

Scientific Skills

We learn about the world around us through **OBSERVATION** that involves one or more of the senses—sight, smell, touch, hearing, and taste—to obtain information about objects or events. Good observational skills are paramount in Science. There are two types of observation:

- **QUANTITATIVE**—observations involving measurements;
- **QUALITATIVE**—observations of properties such as texture (comparing to known).

When observing, always:

1. Time and date observations;
2. List what is to be observed;
3. Record observations at the time they were made;
4. Record both quantitative and qualitative observations.

~~~ *Other Skills that you need to Know and Understand* ~~~

**CLASSIFYING**—group objects or events according to some method or common property

**COLLECTING DATA**—gathering information in a systematic way

**COMMUNICATING**—use words, pictures, and diagrams to share information

**CONTROL GROUP**—an unaffected sample that is compared to experimental samples

**CONTROLLING VARIABLES**—change one factor that may affect the outcome of an event while holding other factors constant

**DEFINING OPERATIONALLY**—state information about an object or event based on use; a working definition based on action and/or procedure

**DEMONSTRATE**—to show by evidence or reasoning; to explain by use of example

**DESCRIBE**—give an account in words; part of **communicating**

**ESTIMATING**—use judgment to state how much, how long, how many

**EXPERIMENT**—a design to solve a problem or answer a question; use of a control group and adequate sample sizes should be used; planning and carrying out data gathering procedures

**HYPOTHESIZING**—make an educated guess as to a solution for a problem; generalizing from limited observations, inferences, or reported findings to a larger population and testing the generalization

**IDENTIFY**—to associate with a group; specifically state what the investigator is attempting to find out

**INFERRING**—make a reasonable guess to explain observed events; creating plausible explanations for observations

**INTERPRETING DATA**—explain information found in graphs, tables, or diagrams; to clarify meaning by explanation and/or restating; identify patterns and create meaning for data

**MAKING A GRAPH**—use diagrams such as line, bar, or pie graphs to show quantities

**MAKING MODELS**—using observations, inferences and hypotheses to construct real or mental representations to explain ideas, objects, or events

**MANIPULATE**—to control or operate; “hands-on”

**MEASURING**—using metric units to describe objects or observations; compare unknown to known dimensions

**PREDICTING**—form an idea or a result after studying the evidence; forecasting future observations based on current/recorded observations/evidence

**QUESTIONING**—expressing curiosity, inferences, and hypotheses in the form of testable questions

**SPACE/TIME RELATIONS**—identifying and describing the relative position and motion of objects and changes in these objects through time

**USING NUMBERS**—applying the concept of number and number operations while engaging science (math)