

EASY SCIENCE Water Wise, Kyle!

By Helene Share

Happy New Year, everyone! 2011 is going to be a very exciting year. Why? It is the Year of Chemistry! I am so looking forward to all the fun we are going to have with chemistry!

Last weekend my dad took me fishing. We camped next to the river in a tent. It was so much fun, except... we ran out of clean drinking water, because it was so hot. I then started thinking about Water. Where does our water come from? How is water purified (made safe to drink)?

The Water Cycle

To explain where our water comes from, we need to understand the Water Cycle. The water we use comes from rain, hail or snow, which is formed by a process called precipitation. The rain water or melted snow flows into rivers and can also be stored in dams. Some of the water sinks into the ground and forms groundwater, which sometimes flows out of the ground as springs, fountains or waterfalls.

Groundwater is also used by plants. The roots absorb the water and transport it to the rest of the plant. The water that is not used by the plant is then given off by a process called transpiration (almost like sweating in humans).

The water in rivers and dams changes to water vapour when it is hot. This process is called evaporation. The water vapour rises up into the air and cools down again to form rain, hail or snow (condensation).

When this happens the water cycle is complete and the whole process happens again and again and again...

Water Purification

Fresh water sometimes becomes polluted when bacteria (germs) grow in the water and it becomes unsafe to drink. It is important that this water is properly cleaned. Different methods can be used to purify the water, the most common method being the use of chlorine. Chlorine is a chemical that kills bacteria and has disinfectant properties, but it is also a poisonous

gas. To prevent people from coming into contact with the chlorine gas, scientists often use sodium hypochlorite solutions, which are added to the water and then release chlorine. This method is not expensive and safe to use.

Nanotechnology as a purifier

Another method that can be used to make water safe to drink involves Nanotechnology. Nanotechnology is the science of very small objects. Scientists use tiny silver particles, called nano silver, to clean the water, because they are antibiotics. This means that they kill those bacteria which could cause diseases and sometimes death!

The nano silver particles combine with the bacteria and stop them from getting oxygen. In other words, they suffocate the bacteria! We can get plastic water buckets that contain nano silver particles to use at home. If we leave the water in the bucket for a few hours, all the harmful bacteria will be killed. How great is that? Quick and easy, yet safe!

pH balancing

It is not just bacteria that must be killed in order for the water to be safe, though. A few other things must be done as well, such as the pH of the water must be checked and controlled. The pH should be 7 (neutral), if the water is too acidic (below 7) or basic (above 7), chemicals must be added to correct the pH. Lime is often used for pH control, because it is cheap and works well.

Make your own water filter!

Flocculation is the process that makes the water clear. Often we have impurities floating in the water that must be removed. This is done by letting the water run through a sand filter. Check it out for yourself in the experiment below:

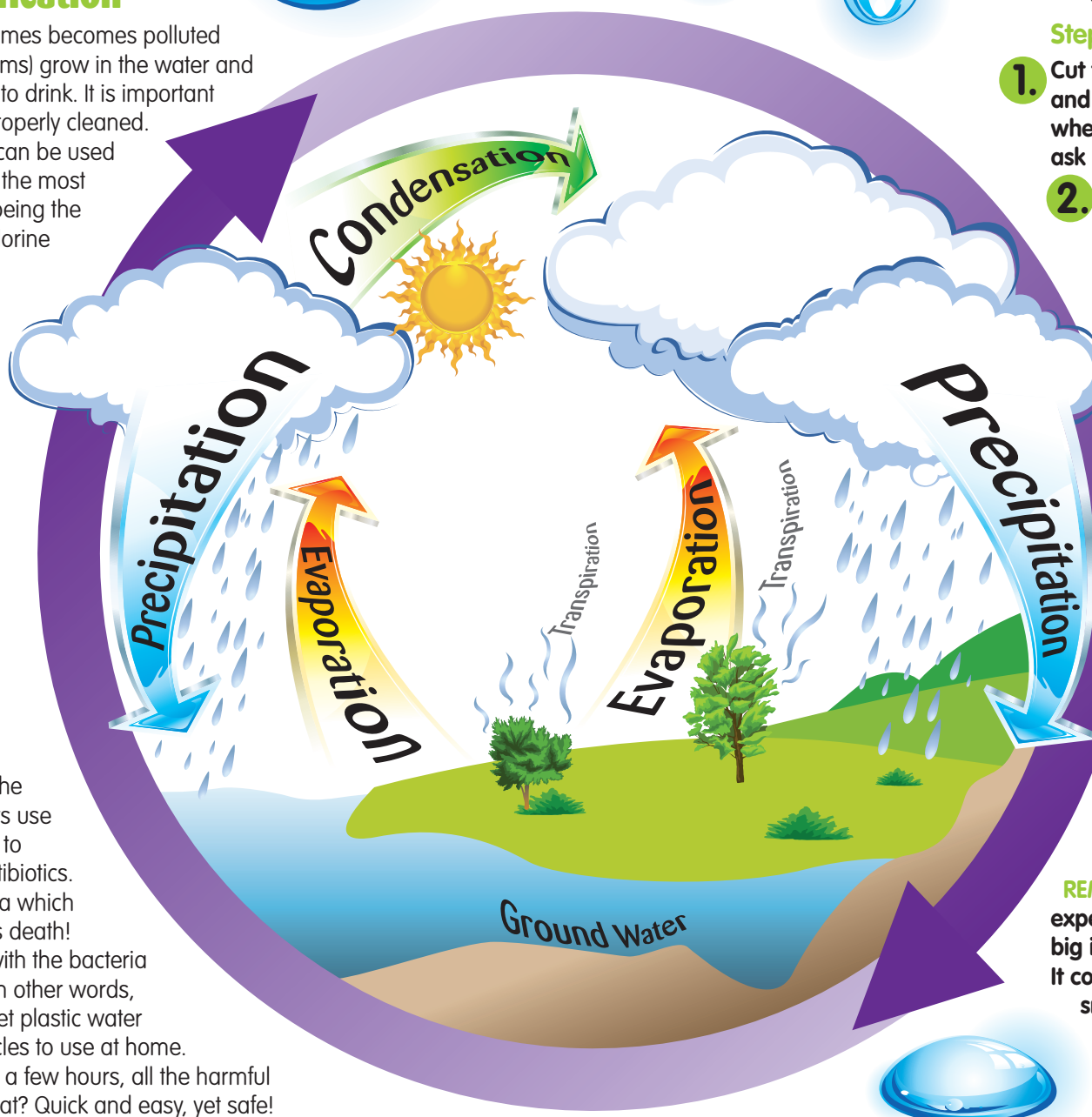
Stuff you need:

- 2L soda bottle
- cheese cloth or any thin material
- elastic bands
- scissors
- sand (very fine)
- gravel (stones and coarse sand)

Steps to follow:

1. Cut the soda bottle in half and remove the lid. (Be careful when you do the cutting, or ask someone to help you.)
2. Put three layers of cheese cloth over the narrow mouth of the bottle and use the elastic bands to hold them in place.
3. Put the top half of the bottle, upside down, into the bottom half.
4. Put a layer of sand in the top half of the bottle, followed by a layer of gravel.
5. Get some dirty water. If you do not have dirty water, you can make some, by using cooking oil, dirt, bits of food, etc.
6. Pour dirty water into the top half of the bottle. It should run through the sand and gravel, out the cheese cloth and come out clearer in the bottom half of the bottle!

REMEMBER: This is only an experiment used to remove big impurities from the water. It could still contain very small bacteria, which we cannot see!



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