- True sentence, go up the tree.
- False sentence, go down.

After writing them down, they have to challenge the rest of the class to discover the journey.



1. ....
2. ....
3. ....
4. ....



## UNIT 1: HOW MUCH WATER DO WE USE AT HOME?

### LESSON 1

#### ACTIVITY 5. CONSUMPTION TABLES

The teacher reads the instructions step by step and the students write down notes on every instruction box. THIS IS INDIVIDUAL WORK.

- Know the flow of every tap at home. Here you can find the most common flows. These flows are fixed. Every student has the same.

TAP / FAUCET	FLOW
Washbasin tap	0,1 l/s
Shower tap	0,2 l/s
Bath tap	0,3 l/s
Kitchen sink tap	0,2 l/s
Garden watering plants tap	0,2 l/s

- Know the volume/capacity of most tanks at THEIR home. The most common volumes are only an example: they have to measure their tanks and bath tubs (large x width x height)

COMPONENT	VOLUME
Modern toilet tanks. Double choice.	3l / 6l
Old toilet tanks	6l / 10l
Bath tub	About 350l

- Know how much water THEIR electric components use for a normal cycle. The most common use of water is only an example: they have to find out the consumption of their machines. (look at the instructions or similar machines at the internet)

MACHINE	VOLUME
Washing machine. White clothes program	60l
Washing machine. Coloured clothes program	40l
Dishwasher eco program	20l

- They check how much time every member of the family spends in every activity. All times must be **shown** in seconds.  
Father, shower: 6 minutes. 6 minutes x 60 seconds per minute= 360 seconds
- They make 7 tables (one for every day of the week) in 3 weeks:

**Week 1: Tuesday and Friday**

**Week 2: Wednesday and Saturday**

**Week 3: Monday, Thursday and Sunday**

At the end of these 3 weeks, with the 7 tables they will have the of all water consumption for an average week at their home.

**INSTRUCTIONS TO CREATE THE TABLE:**

The teacher reads the instructions step by step and the students write down notes on every instruction box. THIS IS INDIVIDUAL WORK.

1. The table will have as many rows as::
  - Number of water individual activities +
  - Number of common activities +
  - First row for headline +
  - Last row to summarize all water used
  
2. The table will have as many columns as needed to have:
  - Number of members of the family +
  - A column for common activities +
  - A column for the activities and appliances used +
  - Last column for the flow of each tap and volume of tanks.
  
3. You can add sub-columns to put the amounts of water used, beside each family member and the common activities column.
  
4. Once you have created the table, with its corresponding rows and columns, fill all cells.
  - Choose an appropriate style of letter and apply to all the table
  - Put the names of your family, the activities, the flows and all pre-determined names.
  - Begin to check the time used for each activity.
  - Introduce it to the corresponding cell and convert into seconds (multiply for 60 seconds, each minute)
  - Multiply each time for the flow corresponding to its tap.
  - Then, you will have the water used in every activity.
  - When finished all the activities, join all the data and mark the total amount per family member and the total amount per family in that day.
  
5. This will be the table of a certain day. Do the same 7 times for every week day, as shown in the last paragraph of the last page.

By the end of the class, every student must have their own particular draft table.  
Try to ask some students about their families to be sure they don't copy from the example.

## LESSON 2

### ACTIVITY 6: CONSUMPTION TABLE CONSTRUCTION

To practise the table they will work in groups of 4 on an example consumption table. All the class will have the same example, so the results must be the same

#### INSTRUCTIONS

1. All the class must be divided in groups of 4 people.
2. In every group there will be a father, a mother, a brother and sister.
3. Look at the table and complete the table and complete your column.
4. Together design the full table and the common activities.

#### ACTIVITIES OF THIS FAMILY

- Both parents have a 5 minute shower every day.
- The sister spends 9 minute under the shower.
- The brother showers at the football club where he plays.
- Each member of the family brushes their teeth twice a day and spends 2 minutes every time, and leaves the tap running.
- Each member of the family goes to the toilet an average of 4 times a day, and the toilet tank has 10 litres.
- They use the washing machine once a day and the average use of water of it is 40 litres.
- They wash the dishes by hand twice a day, and while rinsing they let the tap run for approximately 10 minutes.
- They water the garden for 10 minutes per day.

As you have the flow of every tap, complete the table with ONLY THE ACTIVITIES MENTIONED.

Every group will have an example of a table completely finished:

Monday, .....of 200....

Father		Mother		Sister		me		Common		Activities and appliances	Flow and volume
6'x60sx0'2 l/s=	72l	3'x60sx0'2 l/s=	36l	5'x60sx0'2 l/s=	60l	5'x60sx0'2 l/s=	60l			Showering	0'2 l/s
2x20sx0'1 l/s=	4l	3x20sx0'1 l/s=	6l	2x25sx0'1 l/s=	5l	2x20sx0'1 l/s=	4l			Teeth brushing	0'1 l/s
7x10sx0'1 l/s=	7l	6x15sx0'1 l/s=	9l	6x13sx0'1 l/s=	7'8l	5x18sx0'1 l/s=	9l			Hands washing	0'1 l/s
20sx0'1 l/s=	2l	20sx0'1 l/s=	2l	30sx0'1 l/s=	3l	25sx0'1 l/s=	2'5l			Face washing	0'1 l/s
40sx0'1 l/s=	4l	_____	0l	_____	0l	_____	0l			Shaving	0'1 l/s
_____	0l	_____	0l	1'x60sx0'1 l/s=	6l	40sx9'1 l/s=	4l			Hair	0'1 l/s
7 x 6 l=	42l	6 x 6 l=	36l	6 x 6 l=	36l	5 x 6 l=	30l			WC (use of)	6l
								5'x60sx0'2 l/s=	60l		
								2'x60sx0'2 l/s=	24l	Cooking	0'2 l/s
								2x3'x60sx0'2 l/s=	72l	Dishwasher	0'2 l/s
								2 x 40 l=	80l	Washing machine	Withe:40 l
								1 x 60 l=	60l	Colour:60l	
								_____	0l	Plants watering	0'2 l/s
								3'x60sx0'2 l/s=	36l	House cleaning	0'2 l/s
								20sx0'2 l/s=	4l		
	131l		89l		117'8l		109'5l		336l	<b>All together: 783'3l</b>	

Name:.....

The table should be completed with the following figures::

FATHER	MOTHER	BROTHER	SISTER	COMMONS	ACTIVITY	FLOWS
5min x 60 s/m= 300 s x 0,2 l/s = <b>60 l</b>	5min x 60 s/m= 300 s x 0,2 l/s = <b>60 l</b>	_____	9min x 60 s/m= 540 s x 0,2 l/s = <b>108 l</b>		<b>SHOWER</b>	<b>0,2 l/s</b>
2 x 2min x 60 s/m= 240 s x 0,1 l/s = <b>24 l</b>	2 x 2min x 60 s/m= 240 s x 0,1 l/s = <b>24 l</b>	2 x 2min x 60 s/m= 240 s x 0,1 l/s = <b>24 l</b>	2 x 2m x 60 s/m= 240 s x 0,1 l/s = <b>24 l</b>		<b>TOOTH BRUSHING</b>	<b>0,1 l/s</b>
4 x 10 l = <b>40 l</b>	4 x 10 l = <b>40 l</b>	4 x 10 l = <b>40 l</b>	4 x 10 l = <b>40 l</b>		<b>TOILET</b>	<b>10 l</b>
				1 x 40 l = <b>40 l</b>	<b>WASHING MACHINE</b>	<b>40 l</b>
				2 x 10min x 60 s/m= 1200s x 0,2l/s = <b>240 l</b>	<b>WASHING UP</b>	<b>0,2 l/s</b>
				10min x 60 s/m= 600s x 0,2l/s = <b>120 l</b>	<b>GARDEN WATERING</b>	<b>0,2 l/s</b>
<b>124 l</b>	<b>124 l</b>	<b>64 l</b>	<b>172 l</b>	<b>400 l</b>		
					<b>884 l</b>	

QUESTIONS

1. How many litres does the father use for his own activities? **124 l**
2. How much water does this family use in one day?. **884 l**
3. What is the average use of water per member of family and day? **221 l**

## ACTIVITY 7: PIE CHART

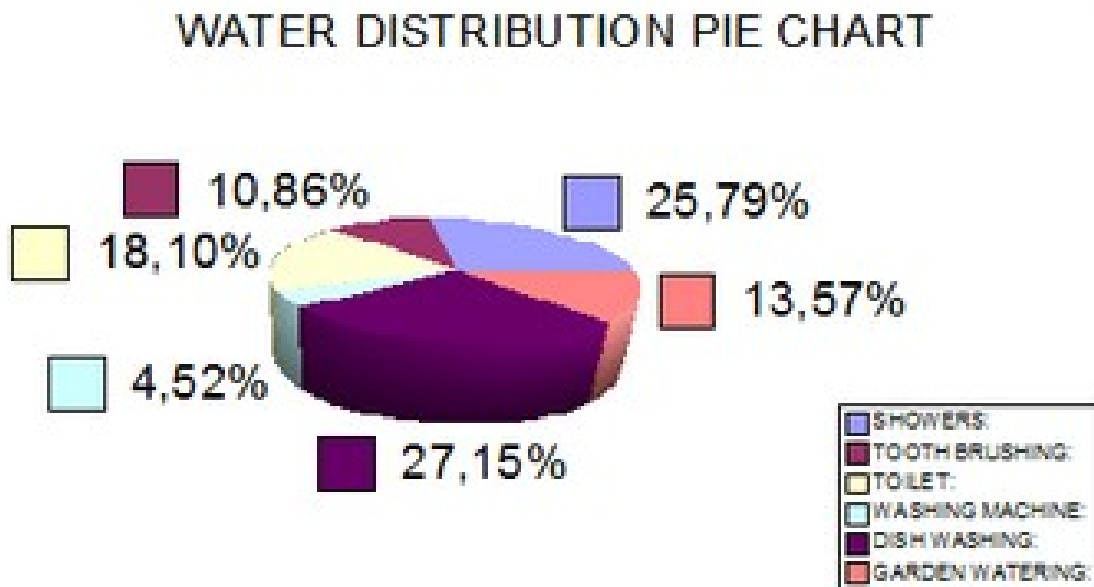
With the results from the table above, every student, in the computer room, will create the consumption pie chart for this family.

They have to follow instruction and work with OPEN OFFICE.  
Remind them not to use units, as the software just needs figures!!!!

The activities total consumptions are:

SHOWERS:	228 L
TOOTH BRUSHING:	96 L
TOILET:	160 L
WASHING MACHINE:	40 L
DISH WASHING:	240 L
GARDEN WATERING:	120 L

Every student should have a pie chart with the following percentages



### LESSON 3

#### ACTIVITY 8: ANALYSIS OF AN ENGLISH WATER BILL

In EL MASNOU, the water distribution company is called: **SOREA**

In NORWICH (NORFOLK, ENGLAND), the water distribution company is called: **ANGLIAN WATER.**

This is an ANGLIAN WATER water bill.

