Scientific Method Quiz

Name: _____

Question 1

Consider the following scenario (don't take it too seriously, I just made it up on the spot):

A scientist at CERN discovers a new class of particles, which always seem to repel each other. Over the course of many experiments she measures the repulsive force as a funciton of particle mass and interaction distance, producing the equation $F = \propto \frac{m^2}{\sqrt{d}}$. She suggests that this force is caused by electrostatic interactions, but later experiments show that the particles are charge-neutral. Another scientist suggests that this force is caused by interactions with a new type of lepton, and later experiments show results consistent with this idea. After many years and many corroborating experiments, the standard physical model for subatomic particles is updated to include these new particles.

Match each element of this story on the left with the correct step of the scientific method from the right. Note there may be more than one story element for each step.

- ○ New particles repel each other
- ○ The equation $F \propto \frac{m^2}{\sqrt{d}}$
- ○ Electrostatic interactions are causing the force
- ○ Particles are shown to be charge-neutral
- ○ New lepton interactions are causing the force
- ○ Later results match the lepton idea
- ○ Revised standard model for particles

- ○ Observation
- ○ Hypothesis
- ○ Experiment/Results
- ○ Theory
- ○ Law

Question 2

Describe in your own words what is meant by the concept of *falsifiability*. If you want, include an example of an unfalsifiable hypothesis, either from history or of your own invention.

The Waves

By Virginia Woolf

I see nothing.

We may sink and settle
on the waves.
The sea will drum
in my ears.

The white petals
will be darkened
with sea water.

They will float
for a moment
and then sink.

Rolling over
the waves will
shoulder me under.

Everything falls in a
tremendous shower,
dissolving me.