

Lesson Plan Title: **Water Distribution Challenge (The 3 Jugs)**

Concept / Topic To Teach: The Availability of Clean Drinking water in the world

Target audience: Primary school: 3rd to 6th class and Secondary: all years.

General Goal(s): To get a different perspective on drinking water, to create a realisation of the link between our freshwater resources and the water we drink, and finally to get an understanding of what goes into making that water fit for consumption.

Specific Objectives:

- To explore where our drinking water comes from
- To emphasise the connection between local water resources and drinking water
- To explain in detail the processes involved in water treatment
- To make pupils think about what went into bringing water to their taps, and give them a good understanding of the process

Seven Step Link: All

Required Materials: A Globe, 3 clear plastic 1 litre measuring jugs, water, laminated pictures for under each jug – 1 of rivers and lakes, 1 of oceans and seas, and one of glaciers and ice-caps.

Preparation Level: Low

Students' pre-requisite knowledge and skills: A basic understanding of the water cycle would be helpful.

Anticipatory Set (Lead-In): I find it is best to start the lesson with some all-encompassing questions such as: “where does our water come from”? “Does it just come straight from the tap”? “How does it get to be in our houses”? “Do we have lots of drinking water available in Ireland? Europe? The rest of the World?” Discuss the crisis in Water Quality in places like Galway and Ennis.

A recap of the water cycle helps, and the question can then be posed: “Is there enough clean drinking water in the world for everyone?” Show the class the globe and discuss how much ‘blue’ there is on it. After guesses to this question, you can tell the class you have squeezed all the water off the world, from the Rivers and Lakes, the Oceans and Seas, and Glaciers and Icecaps.

Step-By-Step Procedures:

1. This is a bit of fun and very visual and sometimes no-one gets it right! It might be good to mention this before you start so they don't feel too bad if they get it wrong.
 - a. Measurements are 975 ml in oceans,
 - b. 24 ml locked in glaciers, permafrost, and snow etc.,
 - c. 1 ml freshwater in rivers and lakes (mostly lakes very little in rivers)
2. You could start with reminding them of the **water cycle** before you do this activity it will get them starting to think where all the water is.

Closure:

I often combine this talk with other water talks, but when I am finishing up about the treatment aspect I re-cap by saying: “so if you leave your tap running, remember that the water had to fall as rain on the mountain, come down as part of the river, get sucked in to the treatment plant, cleaned in the various ways, pumped up to a reservoir/ water tower, then piped to your house before being stored, then isn't it a waste just let it run away down the sink after all that”. So the whole talk is just designed to get a better appreciation of water, the journey it makes to our taps and the effort that goes into getting it clean.

Continuation:

1. A good visual representation of how much water we use everyday:
 - a. Collect 2 one litre jugs (or you can use clear plastic lemonade bottles with the top cut of and just have one measuring jug, it's cheaper and you are reusing everyday item!)
 - b. One 100 ml measuring jug
 - c. vegetable oil
 - d. blue food colouring.

- e. In one bottle pour in 970 ml of tap water, add a drop or two of blue food colouring in it and tell them this is the ocean part of the world's water distribution. Now pour in 30 ml of vegetable oil, this should sit on top of the water. You can tell them this is freshwater portion (even though not totally true as it is less but I doubt if it will work with less, too hard to see)
 - f. Now you get the kids to add water to the other bottle according as to how much water they use everyday:
 - i. Taps - 120 ml
 - ii. Shower - 210 ml
 - iii. Bath - 90 ml
 - iv. Toilet leak - 50 ml
 - v. Dishwasher - 30 ml
 - vi. Washing machine - 220 ml
 - vii. toilet flush - 280 ml
 - g. Now you can put the jugs or bottles next to each other and they can see the difference. I would say this experiment could be really good if you ask the teacher before hand to get the children to fill in a water diary for a day so they can have a realistic figure of how much water they use every day.
2. You can also get them thinking about wasted water, if there is a tap in the classroom you can put a jug underneath and get the tap dripping, let them take a guess how much water is collected in the jug at the end of the session and then just leave it on for the duration, you can even turn it into a competition for them and give them a prize at the end.
 3. You can also get them thinking about water use in the past and in the developing world, availability less, they used to (and still do) have to carry water from a source away from their house. After you do the activity on water use you can ask them to guess how much this water weighs (1 liter = 1 kilogram = 2.2 lbs) and then see would they be willing to carry this amount

of water to their house every day. Then you can get them to come up with ideas on how to conserve water.

4. A great way to get them to think about those things is to play the 'wants and needs' game. Print of some pictures of things we need to live and things we just want (e.g. family, love, food, television, computer, play station, cars, bikes, holiday, trees etc.) Divide them in groups and let them discuss amongst themselves for a few minutes. Then you get them all together and hold up the cards and ask each group if they thought this was a 'want' or a 'need'. You can get very interesting discussions going! Everyone will tell you that food is a need, then ask them how about a chocolate bar, or strawberries in December? Holiday; most of them will say it is a want (except for the teacher!!), ask them if they are happy to go to school 365 days of the year? Then you can talk about where they go on holiday, would it be better to stay in Ireland or go to Australia? Trees are really good to encourage talk about what we need trees for (food, oxygen, furniture, medicines, heat, biodiversity etc.) I find this game gives them a great understanding of our level of consumption.
5. A great site is called 'the story of stuff' <http://www.youtube.com/watch?v=OqZMTY4V7Ts&feature=user> It gives great information on consumption and might give you some more ideas for this game.

Adaptations for students with learning difficulties:

Posters could be made with 3D versions of the sun, rain and rivers to give greater touch/ feel dimension. As well as this the globe can be looked at in greater detail.

Extensions (for gifted students):

More advanced students could be asked more technically difficult questions at the end of the talk, and explained the processes of fresh water abstraction, cleaning, and pumping in more complicated detail.

Links to other subjects:

Compliments and touches on many aspects of SPHE, science, geography.