<b>anglianwater</b>		
Account number <b>114 393 176</b>	Customer name(s)	PO Box 770 Lincoln LN5 7WX
Account date 11 Jan 08	Premises supplied	VAT Reg. No: 514060002
Payment number		www.anglianwater.co.uk
<b>how your charges have been calculated:</b>		
Balance of last bill		£192.18
<b>Payments received</b> (since last bill)		
15/08/07	Payment	£47.00cr
20/11/07	Payment	£145.18cr
Total payments		£192.18cr
<b>Balance brought forward as at account date</b>		<b>£0.00</b>
meter no: 98M021052U    meter size: 15mm		
<b>Readings</b>	<b>Standard rate</b>	
Present - Read 11/01/08	1014	
Previous - Estimate	980	
Volume used - cubic metres (m <sup>3</sup> )	34	
<b>Water supply</b>		
Volume used	34m <sup>3</sup> x	115.14p
Standing charge	164 days x	6.56p
<b>Total water charge</b>		<b>£49.89</b>
<b>Sewerage service</b>		
Volume used (foul & surface) (at 90% of water used)	30.60m <sup>3</sup> x	124.49p
Standing charge	164 days x	18.31p
<b>Total sewerage charge</b>		<b>£68.11</b>
<b>Bill amount</b>		<b>£118.00</b>

Image 2: private bill

## SOME INTERSESTING WORDS

Try to translate the following words

ENGLISH WORD	CATALAN	SPANISH
BILL	<b>FACTURA</b>	<b>FACTURA</b>
CUSTOMER	<b>CLIENT</b>	<b>CLIENTE</b>
ENQUIRIES	<b>CONSULTA</b>	<b>CONSULTA</b>
ACCOUNT	<b>COMPTE CORRENT</b>	<b>CUENTA CORRIENTE</b>
SEWERAGE SERVICE	<b>SERVEI DE DEPURACIÓ</b>	<b>SERVICIO DE DEPURACIÓN</b>
DRINKABLE WATER	<b>AIGUA POTABLE</b>	<b>AGUA POTABLE</b>
BILL AMOUNT	<b>TOTAL FACTURA</b>	<b>TOTAL FACTURA</b>
TAX	<b>IMPOST</b>	<b>IMPUESTO</b>
PAYMENT	<b>PAGAMENT</b>	<b>PAGO</b>

Look carefully at the water bill and answer the following questions:

1. Which is the period quoted in this bill?

**From 15/08/2007 to 11/01/2008 (164 DAYS)**

2. How much water has this costumer used in this bill?

**34 m<sup>3</sup>, or 34.000 litres**

3. How much does a m<sup>3</sup> of water costs in Norwich?

**1,1514 £ or GBP (Great Britain Pounds) = 1,503 € (you can make immediate currency conversion at <http://www.xe.com/ucc/convert.cgi>)**

4. What do you think the SEWERAGE CHARGE is?

- a. A tax on the cost of cleaning used water**
- b. A tax on the cost of purification water to make it drinkable**
- c. The price of every m<sup>3</sup> of water used**

5. This bill belongs to a 4 member family. How much water do they use per person and per day?

**51, 83 litres per person and day**


Write here your calculations

**34 m<sup>3</sup> X 1000 L/ m<sup>3</sup> = 34.000 litres : 164 DAYS = 207,32 L/day all family  
207,32 l/day : 4 members = 51, 83 L/day and person**




### ACTIVITY 9: WATER BILLS COMPARISON.

Now, look at a water bill of a four member family of El Masnou



**Sorea**  
SERVEI MUNICIPAL DE SUBMINISTRAMENT D'AIGUA POTABLE DEL MASNOU  
SOREA N.I.F.: A08146367  
C/ITALIA,50 1ª PLTA."EDIFICI CENTRE"  
08320-EL MASNOU  
tel.935-55.06.28 - / http://www.sorea.es/elmasnou

TELEFON ATENCIÓ CLIENT  
**902 250 070**  
TELEFON AVARIES  
**902 250 370**



NÚM. CONTRACTE/Nº CONTRATO		DATA EMISSIÓ/FECHA EMISIÓN
2070011632		19-06-2007
NÚM. FACTURA/Nº FACTURA		PERIODE/PERIODO
07018346		ABR/JUN-2007/2
NÚM. COMPTADOR Nº CONTADOR	DIÀMETRE (mm) DIÀMETRO (mm)	NOMBRE D'UNITATS Nº UNIDADES
01077462	13	1
LECTURA ANTERIOR	LECTURA ACTUAL	CONSUM/ CONSUMO(m³)
5-03-2007 670	6-06-2007 713	43

TITULAR - DOMICILI DE SUBMINISTRAMENT/DOMICILIO DE SUMINISTRO  
35103261V

2070011632 2500230100000

TARIFA  
DOMÈSTICA  
Junta Govern Local de 22-02-2007  
CÀNON AIGUA-Decrets 103/2000,3/2003,47/2005

Sorea, Sociedad Regional de Abastecimiento de Aguas S.A. - CIF A08146367 - Avda. Diagonal 211, 08018 Barcelona - R.M. Barcelona, Tomo 36067, Folio 55, Hoja B 16139, Insc. 243

FACTURA	Quantitat	Preu unitari	Import Eur.	Sub-total Eur.	% IVA
<b>Detall de la factura</b>					
SERVEI MUNICIPAL D'AIGUA A08146367:					
<b>AIGUA</b>					
Quota de servei			3,24		
1 bloc consum	43,00	0,3043	13,08	16,32	7
<b>CONSERVACIÓ</b>					
Comptador			1,47	1,47	16
IVA 7,00 %S/			1,14		
IVA 16,00 %S/			0,24	1,38	
<b>TOTAL SERVEI MUNICIPAL D'AIGUA</b>				<b>19,17</b>	
AGÈNCIA CATALANA DE L'AIGUA Q0801031F:					
<b>CÀNON DE L'AIGUA</b>					
Minim 0,3287 x 1	18,00	0,3287	5,92		
1 Tram 0,3287 x 1	12,00	0,3287	3,94		
2 Tram 0,3448 x 2	13,00	0,6896	8,96	18,82	7
IVA 7,00 %S/			1,32	1,32	
<b>TOTAL AGÈNCIA CATALANA DE L'AIGUA</b>				<b>20,14</b>	
<b>Total factura</b>				<b>39,31</b>	

**MISSATGES/MENSAJES**

- La vostra despesa mitjana en aquest període ha estat de 0,41 Eur./dia, dels quals 0,18 Eur./dia corresponen a aigua.
- Horari d'oficines del servei: de dilluns a divendres de 9 a 13 hores.
- Dijous tarda de 15,30 a 19,30 hores, excepte juliol, agost i setembre.

**INFORMACIÓ ESTADÍSTICA/INFORMACIÓN ESTADÍSTICA**

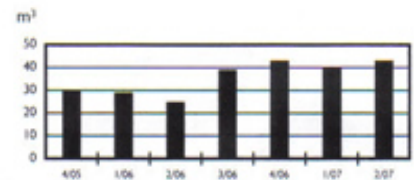


Image 3: private bill



Find the differences between the 2 bills

Fill in the following table with the differences found.

	SOREA	ANGLIAN WATER																												
Price per m <sup>3</sup> of water used	First volume used: 0,3043€m <sup>3</sup>	All volume used: 1,503 €m <sup>3</sup>																												
Different price per m <sup>3</sup> , depending on the amount of water used.	<p>EXPLAIN DE CONCEPT OF "CANON"  <a href="http://mediambient.gencat.net/aca/es//tramitacions/canon/canon2005.jsp">http://mediambient.gencat.net/aca/es//tramitacions/canon/canon2005.jsp</a></p> <table border="1"> <thead> <tr> <th>people</th> <th>1st Bloc</th> <th>2<sup>nd</sup> Bloc</th> <th>3<sup>rd</sup> Bloc</th> </tr> </thead> <tbody> <tr> <td>0-3</td> <td>&lt; 10 m<sup>3</sup></td> <td>10-18 m<sup>3</sup></td> <td>&gt; 18 m<sup>3</sup></td> </tr> <tr> <td>4</td> <td>&lt; 13</td> <td>13- 24</td> <td>&gt; 24</td> </tr> <tr> <td>5</td> <td>&lt; 16</td> <td>16- 30</td> <td>&gt; 30</td> </tr> <tr> <td>6</td> <td>&lt; 19</td> <td>19- 36</td> <td>&gt; 36</td> </tr> <tr> <td>7</td> <td>&lt; 22</td> <td>22- 42</td> <td>&gt; 42</td> </tr> <tr> <td></td> <td>0,3474 €m<sup>3</sup></td> <td>0,7358€m<sup>3</sup></td> <td>1,8395€m<sup>3</sup></td> </tr> </tbody> </table>	people	1st Bloc	2 <sup>nd</sup> Bloc	3 <sup>rd</sup> Bloc	0-3	< 10 m <sup>3</sup>	10-18 m <sup>3</sup>	> 18 m <sup>3</sup>	4	< 13	13- 24	> 24	5	< 16	16- 30	> 30	6	< 19	19- 36	> 36	7	< 22	22- 42	> 42		0,3474 €m <sup>3</sup>	0,7358€m <sup>3</sup>	1,8395€m <sup>3</sup>	It's always the same price, from the first m <sup>3</sup>
people	1st Bloc	2 <sup>nd</sup> Bloc	3 <sup>rd</sup> Bloc																											
0-3	< 10 m <sup>3</sup>	10-18 m <sup>3</sup>	> 18 m <sup>3</sup>																											
4	< 13	13- 24	> 24																											
5	< 16	16- 30	> 30																											
6	< 19	19- 36	> 36																											
7	< 22	22- 42	> 42																											
	0,3474 €m <sup>3</sup>	0,7358€m <sup>3</sup>	1,8395€m <sup>3</sup>																											
Tax per sewerage service	It doesn't exist	90% of all volume used, at 1,2449£ (1,626€m <sup>3</sup> )																												
Amount of water used per person and day	111,98 L/person and day	51,83 L/person and day																												
Total bill amount	39,31 € in 3 months	118,00£ = 153,90€ in 5 months																												

England doesn't have the problem we have in Catalonia:













1. What problem do we have? **LACK OF WATER**
2. Nevertheless, the price of the water is **MUCH HIGHER** than in Catalonia.  
 What do you think about the price of water in Catalonia? **IT'S TOO CHEAP. IF WE NEED PEOPLE TO BE AWARE OF THE VALUE OF WATER, THE COST MUST BE HIGHER**
3. Do you think the price of water in Catalonia and Spain will change in the future? **YES**
4. Why? **BECAUSE PEOPLE NEED TO SAVE WATER IN THEIR DAILY ROUTINES, AND BECAUSE IF WE NEED TO DESALINATE WATER TO MAKE IT DRINKABLE, WE WILL NEED TO PAY A LOT OF MONEY IN ENERGY AND FACILITIES, AND CUSTOMERS MUST PAY THIS.**

## UNIT 2: HOME PLUMBING SYSTEM

### LESSON 1

#### ACTIVITY 10: WATER AT HOME: LABELLING

Working in pairs they put the name of every water device in the boxes.

