

Name: _____

Date: _____

Dalton's Investigations

In our last lesson, we came up with a new idea that might help us explain something about the gas that appeared when our bath bomb was put into water. This idea led us to wonder whether you can take different substances that are made of different kinds of particles and dismantle or put together those particles to make a new particle that is a new substance.

John Dalton was a retired school teacher who investigated these questions in the early 1800s. In his early research, he was first trying to figure out how weather worked. To do this, he took lots of measurements of the air where he lived. To study the air higher up, he climbed to the top of mountains and collected measurements of the air there.

At the time he did this, scientists knew air was a mixture of different gases. Dalton's investigations into air helped him determine more about what the properties of gases were. He isolated and identified four distinct gases in the air around us: water vapor, oxygen, nitrogen, and carbon dioxide. At first, he assumed each was made of the same type of particle throughout. Over time, however, Dalton began to wonder whether each gas he isolated was really made of the same type of particle throughout or if a gas could be separated into other types of particles. To investigate this, he tried heating different combinations of gases and also tried heating other substances to see how heat affected those substances and gases.

He conducted some of these experiments on water. When he heated liquid water, it caused gas bubbles to appear in the water, which then rose to the surface.

A few years before this, other scientists had experimented with adding energy to water in a different way. They used a battery to run electricity through water. These scientists found that running electricity through water also caused gas bubbles to appear in the water and rise to the surface.

In both cases, adding energy to water caused gas bubbles to appear. But what exactly was in those gas bubbles? Scientists had different ideas about that. They wondered:

- *Was the gas in the bubbles produced from both the application of heat and the application of electricity the same substance?*
- *What substance was in those gas bubbles? Was it water or was it something else?*

What do you predict? _____

If we did both of these experiments ourselves, and captured the gas that appeared, what are some tests you think we could do to that gas to help us answer these questions?
