**Assessment of teachers’ knowledge and application of computational thinking.**

***Form A.***

1. *Please read the vignette below and use it to answer the questions here and the ones that follow the vignette.*
   1. *Identify where, if at all, each of the following data practices is evident in the vignette by highlighting a section of text and explaining how it is a data practice in a comment* 
      * 1. *creating data*
        2. *collecting data*
        3. *manipulating data*
        4. *visualizing data*
        5. *analyzing data*
   2. *Identify where, if at all, each of the following computational thinking practices is evident in the vignette by highlighting a section of text and explaining how it is computational thinking in a comment (there may be overlap with the data practices):*
      * 1. *decomposition*
        2. *pattern-finding*
        3. *abstraction*
        4. *algorithmic thinking*
        5. *automation*

In your science class, Paula is going to conduct an investigation to identify an unknown material using the property of density. In the investigation, Paula is given 100 mL of an unknown liquid in a beaker, a graduated cylinder, an electronic balance, and a list of 20 different material names with known densities. Paula knows the following two things when she begins the investigation: (a) materials have unique densities, regardless of the amount of material, the density they have are the same, and (b) to calculate density, she must find the volume and mass. Instead of only finding the mass of the 100mL of liquid given to her, Paula is going to measure a number of different amounts of the liquid and plot the resulting data points on a volume (vertical axis) versus mass (horizontal axis) graph. Paula will then calculate the slope of the graph to find the density.

Paula masses the empty graduated cylinder and records it. She then pours 10 mL of the unknown liquid into the graduated cylinder and masses the liquid and the cylinder. She records this mass and then subtracts the mass of the empty cylinder to find the mass of the liquid only and records the remaining mass. Paula then plots the point (10mL, mass measure) on the graph using Excel software. She repeats this process for 20mL, 35mL, 42mL, 55mL, 78 mL and finally 100mL. She looks at the graph and notices that the points from the 55mL and 78mL measurements are not in the same alignment as the rest of the points. She then notices that she forgot to subtract the mass of the graduated cylinder from the mass of the liquid in the graduated cylinder for these points. She does so and the points look like they are more in line with the other data points.

Paula then calculates the best fit line from her data points using Excel and records its slope. She compares her calculation for the density of the unknown liquid with the list she was given. Her value for density is closer to isopropyl alcohol than the other material, so she concludes that her unknown liquid was isopropyl alcohol.

# c. Explain specifically how you would promote each of the computational thinking practices in the lesson above.  If the vignette itself doesn’t provide a context for a specific practice, explain how you would incorporate it into the lesson in your own way.

(Type here)

d. Are there any opportunities not stated in the vignette above that could enhance student learning about computational thinking during data practices?

(Type here)

***Form B.***

1. *Please read the vignette below and use it to answer the questions here and the ones that follow the vignette.*
   1. *Identify where, if at all, each of the following data practices is evident in the vignette by highlighting a section of text and explaining how it is a data practice in a comment* 
      * 1. *creating data*
        2. *collecting data*
        3. *manipulating data*
        4. *visualizing data*
        5. *analyzing data*
   2. *Identify where, if at all, each of the following computational thinking practices is evident in the vignette by highlighting a section of text and explaining how it is computational thinking in a comment (there may be overlap with the data practices):*
      * 1. *decomposition*
        2. *pattern-finding*
        3. *abstraction*
        4. *algorithmic thinking*
        5. *automation*

In your science class, Edwin is going to conduct an investigation to determine the environmental conditions that lead to the greatest number of germinated mung bean seeds. In the investigation, Edwin is given 120 mung bean seeds, paper towels, zippered plastic bags, jars, water, and light sources. Edwin knows that water has something to do with the sprouting process, but he is not sure how much water is involved. He thinks about the possible conditions that he can produce for the beans in 2 days and proceeds with the following plan.

Edwin takes 60 mung bean seeds and soaks them overnight. He allows the other 60 mung beans to stay dry overnight. In the morning, Edwin drains the water from the soaked mung beans and divides these 60 beans into 6 piles of 10 beans. He also divides up the 60 unsoaked beans into 6 piles of 10 beans.  He takes 2 jars of 10 soaked beans and soaks them in water again. He does the same with 2 jars of 10 unsoaked beans. He places one jar of previously soaked beans and one jar of unsoaked beans in the dark and one of each in the light to sit for 24 hours.

He then prepares 2 sets of 10 soaked beans and 2 sets of 10 unsoaked beans in rolled up wet paper towels and places them in jars. From the paper towel prepared jars, he places one jar of previously soaked beans and one jar of unsoaked beans in the dark and one of each in the light to sit for 24 hours. He prepares 2 sets of 10 soaked beans and 2 sets of 10 unsoaked beans in dry jars. From the dry jars, he places one jar of previously soaked beans and one jar of unsoaked beans in the dark and one of each in the light to sit for 24 hours.

After 24 hours pass, he counts out the number of beans that have germinated from each of the 12 conditions and records the number of germinated seeds in an Excel spreadsheet. He performs the same procedures for a total of three trials of the 12 conditions. He compares the resulting number of germinated seeds for the three trials from each condition and notices that the beans that soaked overnight and were placed in the dark underwater had three very different numbers, so he performs this condition again. The second time, his numbers were similar.

He then finds the average and range of the numbers and plots them on a box and whisker plot. He notices that the soaked beans placed in the dark with the paper towel had the highest yield of germinated seeds and concludes that soaking mung beans and then placing them in a wet paper towel in the dark is the condition that yields the highest germination.

# c. Explain specifically how you would promote each of the computational thinking practices in the vignette above.  If the vignette itself doesn’t provide a context for a specific practice, explain how you would incorporate it into the lesson in your own way.

(Type here)

d. Are there any opportunities not stated in the vignette above that could enhance student learning about computational thinking during data practices?

(Type here)