 <p>4</p>	<p>WASHINGMACHINE</p>	 <p>10</p>	<p>BIDET</p>
 <p>5</p>	<p>BATH TUB</p>	 <p>11</p>	<p>SHOWER HEAD</p>
 <p>6</p>	<p>CLOSE COUPLED TOILET</p>	 <p>12</p>	<p>SHOWER SET MIXER</p>
 <p>7</p>	<p>2 BOWLED KITCHEN SINK</p>	 <p>13</p>	<p>DISHWASHER</p>
 <p>8</p>	<p>SHOWER PLATE</p>	 <p>14</p>	<p>SHOWER HOSE</p>
 <p>9</p>	<p>WASHBASIN</p>	 <p>15</p>	<p>BATHROOM TAP</p>

Images 4-15: <http://www.global-b2b-network.com/>

## ACTIVITY 11: LISTENING AND COMPREHENSION

### “UNBLOCK A SINK WITH A TUBULAR TRAP”

Project the video that you will find in the website:

<http://www.videojug.com/film/how-to-unblock-a-sink-with-a-tubular-trap>

Before they see the video, explain to the students that they have to recognize the words of the table, and try, from the context, to recognize them.

ENGLISH WORD	CATALAN	SPANISH
PLUMBER	LAMPISTA	FONTANERO
SINK	PICA	FREGADERO
BLOCKED / UNBLOCK	BLOQUEJAT/DESBLOQUEJAR	EMBOZADO/DESEMBOZAR
BUCKET	GALLEDA	CUBO
PLUNGER	DESATASCADOR	DESATASCADOR
WIRE	CABLE	CABLE
BLEACH	LLEXIU	LEJÍA
WRENCH	CLAU ANGLESÀ	LLAVE INGLESA
PIPE	CANONADA	TUBERÍA
TRAP	SIFÓ	SIFÓN
SCREW / UNSCREW	CARGOLAR/DESCARGOLAR	ATORNILLAR/DESATOR...

After viewing the video, fill the blanks on the instructions to **UNBLOCK A SINK** using the words in the table.

### LISTEN

Unblock a Sink with a Tubular Trap. A **SINK** can easily become **BLOCKED** through everyday use and there is often no need to call a **PLUMBER** as unblocking it is fairly easy.

We show you two different methods to help you **UNBLOCK** a household **SINK**

---

#### Step 1: You will need:

- **1 BUCKET**
- 1 bowl
- **1 PLUNGER**
- some kitchen towel
- some newspapers
- a piece of **WIRE**
- a cloth
- some household **BLEACH** or disinfectant
- a **WRENCH**

---

#### Step 2: Place newspapers onto the floor

Put some newspapers down onto the floor in case of any water spillage

---

**Step 3: The PLUNGER Method**

Block the overflow of the **SINK** using some wet kitchen towel. This prevents air from escaping when you start plunging.

Using both hands, push the **PLUNGER** down several times over the plug hole. This will force water through the waste **PIPE** and hopefully dislodge the **BLOCKAGE**

---

**Step 4: Removing the TRAP**

If the **PLUNGER** hasn't solved the problem you will need to remove the **TRAP** beneath the **SINK** and examine it for **BLOCKAGES**

---

**Step 5: Bale out the water**

It's a good idea to bale out as much of the water in the **SINK** as possible using a bowl or a **BUCKET**

---

**Step 6: Put the plug in**

If your **SINK** still has water in – like this, then you should put the plug in unless you want an impromptu shower later on.

---

**Step 7: Position the BUCKET**

The **TRAP** connected to the underside of the **SINK**, typically a "U" shaped piece of drainage **PIPE**. As all **SINKS** are connected to the foul water drain of the property, the **TRAP** is full of water all of the time which creates a permanent barrier stopping smelly gasses from entering your home. Place the **BUCKET** underneath the **TRAP** below the **SINK**

---

**Step 8: UNSCREW**

Use either a **WRENCH** or your hands to **UNSCREW** the **TRAP**. Once both ends of the **TRAP** are fully loosened, remove it and empty the contents into the **BUCKET**.

---

**Step 9: Clear with WIRE**

Use the **WIRE** to clear away any **BLOCKAGES** both inside the **TRAP** and in the **PIPES**.

---

**Step 10: Replace the TRAP**

Carefully reposition the **TRAP**. Make sure to **SCREW** the nuts on tightly so that they don't leak.

---

**Step 11: Test the SINK**

Run some water from the taps down the **SINK** keeping an eye on the **TRAP** for leaks. If the **SINK** does not back up again, you've completed the job.

---

**Step 12: Pour some household BLEACH down the SINK**

Pouring some household **BLEACH** or disinfectant will cleanse your **SINK** and clear away any remaining residue

## LESSON 2

## ACTIVITY 12: ORDER A PROCESS. PRONUNCIATION.

Divide the class in pairs. (They have to stand up).

Cut these pieces of information and give a piece of paper to every pair of students.

After reading the piece of information, they have to search for the information before and after theirs. At the end, every student has to read their piece in the correct order (one after the other), and the whole class has to decide if the order is the correct. If not, they should change their position until they reach an agreement.

<p><b>You will need:</b>  <b>1 BUCKET</b>, 1 bowl , <b>PLUNGER</b> , some kitchen towel , ome newspapers , piece of <b>WIRE</b>, a cloth, some household, <b>BLEACH</b> or disinfectant, a <b>WRENCH</b></p>	<p><b>Place newspapers onto the floor</b>  Put some newspapers down onto the floor in case of any water spillage</p>
<p><b>The plunger method</b>  block the overflow of the <b>sink</b> using some wet kitchen towel. this prevents air from escaping when you start plunging. using both hands, push the <b>plunger</b> down several times over the plug hole. this will force water through the waste <b>pipe</b> and hopefully dislodge the <b>blockage</b></p>	<p><b>Position the bucket</b>  The <b>trap</b> connected to the underside of the <b>sink</b> , typically a "u" shaped piece of drainage <b>pipe</b> .as all <b>sinks</b> are connected to the foul water drain of the property, the <b>trap</b> is full of water all of the time which creates a permanent barrier stopping smelly gasses from entering your home. place the <b>bucket</b> underneath the <b>trap</b> below the <b>sink</b></p>
<p><b>Removing the TRAP</b>  If the <b>PLUNGER</b> hasn't solved the problem you will need to remove the <b>TRAP</b> beneath the <b>SINK</b> and examine it for <b>BLOCKAGES</b></p>	<p><b>Bale out the water</b>  It's a good idea to bale out as much of the water in the <b>SINK</b> as possible using a bowl or a <b>BUCKET</b></p>
<p><b>Put the plug in</b>  If your <b>SINK</b> still has water in – like this, then you should put the plug in unless you want an impromptu shower later on.</p>	<p><b>UNSCREW</b>  Use either a <b>WRENCH</b> or your hands to <b>UNSCREW</b> the <b>TRAP</b> .Once both ends of the <b>TRAP</b> are fully loosened, remove it and empty the contents into the <b>BUCKET</b></p>
<p><b>Clear with WIRE</b>  Use the <b>WIRE</b> to clear away any <b>BLOCKAGES</b> both inside the <b>TRAP</b> and in the <b>PIPES</b>.</p>	<p><b>Replace the TRAP</b>  Carefully reposition the <b>TRAP</b> .Make sure to <b>SCREW</b> the nuts on tightly so that they don't leak</p>
<p><b>Test the SINK</b>  Run some water from the taps down the <b>SINK</b> <u>keeping an eye</u> on the <b>TRAP</b> for leaks. If the <b>SINK</b> does not back up again, you've completed the job</p>	<p><b>Pour some household BLEACH down the SINK</b>  Pouring some household <b>BLEACH</b> or disinfectant will cleanse your <b>SINK</b> and clear away any remaining residue</p>

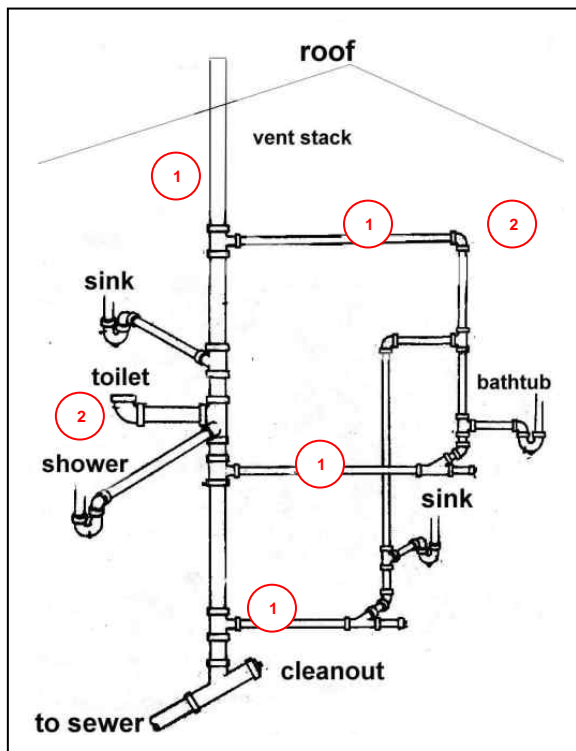
The plumbing techniques include:

**ACTIVITY 13: WASTE WATER ELEMENTS MATCHING**

- Wastewater system (mainly with CPVC)

				
STRAIGHT PVC CONNECTOR <b>1</b>	90/45 DEGREE PVC ELBOW <b>2 - 2'</b>	EQUAL TEE and "Y" TEES <b>3 - 3'</b>	SEAL PLASTIC TRAP <b>4</b>	CHROME BASIN TRAP <b>5</b>

Images 16-20: <http://im.edirectory.co.uk/>









Mark in the picture on the left the name of every piece in the wastewater net. Make a list of how many of the following pieces you need for it:

- 90 degree pvc elbow: **3**
- 45 degree pvc elbow: **3**
- Equal tees: **4**
- Equal "Y": **5**
- Seal plastic traps: **4**

Image 21: [www.make-my-own-house.com/images/uprightsystem.jpg](http://www.make-my-own-house.com/images/uprightsystem.jpg)

- Fresh water system (mainly with copper)

