PROJECT WET Water Education for Teachers

California Project WET Gazette

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Virtual Water

It is obvious to anyone turning on a faucet, listening to the chugging slosh of a washing machine or watching the flow from sprinklers or a hose that water is being used. Hopefully, most of us are also aware of how much water is being used in these examples after decades of water conservation messages – will look up the answers, which are provided in the new Project WET activity *'Water Audit' (p: 469).* But most of us are unaware or rarely think about water we consume in the products we use. How much water does it take to grow an avocado? How about a pound of rice or beef? Is water even used in producing a stick of anti-perspirant, a queen size bed sheet or the printer sitting next to my desk? Welcome to the hidden world of *'Virtual Water'* (p: 289), which students are introduced to during the new Project WET activity of the same name!

'Virtual water' refers to the indirect use of water to produce the goods and services we enjoy. It is not just the water in the apple we are about to eat, but the average amount of water consumed by the apple tree to grow that apple. Virtual water includes the water used to generate the power to operate the pumps that deliver water to the farm and to our homes – and powers the lights and the myriad of electrical appliances we have grown to rely on. As stated in the activity background, *'the indirect use of water is a cornerstone of the global economy.'* It takes between 1,200 to 1,600 gallons of water to produce a pound of beef, around 200 gallons to grow a pound of rice, 43 gallons for the avocado, approximately 220 gallons to produce a 2.4 ounce stick of anti-perspirant, 6,663 gallons for a queen-size 400-thread count sheet and 9,510 gallons to produce an average color printer. People are often shocked to see these figures and are critical of the amount manufactures require; yet, we often just as easily forget we are also the major consumers of these products. One goal of this new Project WET activity is to introduce students to this hidden world of water consumption and become aware of our role as a consumer.

'Virtual Water' has been a popular activity during Fall 2011 and California educators have already derived some wonderful additions to the activity. *'Virtual Water'* is a redesign of the original Project WET activity *'Water Works!'* The new activity includes a limited selection of information on water used to make common products. John Zavalney - Science Expert with the Los Angeles Unified School District San Pedro Math, Science & Technology Center - has created virtual water quiz strips for 30 products based on *'The Green Blue Book: The Simple Water Savings Guide to Everything in Your Life'* by Thomas M. Kostigen. I've broken out and expanded the list of water users included in the activity to make it easier to use with larger classes. The expanded list also provides a greater variety for those of you who would like to 'localize' the activity and provides an easier to use template if you would like to use the 'business card' variation noted in the activity *(p: 293).* I have attached copies of the virtual water quiz strips and answers developed by John Zavalney and the expanded lists of water users, which are already formatted to print out as name tags on Avery 5163 labels.

Rather than tying strings to a jug, you can provide each student with a 5' to 6' length of thick string or twine and have them tie on a paper clip bent into a hook or an S-hook on one end. Instead of a jug, wrap several rubber bands around a soup or small coffee can and use it as the water supply. Each student 'gets their hooks into the water supply' by walking to the source and hooking their 'service connection' to the rubber bands after stating what user they represent. This not only provides a great visual showing each user's connection to the community water supply, but it also eliminates the time it takes to tie or loop each string to a water jug. The quiz strips gets each student thinking about the total water consumed to generate and deliver products we use on a daily basis. The strips also provide a ready-made prompt to help students see the water connection between products and the water users represented by each student around the circle. Using the above supplies provides you with a good portion of the materials needed to extend your study of our water use connection by engaging students in another new Project WET activity, *'8-4-1, One For All' (p: 299)*.

The *'Virtual Water'* activity with John's quiz strips has generated incredible discussions. As with students, workshop educators can't resist that initial desire to yank on their 'service connections' at the first opportunity, providing plenty of laughs as well as great discussion on community impacts resulting from an overstressed infrastructure. With the initial desire to yank out of the way, attention can be refocused on how all the water users in the community could work together to protect the water supply, while still putting demand on the system. The quiz strips generate great discussion and provide a ready-made hook to engage learners - and I haven't met a person yet that wasn't itching from the start to see the answers! The initial guesses are usually just that, but qualifiers on how answers were formed quickly begin to be shared and guesses around the room begin to change as the group pulls away the veil of this hidden world of water consumption. I also haven't met a group yet who has been satisfied by the quiz answers – every group demands to know more details on how the numbers were derived and with a multitude of questions critically- thinking citizens should be asking, i.e., What factors were included in the estimate? Where were the estimates derived? Does the region studied influence the estimate? Were the businesses studied using water saving technologies? Are there studies comparing virtual water estimates between manufactures utilizing different water use practices? The activity is a great generator of a desire in students to seek more knowledge!

