

SCIENCE 8 – DESIGNING EXPERIMENTS

WRITTEN ASSESSMENT – BLUE

QUESTION #1:

A student is trying to determine how the amount of salt dissolved in water affects the boiling point of the water. Salt has a limited solubility, which means that only so much salt can be dissolved in water before it will start piling up without dissolving. When no more salt has dissolved, we say that the solution has reached its “saturation point.”

The student dissolves 10 grams of salt in 100 ml of water. The student then tries to dissolve 20 grams of salt in another beaker that also has 100 ml of water. This time, the solution reaches its saturation point and some of the salt will not dissolve, being left as a solid on the bottom of the beaker. The student was adding salt a little bit at a time, so he knows that somewhere between 15 and 20 grams of salt successfully dissolved before the additional salt started to pile up.

The student heats up each beaker and finds that the solution with 10 grams of dissolved salt boils at a temperature of 100C while the beaker with more salt present boils at a temperature of 98C. After conducting 5 trials, all results were consistent – the beaker with more salt present boiled at a lower temperature. The student made the following conclusion: the more salt is dissolved in water, the lower will be the boiling point of the solution.

Is this a valid conclusion when you consider the requirements for valid experimental design? Explain.

QUESTION #2:

Experimental Question: How is the strength of a paper towel affected by how wet it is?

Independent Variable: _____

Dependent Variable: _____

Standards:

Procedures:

Data Table:

SCIENCE 8 – DESIGNING EXPERIMENTS

WRITTEN ASSESSMENT – GREEN

QUESTION #1:

A student selects four different wrappers (foil, plastic wrap, paper, and cardboard) to use to store a chocolate bar. When the chocolate bars are wrapped in the different materials, the student places them out in full sun for ten minutes. Two of the chocolate bars are placed on the grass, one is placed on black asphalt, and another is placed in full sun but on the stone walkway.

After ten minutes, the student discovers that the chocolate bar placed on the stone walkway melted the least. After doing ten trials, all trials indicated that the chocolate bar on the stone walkway had the wrapper that best prevented the chocolate bar from melting.

There are at least two independent variables in this design. What are they?

What is wrong with student making this conclusion from the data he/she collected?

QUESTION #2:

Experimental Question: How does the amount of fertilizer affect the number of flowers a plant produces?

Independent Variable: _____

Dependent Variable: _____

Standards:

Procedures:

Data Table: