

Part I: Vocabulary

Directions: Using the terms below, match the definition with the correct term

Fact Inference Qualitative
 Quantitative Science Scientific method

1. **Quantitative** observations that are measurements
2. **Fact** a phenomenon that competent observers can agree on
3. **Qualitative** an observation that describes
4. **Science** organized common sense and findings by humans about nature
5. **Scientific Method** a way to organize, investigate, and apply knowledge
6. **Inference** an explanation of an observation

Part II: Concepts

1. Using the words in the box, circle those words that represent what science "is"

Self-correcting	common sense	technology	nature
Organized	rational	verifiable	supernatural
mathematics	Continuous	repeatable	natural world
peer review	observable	surveys	chaotic

2. Using the picture, provide a qualitative observation, a quantitative observation, and an inference.



Qualitative: The man is has a stain on his shirt. (anything that describes the picture)

Quantitative: The man is holding one coffee cup. (anything about the picture that has a # in it)

Inference: The man has a stain on his shirt, so **he must have spilled his coffee.**

(The inference must explain the observation, i.e. why he has the stain!)

3. List the steps of the scientific method.

1. **Question**
2. **Make your Hypothesis (an educated guess) – this is always done before you experiment**
3. **Predict outcomes**
4. **Experiment**
5. **Develop Rules / Draw Conclusions – This is always done at the end**

4. Are the steps of the scientific method always done in order, why or why not?

No, Most scientific thinking involves continuous observations, questions, multiple hypotheses, and more Observations The process is always on going and often times a cycle that can be reversed at any point. Science seldom “concludes” and never “proves.”

5. Is the statement an hypothesis, a law, or a theory? Explain why?

Statement: Last night, freezing rain accumulated in the Hanover, PA area, giving a thick coating of ice on the ground 2.5 cm deep. Tom’s mom thinks that the ice formation on the roads and surrounding areas will cause local schools to cancel school for the remainder of the day.

Hypothesis: Tom’s mom is making an educated guess on what will happen due to the ice.

6. Is the statement an hypothesis, a law, or a theory? Explain why?

Statement: In 1766 a scientist by the name of John Dalton conducted numerous experiments on everyday gases. While collecting and experimenting on these gases he found that each gas atom had its own characteristics that was different than any other gas atom. He also explained that two atoms of the same element are identical to each other.

Theory: Not only did Dalton conduct numerous experiments, from those experiments, he was able to explain a relationship. The key with theories are that they explain relationships or the “Why’s” of science.

7. Is the statement an hypothesis, a law, or a theory? Explain why?

Statement: Newton stated that an object in motion will stay in motion unless an unbalanced outside force acts upon it.

Law: The concept has been tested over and over again and to this point there is nothing to refute the statement. It is not a theory because it does not explain.