Wonderful Water

By JOHN BICKART, Ph.D. | ***Science Education and Spiritual Transformation*** **/ Chapter 19: The Mathematics and Science of Wonderful Water!**

What is Wonder?

The first principal I worked for as a teacher had *and has* the ability to truly enter a state of wonder. When he gets quite excited and grateful for something, he has an expression that says it all. He says, “This is an embarrassment of riches!” I got to interview him this morning to ask what he means by this. He said the embarrassment means that there are riches he wishes to be worthy of – that he aspires to and loves. Then he said that the real wonder is something you don’t understand but wish to engage, that the Greeks felt was the beginning of wisdom. He also said some dinners and wines we shared were an embarrassment of riches, but that’s another story.

How is Water Wonderful?

Is that how you feel about some special people or places or things in your life? Are there some gifts that make you

feel almost unworthy to receive them? That is how I feel about water.

Have you ever thought of how water is different from everything else on the planet, in that almost all of those differences are beneficial to the animals, plants, and humankind that inhabit this immense system we call earth? We'll only touch on a very small part of the vast list of properties of water that - transcending our current understanding - turn out to be advantageous to life on earth.

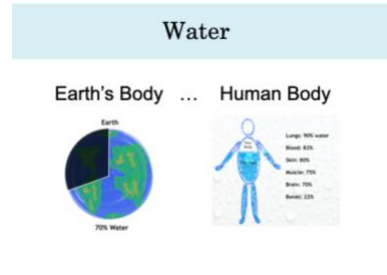
If you are a teacher and you want to get your students excited, you need to get them in the mood to bring real respect to the science of water. How do you do this? I like to turn up the volume on my expectation. I pretend the class and I are going into a room with a closed door. On the other side of the door is a friend that I respect very much, and I cannot wait to introduce the class to this person. In other words, to get the students into the mood, you develop a personal relationship with water as you prepare your lessons. You observe it and research it until it is like a friend. You get to know it on a personal level. For instance, you may research poems about water, like this one by Gajanan Mishra.

"Water element in wave in ocean
In cloud in steam in fog in dew
In river in ponds and everywhere
Only difference of forms
Only difference of opinion.
Water water water and water
Everywhere water in the body

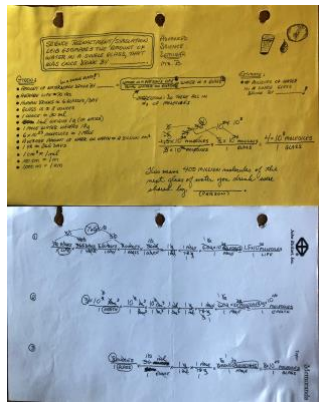
In the house in the tree in the sky
I belong to water
Water not belongs to me."

Five Awesome Facts About Water to Use as Lesson Starters
(Also see more in section 19a of this chapter.)

1. ***The Earth and You:*** Both the earth's body and the human body are mostly water. *Earth's surface is about 70% and human body about 60%.* Does this similarity suggest that we are in a relationship with earth?



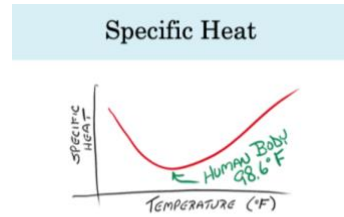
2. ***THE BIG CALCULATION:***



The water on earth stays on earth. This means that you are drinking, swimming in, washing with, and sweating the same water that every other earth being - human or otherwise - has shared. This means that the next 8 ounce glass of water you drink has approximately 400 million molecules of water that some dinosaur ... or any person from history ... shared with you.

3. ***Clouds***:
   Did you ever think about how clouds are the perfect balance of light and heavy? They are. They are light enough to float and yet heavy enough to stay near earth and let gravity keep them from flying away into space.

4. ***Specific Heat of Water****:*
   The sensitivity of water to heat - *specific heat* - is the amount of energy that it takes for water to change its temperature. This varies according to whether the water is hot or cold. It is at its most sensitive spot at the human body temperature of 98.6° F or 37° C.



5. ***Regelation*:**
   Regelation means to re-freeze after melting. Most materials contract under pressure, but ice melts if you press on it hard enough. Recently Zhang and associate scientists discovered chemically how this happens. “Regelation, i.e., ice melts under compression and freezes again when the pressure is relieved, remains puzzling since its discovery in 1850’s by Faraday." In concluding their paper, they use words to describe water that almost sound to me like they were talking about a living being. The H_2O molecule's bonds "form the soul dictating its adaptivity, cooperativity, sensitivity, memory and recoverability when subject to stimulus." (Zhang et

al., 2015)

One incredible fact that comes from this is that glaciers are so immensely, heavy that they melt the ice at their lowest layer. This has two benefits: it allows glaciers to flow, and it provides plants, animals and people with water in otherwise frozen wastelands.

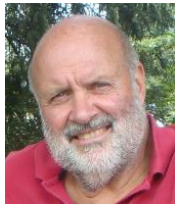
****

For another excellent book on water, you might like reading *Sensitive Chaos : The Creation of Flowing Forms in Water and Air* by Theodor Schwenk (2014). He speaks of water as *the universal bearer of living, formative processes*. In other words, keep looking for water to be the friend that grows on you - the more you see them, the better they look.

Do you remember when you had just met new friends? At first, they simply seemed different. Then, as you got to know them and you started to respect them, they started to seem interesting, then perhaps even fascinating ... then, in some cases ... wonderful. That was all in your power to see, the whole time. Much of your ability to see wonder is ‘in the eyes of the beholder’ … and always was.

****

About the Author



John Bickart

John Bickart, Ph.D., likes to work in the background and let good ideas speak for themselves. He believes that children, and sometimes adults, know what they want and that they empower themselves when they listen to their hearts.

****

This essay was copied with permission from **bickart.org**.

References

Schwenk, T. (2014). *Sensitive chaos : the creation of flowing forms in water and air* (Revised second edition ed.). Forest Row, East Sussex: Rudolf Steiner Press Forest Row, East Sussex.

Zhang, X., Huang, Y., Sun, P., Liu, X., Ma, Z., Zhou, Y., . . . Sun, C. Q. (2015). Ice Regelation: Hydrogen-bond extraordinary recoverability and water quasisolid-phase-boundary dispersivity. *Scientific reports, 5*.