

# THE NATURE OF SCIENCE

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## Assumptions of Science

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- 1.
- 2.
- 3.
- 4.

## The Practices of a Scientist

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### 1. Asking questions

- ▶ Scientific questions are ultimately fueled by \_\_\_\_\_ about the world
- ▶ There is no single \_\_\_\_\_. Scientists use \_\_\_\_\_ to uncover the true nature of the world.
  - ▶ Scientific questions focus on \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
- ▶ Scientific questions are different from other types of questions because their answers must be supported by \_\_\_\_\_.

- Empirical evidence -

### 2. Modeling

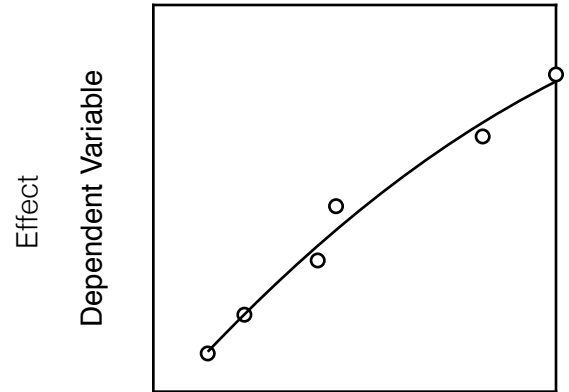
- ▶ Models are \_\_\_\_\_ of parts of \_\_\_\_\_.
- ▶ Models can include \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
- ▶ All models have \_\_\_\_\_ and \_\_\_\_\_.

- ▶ Scientific models are based on \_\_\_\_\_. When new evidence is uncovered that the model cannot explain, the model is \_\_\_\_\_.
- ▶ The goal of modeling is to make \_\_\_\_\_.

### 3. Experiment

▶ When scientists want to answer questions, they develop \_\_\_\_\_. Experiments are procedures to \_\_\_\_\_

- Observation -
- Inference -
- Independent Variable -
- Dependent Variable -
- Control -



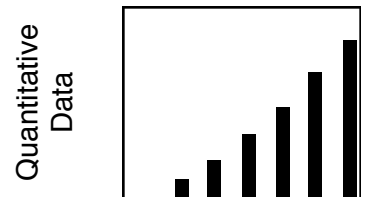
- ▶ Control groups are \_\_\_\_\_ to experimental groups, except for one single \_\_\_\_\_.
- ▶ Control groups are insurance against \_\_\_\_\_ or \_\_\_\_\_.

### 4. Analyzing Data

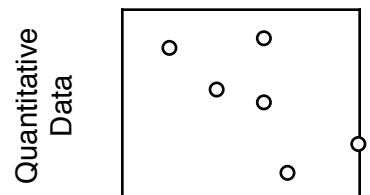
▶ The products of experiment are \_\_\_\_\_. Once collected, data are \_\_\_\_\_ to reveal patterns.

▶ Limitations of data, such as \_\_\_\_\_, and \_\_\_\_\_ must also be considered

- Qualitative Data -
  - examples:
- Quantitative Data -
  - examples:



Qualitative Data



Quantitative Data

5. Apply Mathematics

- ▶ Mathematics is a tool for \_\_\_\_\_ data and \_\_\_\_\_.
- ▶ Math is also used in science to \_\_\_\_\_ and make \_\_\_\_\_.
- ▶ Mathematics involves computational thinking, which uses \_\_\_\_\_ and \_\_\_\_\_ to create computer simulations.
  - ▶ Computer simulations of natural and designed systems have greatly enhanced our ability to \_\_\_\_\_ and \_\_\_\_\_.

6. Construct Explanations

- ▶ Explanations include \_\_\_\_\_. Claims are made \_\_\_\_\_, and are supported by evidence.
- ▶ \_\_\_\_\_ become \_\_\_\_\_ when they are used to \_\_\_\_\_.
- Hypothesis -
- Theory -
  - ▶ The ultimate test of 'truth' in science is \_\_\_\_\_.
  - ▶ The measure of any theory or explanation is its \_\_\_\_\_.

7. Argue from Evidence

- ▶ Argumentation is a process of \_\_\_\_\_. The goal is to \_\_\_\_\_.
- ▶ No explanation in science is exempt from \_\_\_\_\_.

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