



## **Pre-Visit Activity: Water is the Gift that Keeps on Giving**

Message #1: Water is a mineral that does things when you add energy to it.

Water recall – What is it? Where do you find it? What does it do?

Message #2: The world can be broken into chunks that are defined by how much water and energy they have.  
Measuring examples

Message #3: The water and energy in these chunks get put to use.  
Dyke Marsh slide show and first half of Sum of the Parts

Message #4: Water and energy not only divide the world into chunks, they also connect these chunks together.  
They create a watershed.  
Second half of Sum of the Parts

### **Water is a mineral that does things when you add energy to it.**

Humans know a lot about water because they study it their whole lives, whether they realize it or not. In the sixth grade, you have been studying water a little more formally. I want you to combine what you know from school and what you just know to tell me a little about water.

What is water?

Comes in different phases, flows downhill, makes things float,

Where do you find it?

Goes through a water cycle, makes the sky blue

What does it do?

Keeps us alive (photosynthesis, heat exchange, metabolism), dissolves things, moves things around

**The world can be broken into chunks that are defined by how much water and energy they have.**

Because water is so important – and so everywhere – it gives us a handy way to measure things. It gives us a unit that we can use to break the world down into meaningful chunks.

Weight: 1 gram = the weight of 1 cubic centimeter of water at 0 degrees

Temperature: 1 degree Celsius = 1 hundredth of the temperature change needed to get water from freezing to boiling

Biome: Most systems define a biome based on the water cycle (precipitation and temperature). Notice that a biome really only takes into account two things, and neither of them is alive (water and energy).

**The water and energy in these chunks get put to use.**

Once you have broken the world down into meaningful chunks, you can ask yourself, “What is going on here?” In the case of a biome, you can ask yourself, “How are this water and energy being put to use?”

You guys will be coming on a field trip to a “temperate coastal river” biome. You already know how much water and energy it gets because you live in it; it gets about this much water and this much energy. You will get to see firsthand how its energy and water get put to use when you visit, but let’s take a quick tour.

Its water comes mostly from the Potomac River. It has four tides each day (high, low, high, low). It tends to flood in the spring as snow melts and showers pass through.

It gets cold enough in the winter that its water freezes. And it gets super-hot and sticky in the summer.

Temperate coastal rivers have just the right amount of water and energy to build a riot of life. They are a kind of biome that makes for very productive ecosystems.

Dyke Marsh uses its water and energy to build a wetland (its soil is saturated with water). Specifically, it uses its water and energy to build a freshwater marsh (a wetland that is nearly always flooded)<sup>1</sup>. Freshwater marshes can grow tons of algae, bacteria, plants, shellfish, fish, insects, amphibians, reptiles, birds, and mammals.

This biome provides pretty good habitat for most of these creatures, but sometimes a creature – like a beaver – will look around and start to plan out some improvements. Unlike a plant, a beaver isn’t limited to using just what is right around him. He might look out and think, “You know... What I’d really like is one of those pools that goes right up to the edge of the ocean and looks like it blends in.” So he goes out and gets some trees builds a dam.

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<sup>1</sup> There are other types of wetlands, like bogs (a wetland with really acidic water) and swamps (a wetland with a lot of open water).

Now it's your turn to be a busy little beaver. You get to take a chunk of this biome and to turn it into whatever you want. Because you're a human, and not a plant, you can bring in anything you like; you have unlimited resources at your disposal, so go all out.

[Pass pieces of paper and pencils down rows.]

**Water and energy not only divide the world into chunks, they also connect these chunks together. They create a watershed.**

Okay, we're going to reassemble your chunks of this biome so that you can meet your neighbors and see how they are using their water and energy. We're also going to see what kind of ecosystem you've created together.

[Pass yarn down the middle of two rows to form a river.]

Take a moment to shake hands with the person on your left (upstream) and right (downstream) sides and find out what they've done with their property.

Now think back to what we know about water. Does water stay still? We decided that when you add energy to it (kinetic energy) it flows downhill. And when it flows, does it just pass by without affecting anything? We decided that it can carry things with it. Take a look at your property and think about what this river might carry away from it. Now turn your property over and draw or write a description of one thing that you thought of.

Let's see this in action; we're going to make our rivers "flow."

[Students pass their non-point source pollution downstream.]

People at the mouth of the river, what kinds of wonderful gifts have you gotten from your neighbors?

People in the middle, did anything pass you by or linger on your property that would make your development not quite as nice as you hoped it would be?

People at the source of the river, can you imagine a way that some of your "gifts" might find their way back to you? Or, people at the mouth of the river, how might you re-gift some of the things you hold in your hands?

Have you ever heard someone say that something is the "gift that keeps on giving"? How might water be the gift that keeps on giving?