A Drop's Journey

What would people learn if they could follow a drop of water wherever it went? They would discover that the water exists permanently, cycling through different states of matter as it travels on its adventure through so many different aspects of the earth. Its journey might not be measured in years but could be measured in states of being—how many times the droplet finds itself to be part of a pool of water in a suburban back yard, locked up in a glacier, floating in a cloud, or part of a massive sea. Let's examine how a tiny drop of water could make its way through so many different circumstances.

Our drop of water is like any other drop of water—it is made of hydrogen and oxygen. In fact, each molecule of our water drop looks exactly the same: two hydrogen atoms linked up with one oxygen atom. This combination of hydrogen and oxygen is simply what makes water what it is.

When we first see our little drop of water, it is part of a huge ocean, the biggest of all the oceans. This little drop of water lives at the bottom of the Pacific Ocean. Being part of the rumbling ocean means it is liquid, of course. It's dark and cold at the bottom of the ocean, and relatively bleak. Every once in a while the water molecule is somehow consumed by a deep-sea dweller, and passes through its body until it eventually rejoins the ocean. As this happens, the little water drop may end up in a different part of the ocean where it is more shallow, and there is less pressure and more light, as some sunlight filters through.

The water droplet continues to sway and move, sometimes finding itself pushed back down into the darkness, but in general moving up, higher and higher, until eventually one cool night, it hits the surface. All of a sudden, instead of water on every edge, the water droplet makes contact with the air. It's resting right on top there, but of course, it stays closely connected to its other oceanic droplets. This tendency to stay connected to other liquid bits of water is what makes water pool together on a table, if you spill a glass. What could force it to abandon its rigid structure, though, is heat. As liquid water is heated, the individual droplets gain more and more energy. They gain so much energy that they start to bang around against each other with greater and greater force until all of a sudden—pow! The amount of energy the little drop contains is simply too much to be reined in. Instead, the droplet can no longer handle bouncing against its fellow water droplets, and it bursts right out of the body of water and goes straight up into the air. For our little droplet of water, this is exactly what happens the morning after it reaches the top of the ocean. The sun comes out early and throughout the day, and keeps on heating the little drop of water up, hotter and hotter until all of a sudden—pow! Our little droplet of water is lifted up and can no longer call the ocean home.

The water droplet has evaporated, meaning it's gained enough heat to transform from a liquid to a gas. In its new gas state, it is floating up above the ocean into the air. When this happens, all of the salt particles hanging on between water molecules fall, and are left behind. The salt is too heavy for the tiny water droplet to carry it into the sky, so down it stays, making sure the ocean remains salty, even as freshwater rivers run into it, thousands of miles away.

The water droplet continues to rise all the way up, until it's high enough that the air begins to cool down. It's high up in the cool air—the same cool air that makes mountaintops so cool and frigid. And as it gets colder, the droplet of water loses more and more of its energy. It stops bouncing until it slows down dramatically and collides with other drops of water. Rather than separating again, they start to stick. They stick together, with drops of water encasing dust and other small particles that have made it so high up. They stick and continue picking up more and more droplets until they've created the beginnings of a cloud. High up in the sky, the cloud is carried by the wind, across an ocean and finally over the beach. Then it starts to get lower and lower as it collects more and more water droplets.

Soon, enough water is gathered so that the cloud is so heavy that it can start to release some of its water droplets down and back onto the land in big wet drops of rain. Our water droplet falls from the cloud right onto the center of the Rockies, a place that is called the Continental Divide.

The Continental Divide is so named because it represents a stark split across the entire North American continent. The Rocky Mountains are so high they act like a fold in a piece of paper propped up to be a nametag. On one side of the Rockies, all water landing there will trickle down and to the West, so that the droplets of water may eventually reach the Pacific Ocean. On the other side of the Rockies, all water landing there trickles down to the East, and it may eventually reach the Atlantic Ocean. Of course, most of the water will meander amongst the paths of rivers, lakes, bays and clouds on its journey.

Our water droplet falls on the east side of the Continental Divide. Unfortunately, it lands in a small puddle hidden under the shade of a bigger rock. That means it ends up staying there for quite some time, never getting hot enough to pop back into the sky. Months pass, and it grows cold. The next time water falls from the sky, it comes as snow. Cold droplets of water have frozen into tiny solid flakes falling from the sky. It chills our water droplet in the puddle and as the snow packs on, eventually the new drifts meet with a glacier that exists at the top of this mountain. For many months, our water droplet is quiet and still—void of energy and not willing to move. It has crystallized and is joined to its fellow water droplets in a large sheet of frozen ice.

The spring comes and the ice thaws. The water droplet heats up and melts, and as the rest of its snow chunk does, it finds itself propelled forward, trickling all the way down the mountain. This droplet still has so many possibilities—it may trickle all the way into the Atlantic Ocean. Perhaps it will stall and find itself flowing from a natural spring, where it could be collected and bottled, and sent to a grocery store to sit for months on a shelf until someone buys it. Or perhaps it will find its way to your closest lake, and as you dive in, you'll encounter a tiny droplet that has traveled thousands of miles and through several states of being, just to swim next to you.

Name: _______________________________________ Date: ___________________________

1. What is the water droplet made of?

A oxygen and calcium
B hydrogen and oxygen
C lithium and oxygen
D sodium and hydrogen

2. Which of the following states of water are described in the passage?

A liquid, gas, and ice
B liquid and gas only
C liquid and ice only
D gas only

3. The amount of heat energy in the water droplet determines whether the water droplet can transform from a liquid to a gas. Which evidence from the text supports this statement?

A The water droplet loses its salt particles when it evaporates into the air.
B The water droplet gains more and more energy as the liquid water is heated.
C The water droplets bang against each other when they have a lot of heat energy.
D The water droplet evaporates when it has gained enough heat to transform from a liquid to a gas.

4. Where in the ocean does the water droplet need to be located in order to evaporate?

A inside a deep-sea dweller
B in the middle of the ocean
C on the surface of the ocean
D at the bottom of the ocean

5. What is this passage mainly about?

A how water crystallizes
B the different states of water
C the way water evaporates
D how water moves down a mountain

6. Read the following sentences: "And as it gets colder, the droplet of water loses more and more of its energy. It stops bouncing until it slows down **dramatically** and collides with other drops of water."

What does the word "**dramatically**" tell us about the way the water droplet slows down?

A It takes a long time for the water droplet to slow down.
B The water droplet doesn't slow down at all.
C The water droplet barely slows down.
D The water droplet slows down a lot.

7. Choose the answer that best completes the sentence below.

The crystallized water droplet must melt __________ it can trickle down the mountain.

A although
B after
C before
D never

8. How does the water droplet change throughout the passage?

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9. The author writes that the water droplet has evaporated. What does "evaporated" mean?

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10. How does heat affect a water droplet's state of matter? Support your answer with evidence from the passage.

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