					
COPPER STRAIGHT PIPES	90 DEGREE COPPER ELBOW	45 DEGREE COPPER ELBOW	EQUAL TEE	GATE VALVE	PLATED BALL VALVE

Images 22 -27: <http://im.edirectory.co.uk/>

**LESSON 3**

**ACTIVITY 14: MATCHING FRESH WATER SYMBOLS**

What do you think this drawing is? **A RESIDENTIAL PLUMBING SYSTEM.**

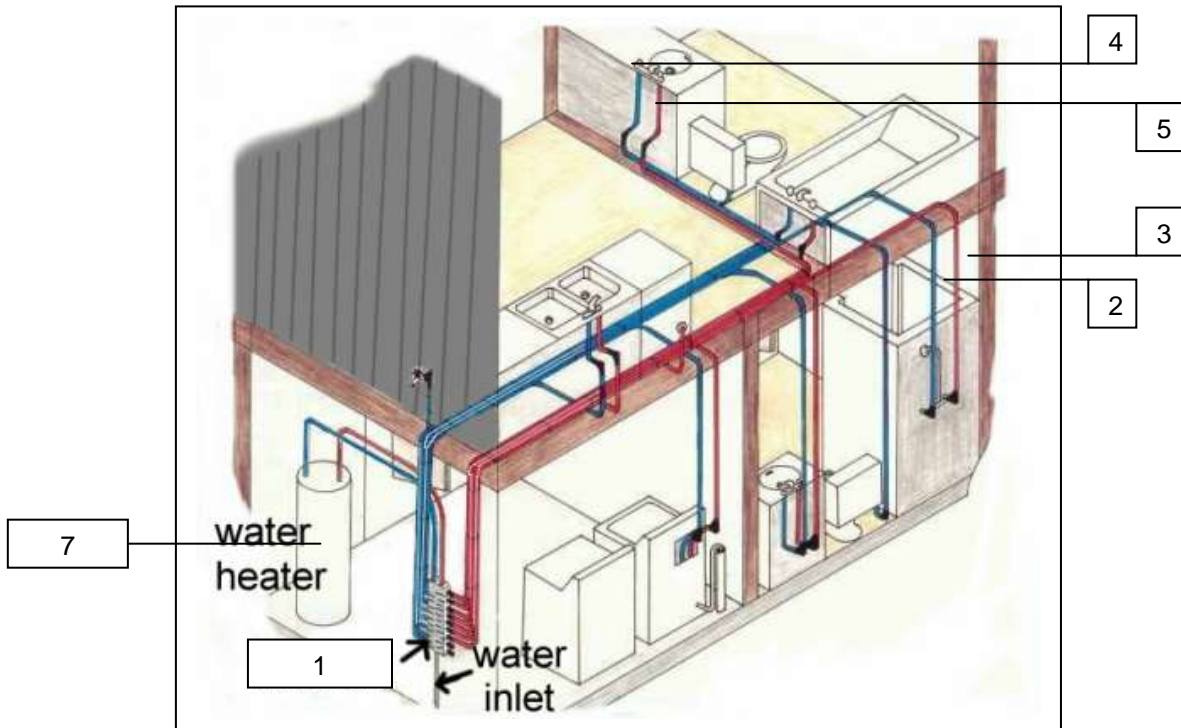


Image 28: www.make-my-own-house.com/images/Pextubing.jpg

But as it is difficult to draw, there are technological standardised symbols for plumbing.

**Match the number of each element with its corresponding name and symbol IN THE LEFT COLUMN. TRANSLATE THE NAME OF EACH ELEMENT.**

1		General counter	ENGLISH TERMS	comptador general	CATALAN TERMS	contador general	SPANISH TERMS
2		Cold water pipe		canonada aigua freda		ca~neria agua fria	
3		Hot water pipe		canonada aigua calenta		ca~neria agua caliente	
4		Cold water tap		aixeta aigua freda		grifo agua fria	
5		Hot water tap		aixeta aigua calenta		grifo agua caliente	
all		Key valve		clau de pas		llave de paso	
		Tankless gas heater		escalfador sense acumulador		calentador sin acumulador	
7		Gas heater with water tank		escalfador amb acumulador		calentador con acumulador	

## PLUMBING RESIDENTIAL SYSTEMS

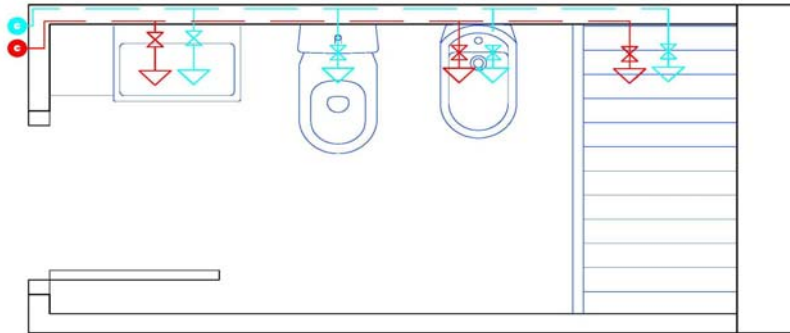
Using these examples, explain how a plumbing system works.

Beginning with the easiest: the series system, typical of a bathroom, and finishing with more than one water room (kitchen + bathroom), where a mixed system is needed.

### SERIES PLUMBED SYSTEM.

The diagram below represents a typical series plumbed system.

Series plumbed system means that the water lines go from one fixture to the next, then from that fixture to the next, etc.



### BRANCHED PLUMBED SYSTEM and MIXED PLUMBED SYSTEM.

Branched plumbed system means that the water lines go individually from the main pipe and from the heater to each component/water outlet.

Usually, the best is a mixed system: series-branched, where there is a general branched system for each water room (kitchen, bathroom1, bathroom 2...), but in every water room, there is a serial system. It's cheaper than the completely branched system, but when a part of the pipe inside the water room bursts, all the room is out of service.

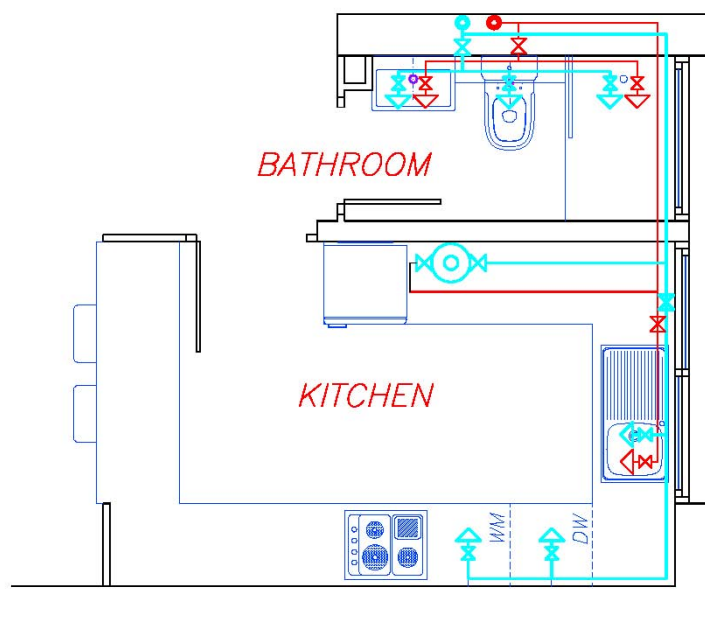


Image 29-30: Author's drawings



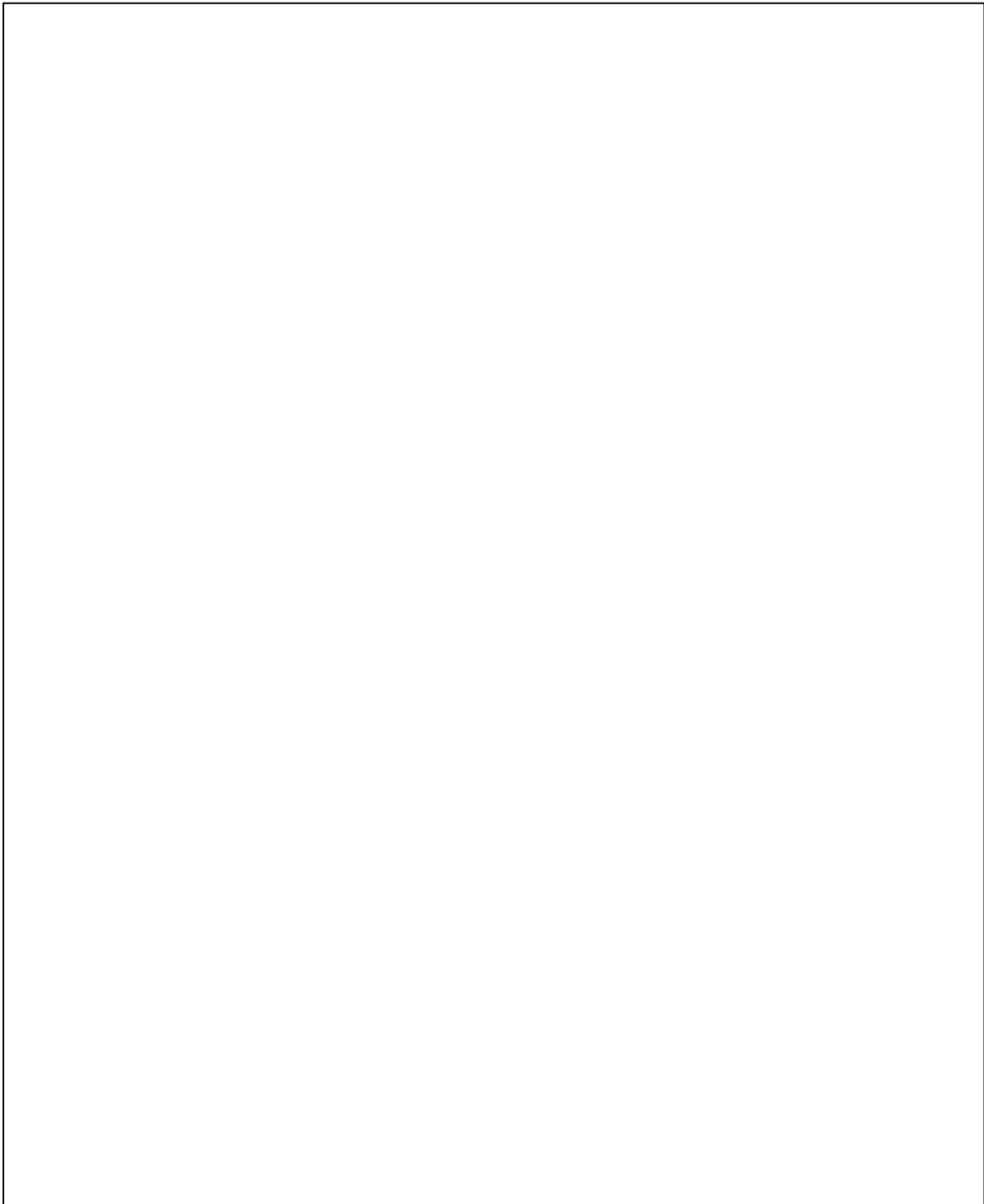
## LESSON 4

### ACTIVITY 15: PLUMBING LAYOUT IN YOUR HOME

1. They will draw the plumbing layout in their home with all water rooms (kitchen, bathroom(s), washing room...).
2. They will use 1:50 (every **1cm** on the drawing will represent **50cm** in reality)
3. They have already drawn these kinds of layouts in the past building unit!

