Name _____ Date _____ Period _____

Scientific Method Practice

1. Indicate whether the following statements are observations (O) or inferences (I) about a lighted candle.

____ a. There is a flame flickering at the top of the wick.

____ b. The wax is combining with oxygen in the air to produce the flame.

____ c. The candle contains a pine-scented perfume that produces an aroma.

____ d. The wick is made of cotton.

____ e. The black smoke that occasionally rises from the flame is mainly carbon.

____ f. A hot fluid rolled down the outside of the candle and solidified at the bottom.

____ g. Carbon dioxide is formed because the candle is burning.

2. Identify the following statements as a scientific theory (T) or a hypothesis (H)

____ a. The cell is the fundamental unit of life.

____ b. If the ramp is taller, then the marble will roll at a greater speed.

____ c. If salt is added to ice, then the temperature will decrease.

____ d. The solar system is sun-centered.

3. Minnie placed 1 cup of sand (S), potting soil, (P), and a mixture of sand and soil (M) into separate containers. In each of the containers she placed a thermometer so that the bulb was 2.5 cm below the surface. She placed the 3 containers under identical heat lamps for an hour. The original temperature of each container was 20°C. After heating the jars in three separate trials, the temperatures of the containers were: S = 28°C, 27°C, 26°C; P = 33°C, 29°C, 31°C; M = 29°C, 29°C, 27.5°C.

Hypothesis: _____

Manipulated variable _____

Responding variable _____

Controls _____

4. Jon wanted to know if adding peat moss to sand would affect its ability to hold water. He put 200 mL of pure sand into container A. He put a mixture of 80% sand and 20% peat moss into container B. He put a mixture of 60% sand and 40% peat moss into container C. He put a mixture of 40% sand and 60% peat moss into container D. He added water to each container and measured the amount of water the contents would absorb. He dried the sand and peat moss and repeated the experiment 5 times. He collected the following data.

Composition of Mixture	Water Holding Capacity (mL)				
100% sand	74	80	70	71	74
60% sand, 40% peat moss	86	88	90	92	94
40% sand, 60% peat moss	110	116	104	108	112
80% sand, 20% peat moss	84	82	86	82	84

Manipulated variable _____

Responding variable _____

Controls _____

Conclusion _____

Go to the back.

5. A student was helping to make hard boiled eggs and noticed that some yolks were grey on the outside and some yolks were yellow. The student conducted an experiment to determine if the colors were due to how fast the egg cooled down. The student cooked 6 eggs and let them cool slowly to room temperature before peeling. All of these eggs had grey yolks. The student then cooked 6 more eggs and cooled them down rapidly by putting them in ice water. All of these eggs had yellow yolks.

Hypothesis _____

Manipulated variable _____

Responding variable _____

Controls _____

Conclusion: _____

5. The amount of pollution produced by cars was measured for cars based on the age of the car. All cars used the same gasoline and were driven under similar conditions.

Hypothesis _____

Manipulated variable _____

Responding variable _____

Controls _____

6. A student wanted to know which headache medicine worked the fastest. The student tested her family of 8. Over the course of a month each family member had two headaches. One group of four took only aspirin tablets and the other group of four took only powdered aspirin. The group taking the powdered aspirin generally felt better in 20 minutes while the group taking the aspirin tablets took 35 minutes.

Manipulated variable _____

Responding variable _____

Controls _____

Conclusion: _____

7. One of the common substances of our world, sulfur (S), is commercially obtained when petroleum and metal ore are refined. The sulfur is often in the form of a fine pale yellow powder. One of the metals obtained from certain ores is the reddish brown metal called copper (Cu). If you mix a little copper and sulfur in a test tube, enclose with a balloon, and heat in the Bunsen burner, a chemical reaction occurs producing a compound that has unique properties. Here are the results from the experiment:

mass of test tube and balloon	20.484 g
mass of tube, balloon, Cu & S before heating	23.440 g
mass of tube, balloon, & products after heating	23.386 g

a. What was the mass of copper and sulfur before the reaction? _____

b. What was the mass of the product after the reaction? _____

c . What was the calculated change in mass? _____

d. Calculate difference in the mass of Cu & S before heating vs. mass of _____
Cu & S after heating. Is the difference between the mass of Cu & S before heating and after heating big or small? _____
Variations in measurement can be due to equipment, gas escaping, or other random error. What do you think caused the differences?

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