

**** Home Lab ** A Watched Pot Never Boils (?)**

Name: _____

Do the following experiment with one (or both) of your parents (or guardians). *For full credit*, have him/her/them sign it below to confirm that they worked with you from beginning to end.

Signature of Parent(s)/Guardian(s): _____

Contrary to the old expression, it turns out that a watched pot will eventually boil, and a lot of interesting observations can be made while it does!

Procedure: Each of you will need a separate sheet of paper with your name at the top and something to write with and some surface near the stove where it will be safe to write. Take a medium sized sauce pan (metal if possible) and place cold tap water in it to a depth of 7 cm. On your sheet of paper, write down your prediction for how many minutes it will take for the water to reach a full “rolling” boil over maximum heat. Now place it on a stove top on the highest possible setting. Record the precise time the stove was turned on: _____

As the water is heating, you and your parent/guardian should now start making your own, **separate**, observations. As you write down each observation, also record the precise time that the observation was made. For example: “5:16 -- water started turning blue!” Don’t share your observations w/each other yet... consider this like a competition to see which of you is more observant! And don’t forget to use all your senses.

When the water has reached a full rolling boil, and no new observations can be made, record the precise time: _____. Then turn the stove off and allow the water to cool (or dump in some Ramen noodles and have a little snack!) Compare your observation to the ones your parent/guardian made. Did they observe things you didn’t?

Now attach both observation sheets to this page, then work together to answer the questions below. Don’t worry about whether you are right or wrong, just do your best. Discuss your answers.

Questions:

1. What is the normal boiling point of water... a) ...in °F? _____ b) ...in °C? _____ c) ...in K? _____

2. Consider the boiling point of water in Miami.
Compared to that, would water’s boiling point be higher, lower, or the same...

- a) ...in Death Valley, Calif.? _____
- b) ...in outer space? _____
- c) ...in St. Louis? _____
- d) ...in Denver? _____

3. As a pot of water continues to boil, what happens to the temperature: does it increase, decrease, or remain the same? _____

4. When water is boiling, think about what, precisely, that is inside the bubbles...

What substance ? _____

What phase (solid, liquid, gas)? _____

5. Above a pot of boiling water, one can see clouds of steam. What precisely is that steam made up of? What **substance** and what **phase** (state of matter)? _____

6. Would the boiling point of salt water be higher, lower, or the same as regular water? _____

7. Would it ever be possible to have boiling ice water? _____ Explain: _____

8. As you probably are aware, water is made up of molecules (H_2O) that are very small - smaller than the molecules of almost any other substance. Water, however, has a very high boiling point - hundreds of degrees higher than most other substances of its same molecular size! Why do you suppose this is? _____

9. a) How does a pressure cooker work to cook foods faster? _____

b) Why are foods cooked in a pressure cooker considered better for you? _____

Pertaining to the observations you made:

10. Long before the water started boiling, you probably noticed small bubbles forming and floating to the surface. What do you think they were made up of? (hint: they were *NOT* H_2O) _____
What do you think caused them to form? _____

11. When the water got even hotter, you probably observed much larger bubbles forming, and then quickly collapsing. What do you think caused this strange behavior? _____

Now, visit the link provided in Schoology (it can be found in the description of this assignment) regarding "Evaporation And Boiling", read over the information, and see if you can go back and answer any of the questions more thoroughly.

Staple observation sheets to this lab, and have it ready to be turned in on the day indicated on the assignment sheet.