Every water element must have

- its corresponding tap, with the corresponding key valve,
- A general key valve for each pipe in each water room,
- The heater system you have at home situated in the correct place.



## LESSON 5

### ACTIVITY 16: TANK WATER HEATERS. VOCABULARY. GAS HEATER WITH WATER TANK

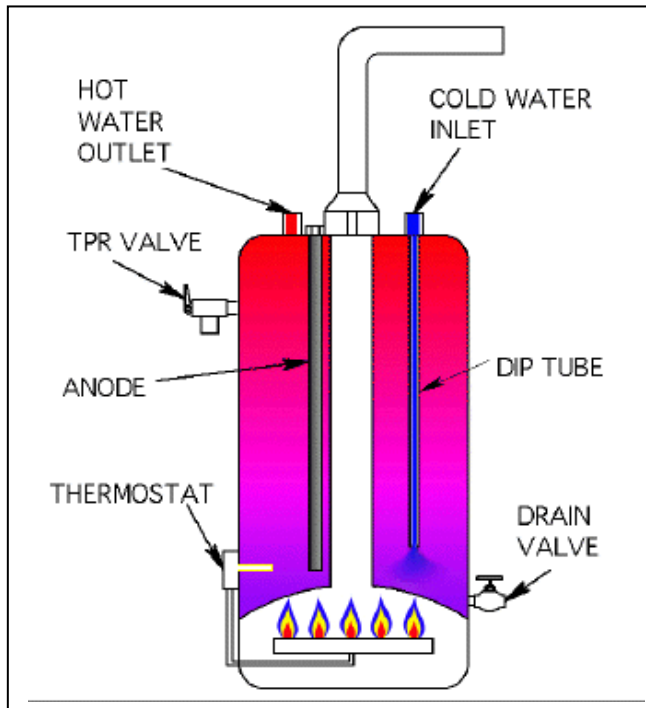


Image 31: [www.chilipepperapp.com/gwh.htm](http://www.chilipepperapp.com/gwh.htm)

Gas water heaters are the most common type. Gas gets the tank up to a temperature about twice as fast as electric do, and cost less than a half of what it takes for an electric unit.

**Warning!** The tank should be firmly fixed to a structure such as the wall to prevent a potential gas fire if the tank falls over and breaks the gas connection.

#### ELEMENTS

On the drawing, there are 7 elements.

They match the names with the following descriptions

- **TPR VALVE**

Storage type units that have a tank have a TPR valve (Temperature Pressure Relief). Tankless units usually don't have one. It's a safety device that releases pressure from the tank if the pressure or temperature reaches unsafe levels.

- **ANODE**

The sacrificial anode is a metal rod usually MAGNESIUM or ALUMINIUM which helps prevent corrosion of the metal tank. Once the anode is gone, the tank itself begins to corrode. To prolong the life of the tank, make sure your anode rod is still there, and replace it when needed.

- **DIP TUBE**

The dip tube is a long narrow tube that directs incoming cold liquid to the bottom of the tank, preventing premature mixing of incoming cold water with without hot liquid at the top of the tank.

- **THERMOSTAT**

The thermostat senses when the tank drops below a certain pre-set temperature and causes the burner to come on. When the desired temperature is reached, the thermostat shuts off the burner.

- **DRAIN VALVE**

The drain valve allows the tank to be drained for various reasons including periodic removal of sediment or for replacement. In areas with high mineral content, it is recommended to drain at least 5 gallons from the drain valve every six months or so to prevent sediment build up.

## ELECTRIC WATER HEATER

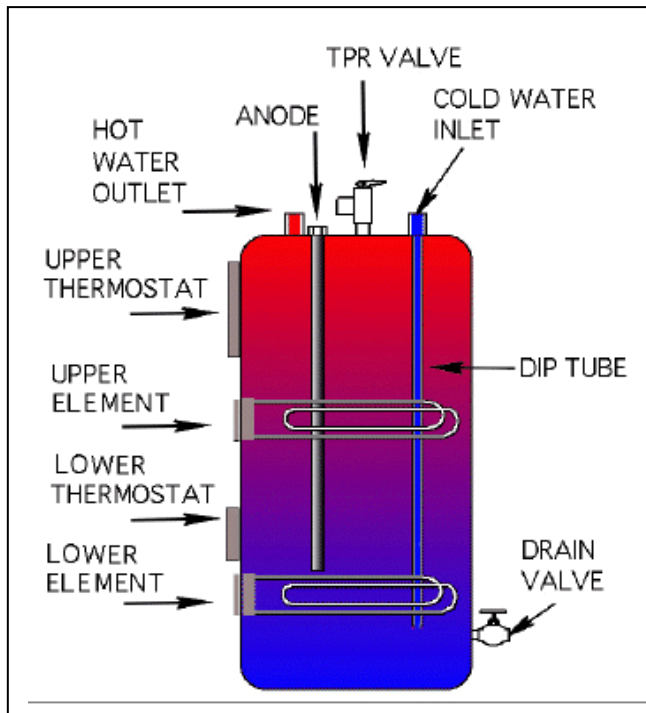


Image 32: [www.chilipepperapp.com/ewh.htm](http://www.chilipepperapp.com/ewh.htm)

Electric water heaters are very common in UK, but not so much in Spain. All of them have a tank to accumulate the heated water, so they need a huge space to be placed on.

### ELEMENTS

- TPR VALVE
- ANODE
- DIP TUBE
- THERMOSTAT (it has 2: Upper and lower thermostat)
- DRAIN VALVE

### SPECIAL ELEMENT

This element is the only one that is special for an electrical heater. All the others are common.

- **HIGH LIMIT SWITCH**

When the tank gets too hot it trips the high limit switch (a circuit breaker). In order to get it working again the high limit switch must be manually reset by pushing in the red button.

### SOME TECHNICAL WORDS

Translate the following words

ENGLISH WORD	CATALAN	CASTELLANO
VALVE	VÀLVULA (CLAU DE PAS)	VÁLVULA (LLAVE DE PASO)
ANODE	ÀNODE	ÁNODO
DIP TUBE	TUB SUBMERGIT	TUBO SUMERGIDO
THERMOSTAT	TERMÒSTAT	TERMOSTATO
DRAIN VALVE	VÀLVULA DE DRENATGE	VÁLVULA DE DRENAJE
SWITCH	INTERRUPTOR	INTERRUPTOR
TANK	ACUMULADOR	ACUMULADOR
TO RESET	RE-ENGEGAR	REENCENDER
COLD WATER INLET	ENTRADA D'AIGUA FREDA	ENTRADA DE AGUA FRIA
HOT WATER OUTLET	SORTIDA D'AIGUA CALENTA	SALIDA DE AGUA CALIENTE

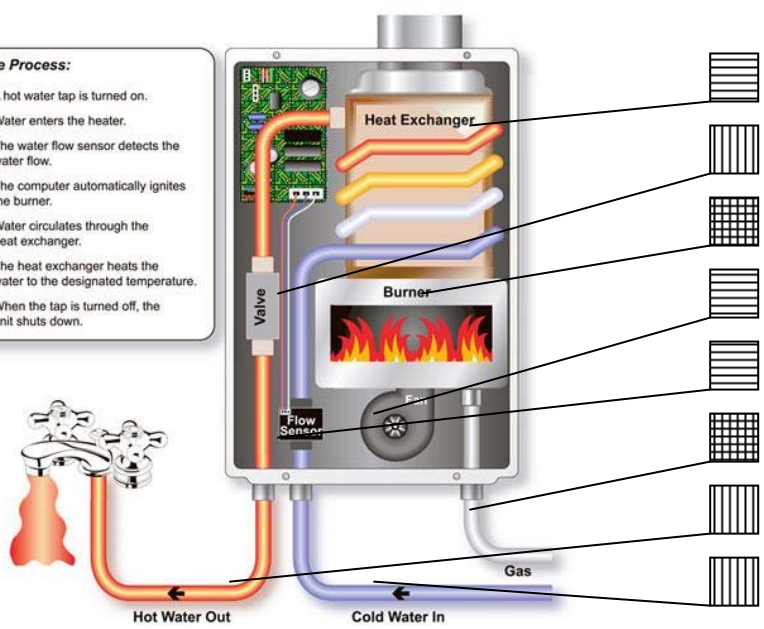
**ACTIVITY 17: TANKLESS HEATERS. Pros and cons.**

**TANKLESS GAS WATER HEATERS**

Most gas water heaters we see in our homes are tankless (they don't have any accumulating water system).

**The Process:**

1. A hot water tap is turned on.
2. Water enters the heater.
3. The water flow sensor detects the water flow.
4. The computer automatically ignites the burner.
5. Water circulates through the heat exchanger.
6. The heat exchanger heats the water to the designated temperature.
7. When the tap is turned off, the unit shuts down.



**The following task must be in pairs of students.**




-  Mark the pieces that are **different** from TANK water heaters like that.
-  And those that are **common**, like that.
-  Pieces common to ALL GAS HEATERS must be hatched like that.

Image 33: www.robinhoodpropertyservicesspain.com/img/Gas\_heater\_big.jpg

Working in pairs, they think about PROS and CONS of TANKLESS heaters in front of TANK HEATERS. Don't give them next page. Limit time to 10 minutes. If they can't express themselves in English, accept explanations in L1.

	PROS (ADVANTAGES)	CONS (DISADVANTAGES)
<b>TANK HEATERS</b>  (electrical or gas)		
<b>TANKLESS HEATERS</b>  (gas)		

They mark those they had already thought about.

If they think there may be some other pros or cons, mark them at the end. (Tankless systems don't need as much space as tank systems)

**TANKLESS HEATERS**

• **PROS**

- They can supply an endless amount of hot water,
- Save energy. Storage tank-type water heaters raise and maintain the water temperature to the temperature setting on the tank (usually between 120° -140° F (49° -60° C). Even if no hot water is drawn from the tank (and cold water enters the tank), the heater will operate periodically to maintain the water temperature.
- .....

• **CONS**

- There is a limit to the amount of hot water that can be produced at one time.
- They are more expensive to purchase than a conventional storage type water heater.
- They also take longer for you to get your hot water, since they don't start heating the water until you turn on the tap.
- The tankless water heaters also cause an increase in water wastage since you have to let the water run longer to get your hot water.
- .....

