

The Nature of Science
Notes 1.1 Thinking Like a Scientist

Scientists use many skills to study the world; these skills include observing, inferring, classifying and making models.

Observing

When you are making observations, you are using one or more of your five senses; hearing, sight, smelling, tasting, and touch.

Two types of observations...

1) Quantitative observations

This type of observation is associated with numbers.

Example: Taking a temperature reading

2) Qualitative observations

This type of observation uses descriptions that cannot be expressed with numbers.

Example: The leaf has a rough surface.

Inferring

When you make an inference, you are explaining or interpreting what you have observed. These are not wild guesses, they are made through reasoning from your past experiences.

An inference you make can be true or false.

Example of a true inference...

Observation: The soil in the pot is dry and the plant is wilted.

Inference: The plant needs to be watered.

Example of a false inference...

Observation: A student completes their math lesson in class.

Inference: They won't have any math homework.

Reality: They need to read the next lesson and complete the practice problems.

Predicting

When you are predicting, you are forecasting what will happen in the future based on evidence or past experiences.

Example: Mr. Hindman is predicting that several unnamed students are making many spelling errors today, because they are writing these notes as fast as possible instead of doing nice, neat work.

Classifying

When you classify things, you are grouping them together based on how they are alike.

Example: The students in this room could be classified by their gender. The girls could be separated from the boys.

Making Models

A model is a representation of a real object.

Examples: A globe is a model of the Earth.

Sim City is a computer model of a possible city.

Scientists use models to study things that are complex or things that cannot be observed directly.

Scientific Attitudes

The process of science is used to explore and study the natural world. Successful scientists usually have several key traits:

- 1) They are creative. They come up with inventive solutions or create new things.
- 2) They are open minded and skeptical. They accept new and different ideas, as well as having an attitude of doubt.
- 3) They show curiosity. They are eager to learn more about what they are studying, even if they have problems.
- 4) They are honest. They are truthful when publishing their results so other scientists can learn from them.