Businesses are becoming more aware and are attempting to quantify the virtual water impact on the corporate water footprint, but the discussion is not without controversy. I have included links to a couple of articles on this issue regarding virtual water exports in the **'Websites of Interest'** section of this Gazette – and found the reader responses as interesting as the articles. I've also included a variety of websites providing more background on the concept of virtual water and sites that provide additional virtual water estimates of products. Check-out the Water Footprint Calculator if you'd like to get a sense of your personal footprint – and take a look at the new Project WET activity *'My Water Footprint' (p: 441)* if you work with younger students Those who have attended a Guide 2.0 workshop can also find literature suggestions, media links to extend the activity, view additional tips from fellow educators – and submit any you may have – on the Project WET Portal. Cheers to another New Year!

WEBSITES OF INTEREST

Water Footprint Network — http://www.waterfootprint.org

The mission of the Water Footprint Network (WFN) is to promote the transition towards sustainable, fair and efficient use of fresh water resources worldwide. The website includes product case studies, estimates of water usage for a variety of products, estimates of national water footprints and a calculator to estimate your personal water footprint: http://www.waterfootprint.org/?page=files/YourWaterFootprint.

WECalc, Your Home Water-Energy-Climate Calculator — http://www.wecalc.org

WECalc, This is a free online tool from the Pacific Institute that shows you how you can save water at

home, save energy, reduce greenhouse gas emissions and save money in the process! WECalc will ask you a series of questions about your home water use habits. Based on your replies, it estimates your water use and provides personalized recommendations for reducing that use.

USGS: Water Science for Schools

http://ga.water.usgs.gov/edu/sc1.html

What is the water content of things? Water is needed to grow not only everything we eat but also to produce almost all the products we use every day. This water is either supplied by nature as precipitation and/or added by people during the growing/production process. You can't tell by the size of a product or the appearance of a food how much water was actually used to produce the item.

Water Facts & Fun

http://www.water.ca.gov/education/wffcatalog.cfm

Lots of free materials for California educators, including ***'The California Water Works'*** that has a colorful comic book character, Professor Goodwater, leading students through the water cycle, showing them how water is delivered through California's built and natural water systems to the end users. Guidelines for water conservation are provided as well.

APPS: WaterPrint

http://waterprint.net

WaterPrint is a one-of-a-kind iPhone application that calculates how much water is embedded in your daily activities, including what you wear, eat and drink. This application even includes a water footprint calculator that quickly and easily tells you how much water it takes to grow a banana, manufacture a T-shirt, or brush your teeth. This application is the first of its kind, and we will continue to add more items to our water footprint list and more detailed information regarding exactly how a water footprint is calculated.

ARTICLE:

Measuring the Water Footprint of the Energy We Consume

Water and energy are cardinal to every aspect of human life. Both are interdependent – water is used in the generation of energy while energy is needed to supply water. Their use depends upon and impacts our eco-system, which is already under stress and running short of both these resources. Further, limitations on water usage are restricting our plans of generating more energy, while energy shortages are curbing our supply of clean water.

ARTICLE:

365 Trillion Gallons of Water Thrown Away With Our Food Every Year

Recent studies now quantify the water and energy costs of discarded and spoiled produce, grains, meat, and dairy. Experts weighing in at World Water Week in Stockholm estimate that half of the irrigation water used around the world is lost to wasted food – the equivalent every year to half of Lake Victoria, Africa's largest lake, or 365 trillion gallons.

DiscoverWater.org

http://www.discoverwater.org

Targeting learners aged eight to 12, DiscoverWater.org shows children how water affects them - and how they can affect water. The website combines kid-friendly illustrations and animation with interactive, science-based activities covering everything from the water cycle and oceans to water conservation and the role of water in the human body. Students can also collect "Take Action" items throughout the site and create their own personalized printable "Take Action Poster" to help them remember how they can conserve and protect water.

If you would like more information on Project WET please contact Brian Brown, California Project WET Coordinator at: projectwet@watereducation.org or (916) 444-6240.

Check our website www.watereducation.org **and/or contact us for updates.**