Thinking of these ADVANTAGES and DISADVANTAGES, which do you think is the best system: TANK OR TANKLESS SYSTEM, and why?

Use the language frames in the table below

**Ex: First, I think that tankless systems are better because they don't need extra storage place. Another reason is that they can supply an endless amount of water.**

**Ex2. I think that tank systems are better. There are several reasons for this: one reason is that they take no time to supply hot water, and this means there's a saving of water. Another reason is that there's no gas facility needed in the house.**

TO BEGIN	TO CONTINUE	TO FINISH
To begin with, it	After that...	As a result of this
First of all	There are several reasons for this	The final result is that
One function of...	Another reason is	This explanation is based on
There are several reasons for this, the first	And this means	In conclusion the facts show
The first reason is,	One explanation for this is	Consequently...
	The evidence for this is	Finally...

**LESSON 6**

**ACTIVITY 18: SOLAR POWER HEATERS. Pros and cons.  
SOLAR POWER- HOT WATER HEATERS WITH TANK**

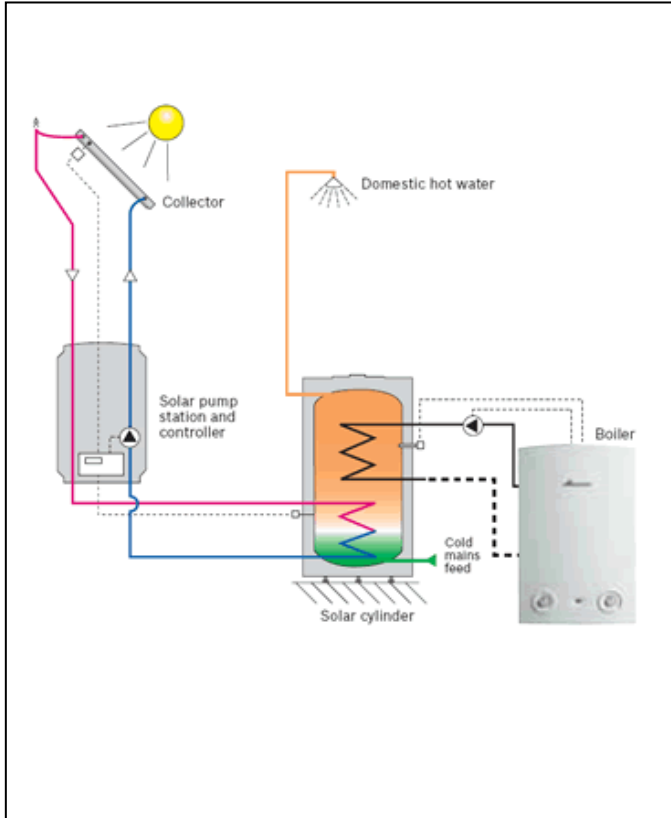


Image 34: <http://mackheating.com/images/layout/pics/solarheating.jpg>

This is the best solution to all problems caused by traditional systems.

**What is it?**

Solar water heating converts the sun's energy into useable heat. This heat is transferred to your hot water cylinder supplementing the original boiler supply.

**How does it work?**

Solar panels are attached to your roof and through a heat transfer system are connected to a solar hot water cylinder. The cylinder stores hot water that has been produced during the day for when you need it.

Working in pairs, they think about PROS and CONS of SOLAR POWER HEATERS over other HEATERS. Do not give them next page. Limit time to 10 minutes. If they can't express themselves in English, accept explanations in L1.

	PROS (ADVANTAGES)	CONS (DISADVANTAGES)
<b>SOLAR POWER WATER HEATERS</b>		

They mark those they had already thought about.

**SOLAR POWER WATER HEATERS**

• **ADVANTAGES (PROS)**

- A typical system will cut your heating bills by up to 90% in the summer & up to 30% in the winter, on average this equates to approximately 50-70% reduction in your costs.
- You can reduce your carbon dioxide emissions by anything from 400-750kg per year.
- Modern technologies allow solar panels to make the best use of the climate, even in cloudy/broken sunshine.

• **DISADVANTAGES (CONS)**

- Ideally solar panels are fitted to a south facing roof to ensure highest exposure to the sun. However, they can also be fitted to a south-east/south-west facing roof provided there is minimal shading.
- The roof will need to be strong enough to support the panels due to their weight, which can be quite heavy. Panels can be fitted to flat roofs, gable ends or an outbuilding. Typically you'll require 2 to 5 square meters for the installation
- A special hot water cylinder is required and this can be a conversion of an original one or if this is not possible then a new one may be required.
- It's expensive, although the saving on energy pays the bill after 7 years.

Thinking of these **ADVANTAGES** or **DISADVANTAGES**, would you install a solar power heater?.....

Why?.....  
 .....  
 .....  
 .....  
 .....  
 .....  
 .....  
 .....  
 .....

(If they can't express themselves in English, accept explanations in L1)

**ACTIVITY 19: ANALYSIS. ALL WATER HEATERS**

Which water heater do they have at home?

.....

Do you think it is the best heater you could have? Why?

Students should analyse if the heater they have at home is the most convenient or if they could have a better one, and why.

(If they can't express themselves in English, accept explanations in L1)

Working in pairs, they fill in the table, marking which of the following pieces is in each water heater.

(Mark them with an "✓"). Some of them might be common to some of them!!

	TANKLESS	WITH TANK		
	GAS WATER HEATER	GAS HEATER	ELECTRICAL HEATER	SOLAR POWER HEATER
DIP TUBE		✓	✓	✓
DRAIN VALVE		✓	✓	✓
SOLAR CELL				✓
THERMOSTAT		✓	✓	✓
TPR VALVE		✓	✓	✓
ACUMMULATING TANK		✓	✓	✓
HEAT EXCHANGER	✓			
BURNER	✓	✓		
HIGH LIMIT SWITCH			✓	



## LESSON 7

## ACTIVITY 20: HEATERS GENERAL COMPARISON

Working in pairs, fill in the table with the names of heaters, and list all the advantages disadvantages they have

		ADVANTAGES	DISADVANTAGES
TANKLESS	GAS WATER HEATER	<p>They can supply an endless amount of hot water,</p> <p>Save energy. Storage tank-type water heaters raise and maintain the water temperature to the temperature setting on the tank (usually between (49° -60° C).</p>	<p>There is a limit to the amount of hot water that they can produce at one time.</p> <p>They are more expensive to purchase than an electrical heater.</p> <p>They take longer to get hot water, since they don't start heating the water until you turn on the tap.</p> <p>They also cause an increase in water wastage since you have to let the water run longer to get hot water</p>
	GAS HEATER	<p>There is no limit to the amount of hot water that they can produce at one time. They take shorter to get hot water, since it is already heated.</p> <p>They save water since you don't have to let the water run longer to get hot water</p>	<p>They can't supply an endless amount of hot water, When the tank is empty, there's no more hot water until is again heated.</p> <p>They use more energy. Storage tank-type water heaters raise and maintain the water temperature to the temperature setting on the tank (usually between (49° -60° C).</p>
WITH TANK	ELECTRICAL HEATER	<p>There is no limit to the amount of hot water that can produce at one time. They take shorter to get hot water, since they have it already heated.</p> <p>They save water since you don't have to let the water run longer to get hot water</p>	<p>They can't supply an endless amount of hot water, When the tank is empty, there's no more hot water until is again heated.</p> <p>They use more energy. Storage tank-type water heaters raise and maintain the water temperature to the temperature setting on the tank (usually between (49° -60° C).</p>
	SOLAR POWER HEATER	<p>A typical system will cut your heating bills by up to 90% in the summer &amp; up to 30% in the winter, on average this equates to approximately 50-70% reduction in your costs.</p> <p>You can reduce your carbon dioxide emissions by anything from 400-750kg per year.</p> <p>Modern technologies allow solar panels to make the best use of the climate, even in cloudy/broken sunshine</p>	<p>Ideally solar panels are fitted to a south facing roof to ensure highest exposure to the sun.</p> <p>The roof will need to be strong enough to support the panels due to their weight, which can be quite heavy. Typically you'll require 2 to 5 square meters for the installation</p> <p>A special hot water cylinder is required and this can be a conversion of an original one or if this is not possible then a new one may be required.</p> <p>It's expensive, although the saving on energy pays the bill after 7 years.</p>

and

### ACTIVITY 21: VOCABULARY PUZZLE

Use the definitions of words to do with work to complete the two word puzzles below. **What are the horizontal words?**

Example: **0** The water distribution company in El Maresme.

1. Piece of a tankless gas heater where the flame is
2. Substance in air-like form that is used as a fuel for heating and cooking
3. A device which opens and closes to control the flow of liquid or gases in a machine
4. Traditional pipes are made of it.
5. The negative end of an electric water heater.
6. A bowl that is fixed to the wall in a kitchen or bathroom that you wash dishes or your hands.
7. Automatic system of detecting temperature changes to control a water heater.
8. The work of connecting water and other pipes in a building.

The image shows two crossword puzzles. The first puzzle has a horizontal word 'DRINKABLE' and vertical words 'SOB', 'BURNER', 'GAS', 'VALVE', 'SINK', 'TAP', 'CUP', 'PUP', 'EARTH', 'PUMPS', 'SINK', 'THERMOSTAT', 'PLUMBING'. The second puzzle has a horizontal word 'DESALINATION' and vertical words 'CUP', 'PUP', 'EARTH', 'PUMPS', 'SINK', 'THERMOSTAT', 'PLUMBING'.

First word definition:

**The water you obtain when you turn on the tap in developed countries: DRINKABLE**

Second word definition:

**The process of taking salt off the sea water: DESALINATION**

## UNIT 3. HOW CAN WE SAVE SOME WATER?

### LESSON 1

#### ACTIVITY 22: BETTING GAME

Aim: predicting and activating prior knowledge about saving water.

Procedure:

(In pairs)

1. Hand out the worksheets and explain that some of the statements are right and some of them are wrong. If they think the statement is right, they put a tick in the right column, if they think it is wrong, they put a tick the wrong column.
2. Students compare their answers then agree on a bet (10 / 20 / 30 ....100) and write the number in the bet column.
3. Set a time limit then check orally.
4. If they are right, they gain the number of points they have bet. If they are wrong, they lose the number of points they have bet.
5. They add the the total losses and gains to reach a total. ( gains minus losses)
6. Which pair has the largest number?

	RIGHT	WRONG	BET	LOSS	GAIN
Take a 20 min shower, instead of a bath.		✓			
Wash the dishes by hand		✓			
Wash your hands less often		✓			
Use the dishwasher.	✓				
Water plants after dusk	✓				
When you go to the toilet, don't flush it.		✓			
Brush your teeth with the tap off.	✓				
Don't shower every day		✓			
Put a bottle into the toilet tank	✓				
Brush your teeth only once a day		✓			
Put the economy half load on in the washing machine	✓				
In the garden plant needle-like leaves plants	✓				
Capture rainwater for water in a dry period	✓				
TOTAL					

GRAND TOTAL:
--------------

They can achieve, in case they were correct and bet 100 points in each correct answer, 1.300 points.

