Nature of Science

1. Science assumes that the world can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, given enough \_\_\_\_\_\_\_\_\_\_\_

and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. All ideas in science are constantly being \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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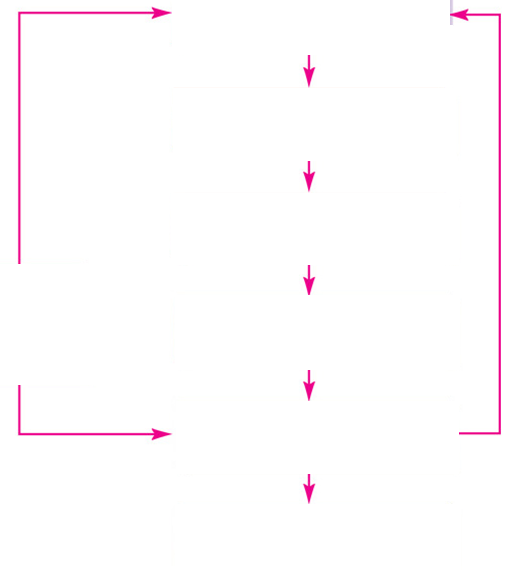
1. Define **hypothesis -**
2. Define **theory -**
3. Scientific discoveries must be **reproducible.** What does this mean?
4. Define **pseudoscience –**
5. Spontaneous generation is an example of pseudoscience. Give two reasons why.
6. What was the goal of alchemy? Why did the study of chemistry advance so little during this time?
7. Why is the study of astrology not really considered scientific?

**Scientific Method**

1. All scientific studies follow the same sequence of steps, called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Fill in each of the parts of the scientific method from the diagram below.
2. Fill in the steps of the scientific method.



1. Define **observation –** 
   1. What observation did Dr. Jenner make when studying smallpox?
2. Define **hypothesis –** 
   1. Can hypotheses be proven false?
   2. What was Dr. Jenner’s hypothesis?
3. Define **experiment –** 
   1. A controlled experiment will attempt to test a \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. There are two groups in a controlled experiment. Define each:
   1. **Experimental Group:**
   2. **Control Group:**
5. Describe the control and experimental groups in Dr. Jenner’s experiment.

1. Define **conclusion -**
2. What is the purpose of communicating the results of an experiment?
   1. What happened when Dr. Jenner communicated his results to the Royal Society?

**Error and Bias**

1. Define **probability -** 
   1. How is the issue of probability countered?
   2. What did Dr. Jenner do to answer his critics?
2. What does it mean to conduct a **natural** experiment?
   1. Give an advantage of this kind of experiment.
   2. Give a disadvantage of this kind of experiment.
3. Define **bias -**
4. Two types of experimental design exist to combat bias. Describe each one.
   1. **Blind:**
   2. **Double-Blind:**
5. Scientific fraud is always detected, eventually, due to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* 1. What damage is caused by scientific fraud?

1. The MMR Vaccine and Autism study published by Dr. Wakefield is considered an example of scientific fraud. What effects were caused worldwide by it?