Compare results and discuss why some results are wrong. Let students participate.

**ACTIVITY 23: ANALYSING MEASURES for saving water**

They will mark the saving proposals suitable at their home

<b>In the kitchen</b>	Don't use combined <b>washer-dryers</b> ; they use more water than conventional machines. Cold water is used to <u>cool</u> the machine and can therefore increase the consumption by between 25 and 55 liters.
	If you have a dishwasher, make sure it's full before use
	When buying one, choose an economical model that fits your needs - water use can vary between 20 and 50 litres per load
	If you prefer your tap water on the cool side, leave a covered jug in the fridge – any chlorine taste will evaporate.
	Check for <u>dripping taps</u> and replace them. A dripping tap can waste 26 litres of water in 24 hours - that's enough for a shower.
	Use a bowl for washing up rather than filling the sink
	Clean vegetables and rinse <u>cutlery</u> in a bowl rather than under a running tap
	If you're replacing your machine, look out for the Eco-label which will provide water consumption figures
	Put a full <u>load</u> in your machine or the economy half load if you have one
<b>In the bathroom</b>	Pop in a bottle of water and save up to one litre every time you flush
	Tissues, cotton wool and plastics are better in the <u>bin</u> , don't waste water <u>flushing</u> them down the toilet
	If you have a dual flush toilet, use the short flush where possible, as the longer flush often uses more water than necessary
	Consider fitting a <u>mixing tap</u> , which uses less water than if you mix hot and cold water separately in the basin
	Fit a <u>tap aerator</u> - this makes the flow of water seem stronger without actually using more water
	Don't leave the tap running when you clean your teeth, you can waste up to 10 litres of water each time
	Have showers instead of baths.
	The amount used will depend on the type of shower and the length of time the shower is on. Don't waste more than necessary under the water. You don't need 20 minutes to be clean!!
<b>In the garden</b>	<b>LAWNS</b>
	Consider reducing the size of your <u>lawn</u> or don't have one at all. A really good lawn can be a real <u>drain</u> in both water and money.
	Don't overwater a lawn as this encourages roots to grow close to the <u>soil</u> surface.. A lawn may turn brown but will quickly recover in wetter months
	<b>MULCH</b>
	Use a thick <u>mulch</u> to limit evaporation from the soil and suppress the <u>weeds</u> . Mulch types include gravel, compost or <u>bark</u> which aid water retention in the soil.
	It's best to add mulch in the spring, preferably after heavy rain to keep the moisture trapped.
	<b>WATERING</b>
	Water plants in the evening to retain <u>moisture</u> in the soil and water at the base of the plant, no need to water the leaves
	Create a 'reservoir' or depression in the ground around the plant to prevent the water running away. It is best to <u>give plants a good soaking</u> rather than watering little and often.
	Invest in a <u>water butt</u> and capture rainwater for use in a dry period. Rainwater is very good for plants
	A <u>hose gun</u> fitted to your hosepipe allows you to turn water on and off easily as you move around the garden. (Remember, a <u>sprinkler</u> uses a large quantity of water, over <b>10L per m</b> )
	<b>PLANTING</b>
	Choosing the right plants is important. Try to select plants that will tolerate dry conditions, many have a type of foliage to minimize water loss or store water in periods of drought
	Hairy leaves, these reduce the drying effect of the wind and reflect the sun's rays
Leathery or <u>waxy leaves</u> - <u>tough leathery</u> leaves help prevent water loss	
Thin <u>needle-like leaves</u> lose very little water ( <u>grasses and conifers</u> )	

**ACTIVITY 24: VOCABULARY EXERCICES**

Match every word with its corresponding description.

WORDS		DESCRIPTION	
1	TO COOL	a	a container for waste
2	DRIPPING TAP	b	an area of grass, especially near to a house or in a park, which is cut regularly to keep it short
3	LOAD	c	the material on the surface of the ground in which plants grow
4	BIN	d	a covering of decaying leaves that is spread over the soil in order to keep water in it or to improve it
5	FLUSH (to)	e	to cause something to become cold
6	TAP AERATOR	f	a liquid such as water in the form of very small drops, either in the air, or on a surface
7	LAWN	g	a tap that drops liquid while is turned off
8	DRAIN (to)	h	to make very wet, or (of liquid) to be absorbed in large amounts
9	SOIL	i	to put a lot of things into a machine:
10	MULCH	j	a large container used to store liquids
11	WEEDS	k	a thin hard pointed leaf of a pine tree or similar
12	MOISTURE	l	to empty the content of a toilet tank
13	SOAK (to)	m	a device with a lot of small holes which you put on the end of a hose in order to water plants, grass, etc
14	BUTT (water)	n	device that in the tap introduces air into the water, reducing the flow
15	HOSE GUN	o	slightly shiny; looking like wax
16	SPRINKLER	p	to remove the liquid from something
17	WAXY	q	any wild plant which grows in an unwanted place, especially in a garden or field where it prevents the cultivated plants from growing freely
18	NEEDLE	r	a device which is held in the hand and used for sending out liquid such as paint or water in very small drops

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
e	g	i	a	l	n	b	p	c	d	q	f	h	j	r	m	o	k

Translate these words.

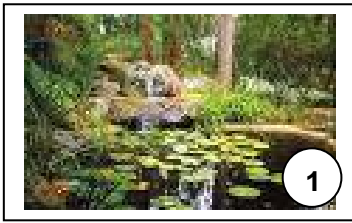
ENGLISH	CATALAN	SPANISH
TO COOL	REFREDAR	ENFRIAR
DRIPPING TAPS	AIXETA QUE PERD AIGUA	GRIFO QUE PIERDE AGUA
LOAD	CÀRREGA	CARGA
BIN	PAPERERA	PAPELERA
FLUSH (to)	BUIDAR LA CISTERNA	TIRAR DE LA CADENA
TAP AERATOR	AIREJADOR	AIREADOR
LAWN	GESPA	CÉSPED
DRAIN (to)	DRENAR, BUIDAR	DRENAR, VACIAR
SOIL	TERRA (on creixen plantes)	TIERRA (donde crecen plantas)
MULCH	ESCORÇA TRITURADA	MANTILLO, ACOLCHADO
WEEDS	MALES HERBES	MALAS HIERBAS
MOISTURE	HUMITAT, HIDRATACIÓ	HUMEDAD, HIDRATACIÓN
SOAK (to)	XOPAR	EMPAPAR
BUTT (water)	CONTENIDOR, DIPÒSIT	CONTENEDOR, DEPÓSITO
HOSE GUN	PISTOLA DE MANGUERA	PISTOLA DE MANGUERA
SPRINKLER	RUIXADOR	ROCIADOR, ASPERSOR
WAXY LEAVES	FULLES CEROSSES	HOJAS CEROSAS
NEEDLE LIKE	AMB FORMA D'AGULLA	EN FORMA DE AGUJA

## LESSON 2

**ACTIVITY 25: RECOGNIZE climate friendly GARDENS**

Fine blooms and **foliage** do not necessarily require large amounts of water.

Could you recognize which of these gardens are climate appropriate for Catalonia?



Images 37-39: [www.articulos.infojardin.com...diseno-jardin.jpg](http://www.articulos.infojardin.com...diseno-jardin.jpg), [www.foroantiguo.infojardin.com](http://www.foroantiguo.infojardin.com), [www.ced.ltd.uk](http://www.ced.ltd.uk)



Images 40-42: [www.pdphoto.org...balboa\\_6\\_bg\\_111900.jpg](http://www.pdphoto.org...balboa_6_bg_111900.jpg), [www.cproduce.com.auassets/IMG0438.JPG](http://www.cproduce.com.auassets/IMG0438.JPG), [www.nrw.qld.gov.au...imageskelly.jpg](http://www.nrw.qld.gov.au...imageskelly.jpg)

- Which of these gardens do you think can develop in Catalonia without water problems?  
**2, 3, 4 and 6**
- Explain why some of them are not suitable in our country.  
**1 is not suitable because it needs a lot of water and shadow**  
**5 is not suitable because is a lawn and needs lots of watering.**
- In groups of 3 people, they describe ONE garden using the words already learnt.  
After that, they'll read the definition to the rest of the class, and they have to guess which garden was it.

GARDEN	DESCRIPTION
1	In image 1 we can see a pond with water lilies, surrounded by lots of green plants. The place is shady and moist.
2	In image 2 we can see an olive tree on the middle of a garden, where part of the lawn has been replaced by stones as pavement.
3	In image 3 we can see another dry garden, with limited surfaces with big stones, and lots of waxy leaves plants as well as conifers.
4	In image 4 we can see a dry garden made of cactus and waxy plants, some of them with flowers.
5	In image 5 there's a large lawn, surrounded by rosebushes and other flowers that need to be watered to live.
6	In image 6 there's a very dry garden where all the surface is covered with gravel, and here and there we can find some waxy leaves plants and grasses.

## ACTIVITY 26: VOCABULARY PUZZLE

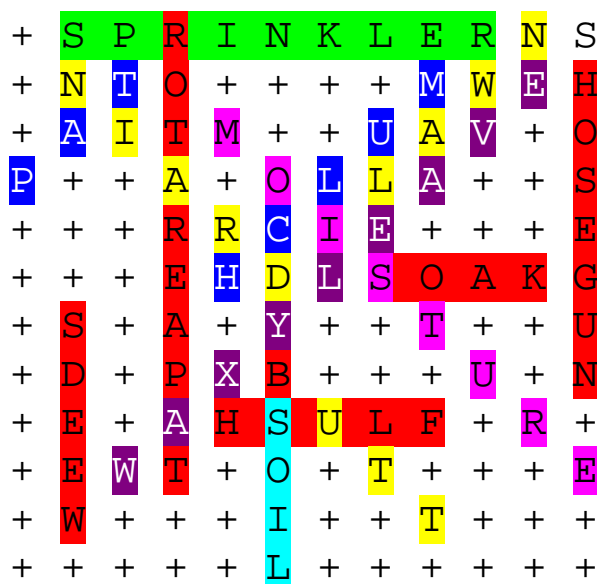
## Work in pairs

Use the definitions of words to find the 14 words described in the word search puzzle below.

Example: 1 Device with a lot of small holes which you put on the end of a hose in order to water plants, grass.

(Over,Down,Direction)

2. A large container used to store liquids: **BUTT (6,8 SE)**
3. To remove the liquid from something: **DRAIN (6,6 NW)**
4. To empty the content of a toilet tank: **FLUSH (9,9,W)**
5. a device which is held in the hand and used for sending out liquid such as paint or water in very small drops: **HOSEGUN (12,2,S)**
6. an area of grass, especially near to a house or in a park, which is cut regularly to keep it short: **LAWN (8,4,NE)**
7. a liquid such as water in the form of very small drops, either in the air, or on a surface: **MOISTURE (5,3,SE)**
8. a covering of decaying leaves that is spread over the soil in order to keep water in it or to improve it: **MULCH (9,2,SW)**
9. to make very wet: **SOAK (8,6,E)**
10. the material on the surface of the ground in which plants grow: **SOIL (6,9,S)**
11. device that controls the flow of liquid, especially water, from a pipe: **TAP (3,2,SW)**
12. device that in the tap introduce air into the water, reducing the flow: **TAPAERATOR(4,10,N)**
13. Slightly shiny, looking like wax leaves. **WAXYLEAVES(3,10,NE)**
14. any wild plant which grows in an unwanted place, especially in a garden or field where it prevents the cultivated plants from growing freely **WEEDS(2,11,N)**





## LESSON 3

### ACTIVITY 27: LISTENING AND COMPREHENSION

#### “HOW TO CONSERVE WATER”

Project the online video you will find in the address:

<http://www.videojug.com/film/how-to-serve-water>

They will watch it twice. After watching the video, they will fill the blanks on the instructions to **HOW TO CONSERVE WATER** using the words of the table and some others they will recognize.

Water is essential for **HUMAN** life, but the **BALANCE** between **SUPPLY** and demand is becoming a crucial issue. The amount of water we use and **WASTE** in day to day life has a direct impact on the **ENVIRONMENT** so VideoJug shows you the **BEST** way to **CONSERVE** water.

---

#### Step 1: **Fit a water meter**

You may be very surprised by how much water you are **ACTUALLY** using. Fitting a water meter will raise your **AWARENESS** and consequently **REDUCE** your water intake.

Call your local water board to request one - it may even reduce your **BILL**.

---

#### Step 2: **Shower Vs. Bath**

A **BATH** can use up to 100 litres of water! Where as a **SHOWER** will only use a **THIRD** of this amount. The maths is simply - take a shower and **SAVE** that water.

---

#### Step 3: **Running TAPS**

Do not let your **TAPS** run when you are not using them.

That includes **CLEANING** your teeth, a whopping 5 litres a minute can be **SAVED** if you **SWITCH** off while you **BRUSH**.

---

#### Step 4: **Fix it**

Are any of the **TAPS** in your house **DRIPPING?** If so, fix them fast.

This could **SAVE** up to 140 litres a week. Have a look at VideoJug's films on fixing a **DRIPPING** tap to see how to do this the **RIGHT** way.

---

#### Step 5: **WASHING machine**

Running your washing machine when you only have a **FEW** items is a **WASTE** of **ENERGY** as well as water. Use the economy **SETTING** or wait until you have enough to make a wash worthwhile

---

#### Step 6: **RAINWATER tank**

If you have a **GARDEN** invest in a **RAINWATER** tank. With hosepipe bans becoming the norm you will still have a **SUPPLY** of water to use on your garden without draining **RESOURCES**

---



**Step 7: REDUCE the water in your CISTERN**

Each time you **FLUSH** up to 9 litres of **CLEAN** water are used. Reduce this amount by placing a plastic bottle, **WEIGHED** down with **PEBBLES** and filled with water, in the **TANK** . This will reduce the amount of water being flushed away  
Alternatively order a 'save-a flush' or 'hippo' from your water board

Finally, only **FLUSH** the toilet is you really **NEED** to. Remember, that's 9 litres of clean water you are using every time.

**SOME TECHNICAL WORDS**

After the first video watching, they will translate the following words according to their context meaning.

ENGLISH WORD	CATALAN	SPANISH
BALANCE	EQUILIBRI	EQUILIBRIO
WASTE (to)	MALBARATAR	DERROCHAR
SUPPLY	SUBMINISTRAMENT	SUMINISTRO
ENVIRONMENT	ENTORN	ENTORNO
AWARENESS	CONSCIÈNCIA	CONCIENCIA
DRIPPING	QUE DEGOTEJA	QUE GOTEJA
SETTING	PROGRAMA (a la rentadora)	PROGRAMA (lavadora)
RAINWATER	AIGUA DE PLUJA	AGUA DE LLUVIA
WEIGHED	CARREGAT	CARGADO

After they have watched the video once, and translated the words in the table, they will watch again the video and fill those words not recognized yet.

**ACTIVITY 28: CONSUMPTION TABLES CALCULATIONS**

By that time, they should have your SEVEN consumption tables already done.

Complete the following questions:

- How much water does your father use in an average working day?  
.....
- How much water does your father use in an average weekend day?  
.....
- How much water do your family use in a week?  
.....
- How much water do your family use in a year? (in litres and in cubic meters)  
.....
- Which is the average use of water per person and day in your family?  
.....

Write your calculations here

To fill the portfolio, students will include their 7 survey tables after this page

## LESSON 4

### ACTIVITY 29: A TAILOR MADE SAVINGS PLAN

With all the measures they chose for saving water in activity 20, they will make their own **saving plan**.

The table must be similar to their SURVEY table, but they'll only make ONE TABLE.

This table has the same number of rows and columns as their SURVEY table.

In each cell, they'll mark the WATER SAVED if the proposal affect to the activity. If not, they'll leave it empty.

For example:

SURVEY TABLE CELL

BROTHER'S SHOWER (before)
15 min x 60 s/min = 900 s
900 s x 0,2 l/s = <b>180 litres</b>

SAVING PLAN TABLE CELL

BROTHER'S SHOWER (proposal)
-10 min x 60 s/min = 600 s
600 s x 0,2 l/s = <b>120 litres</b>

In this example, there's a reduction of 10 minutes from the original 15 minute shower. It means that the brother will take a **5 minute shower**. The total water saving is **120 litres**.

The table will be a SAVING TABLE.

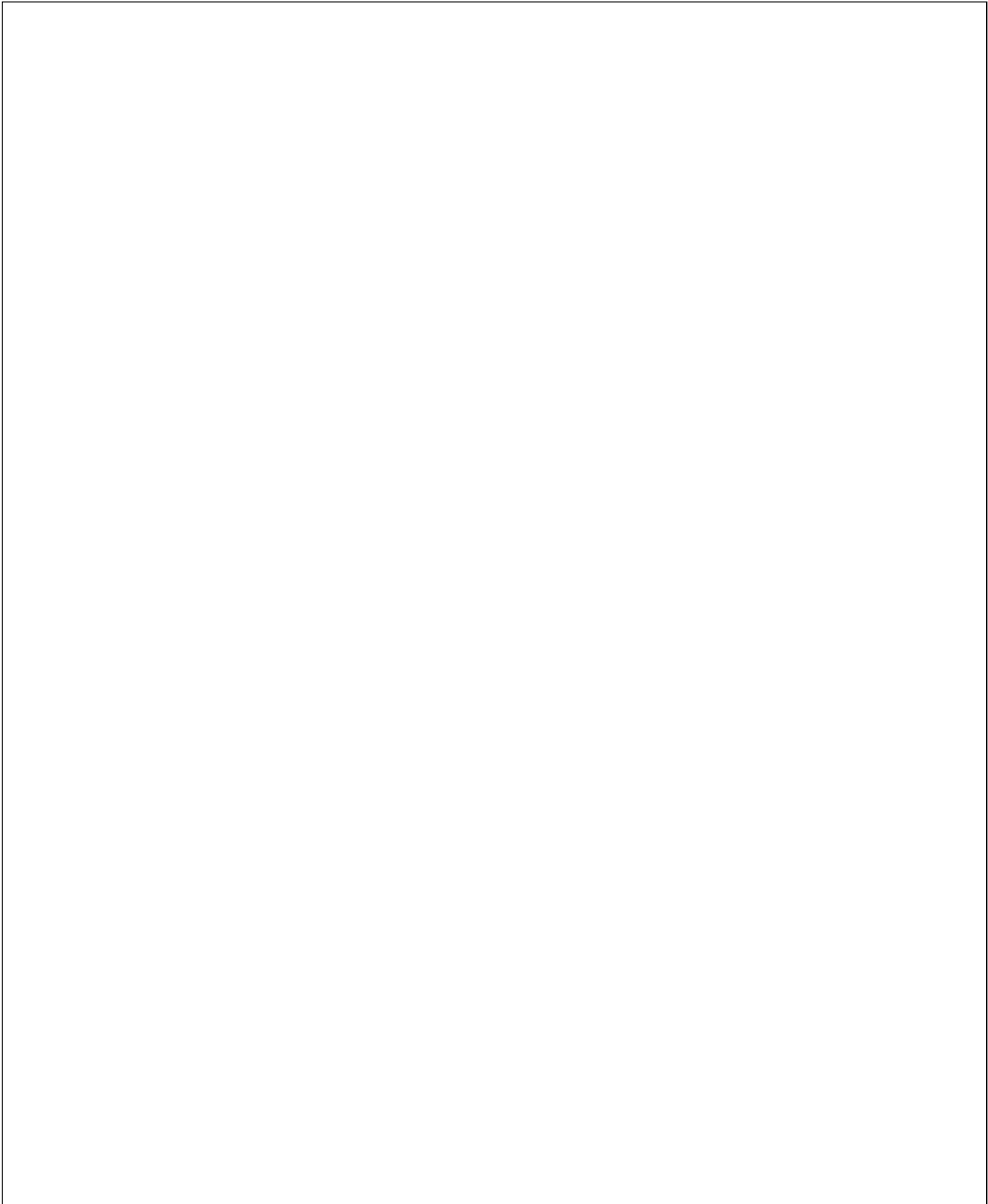
Adding all litres saved you will have the water saved in the family per day.

#### QUESTIONS:

- i. How much water would your family save in one day with your saving plan?.....
- ii. How much water would your family save in one week?.....
- iii. How much water would your family save in one YEAR?.....
- iv. How many CUBIC METERS do this saving represent?.....
- v. If a swimming pool is 2m deep, WHAT ARE THE DIMENSIONS of the swimming pool you can fill with the water saved in your family in ONE YEAR?.....
- vi. If every family in your village did the same, how many swimming pools could they fill in?.....

Write your calculations here

They will place their SAVING PLAN TABLE here



### ACTIVITY 30. CREATE YOUR SLOGAN

Fill in the gaps of the conclusion sentence, or slogan example:

**THE WATER WE WILL HAVE IN THE FUTURE,  
IS THE WATER WE DON'T USE TODAY**

**They create their own slogan and with it, design the front page of their portfolio.**

**They remove at least 4 important words and make a card with the slogan and the blanks where the missing words were.**

**The teacher collects all cards and gives them back to different students to guess the words missing in your classmate card.**