

## **Glossary of Scientific Terms**

**Apply:** The skill of selecting and using information in other situations or problems.

**Challenges:** Problems that can be solved using science concepts and principles, inquiry, and technology.

**Claim:** A valid conclusion of a scientific investigation.

**Common:** Refers to materials and processes most students have experienced.

**Concept:** An abstract, universal idea of phenomena or relationships between phenomena in the natural world.

**Confidence:** Assurance that the conclusions of an investigation are reliable and valid.

**Conservation:** A law that states that matter and/or energy in a closed system are constant.

**Conservation of Energy:** Energy cannot be created or destroyed — only changed from one form to another.

**Conservation of Mass:** Mass can be neither created nor destroyed during a chemical reaction — only changed from one form to another.

**Constraints:** The limitations imposed on possible solutions to human problems or challenges.

**Constructed world:** Systems or subsystems of the natural world built entirely or in part by people.

**Control:** A standard condition against which other conditions can be compared in a scientific experiment.

**Controlled variable:** The conditions that are kept the same in a scientific investigation.

**Correlational:** A type of scientific investigation in which the causality between variables cannot be directly inferred.

**Describe:** The skill of developing a detailed picture, image, or characterization using diagrams and/or words, written or aural.

**Design:** The application of scientific concepts and principles and the inquiry process to the solution of human problems that regularly provide tools to further investigate the natural world.

**Discriminate:** The skill of distinguishing accurately between and among evidence.

**e.g.:** Refers to specific examples of Evidence of Learning

**Effect:** The result or consequence of an action, influence, or causal agent.

**Empirical:** Measurements based on actual observations or experience, rather than on theory.

**Error:** Mistakes of perception, measurement, or process during an investigation; an incorrect result or discrepancy.

**Established:** A proven, or demonstrated, inference or theory.

**Evaluate:** The skill of collecting and examining data to make judgments and appraisals using established evidence.

**Evidence:** Observations, measurements or data collected through established and recognized scientific processes.

**Evolution:** A series of gradual or rapid changes, some regular, some random, that account for the present form and function of phenomena both living and nonliving.

**Examine:** The skill of using a scientific method of observation to explore, test, or inquire about a theory, hypothesis, inference, or conclusion.

**Experiment:** An investigation under which the conditions for a phenomenon to occur are artificial, or arranged beforehand by the observer.

**Explain:** The skill of making a theory, hypothesis, inference, or conclusion plain and comprehensible — includes supporting details with an example.

**Explain how:** The skill of making a process plain and comprehensible — includes supporting details with an example.

**Explain that:** The skill of making plain and comprehensible a theory, hypothesis, inference, or conclusion — includes supporting details with an example.

**Feedback mechanism:** The process in which part of the output of a system is returned to its input in order to regulate further output.

**Human problems:** Difficulties for individuals or populations that invite or call for a solution.

**Hypothesis:** A testable explanation for a specific problem or question, based on what has already been learned. A statement usually in an “if, then” format that posits a causal or correlational relationship between variables. The manipulated variable is stated in the “if” statement and represents the possible causal agent. The effect is stated in the “then” phrase and is the responding or measured variable of the investigation.

**Idea:** A general perception, thought, or concept formed by generalization.

**i.e.:** Refers to specific lists in Evidence of Learning that must be included in the GLE.

**Inference:** The skill of arriving at a decision or conclusion by reasoning from known facts; in a scientific investigation, the logic used to establish correlational or causal relationships among variables in the system being investigated.

**Information explosion:** The rapid expansion of knowledge of the natural world, in part brought about by the feedback of new knowledge and new technologies into the scientific, technological, and communication enterprises.

**Information technology:** The branch of technology devoted to (a) the study and application of data and the processing thereof, i.e., the automatic acquisition, storage, manipulation (including transformation), management, movement, control, display, switching, interchange, transmission or reception of data, and (b) the development and use of the hardware, software, firmware, and procedures associated with this processing.

**Input:** The addition of matter, energy, or information to a system; a change of matter or energy in the system; a living organism learning something new.

**Inquiry:** The skill of the investigative process characterized by asking questions of the natural world, developing hypotheses, testing hypotheses by manipulating variables and measuring responding variables, and drawing inferences from data to develop correlations between variables or cause-effect relationships between variables.

**Integrity:** A state of honesty; freedom from corrupting influence, motive, or bias in the collection and interpretation of data and observations; a completeness or totality of the investigative process.

**Interactions:** The influences between variables in a system or between subsystems described as correlational or causal.

**Interpretation:** The display and inferences drawn from data collected during a scientific investigation.

**Investigation:** A multifaceted and organized scientific study of the natural world that involves making observations; asking questions; gathering information

through planned study in the field, laboratory, or research setting; and using tools to gather data that is analyzed to find patterns and is subsequently communicated.

**Law:** An observed regularity of the natural world; a generalization that scientists make from research findings and can use to accurately predict what will happen in many situations.

**Logical plan:** An investigative plan that has coherence among all its attributes, including hypotheses, observations and data to support the hypotheses, and logical inference to support conclusions.

**Manipulated variable:** The factor of a system being investigated that is deliberately changed to determine that factor's relationship to the responding variable.

**Model:** A representation of a system, subsystem, or parts of a system that can be used to predict or demonstrate the operation or qualities of the system.

**Natural world:** The aspect of human experience that is observable and can be empirically verified.

**Observation:** The skill of recognizing and noting some fact or occurrence in the natural world, including the act of measuring.

**Output:** The removal of matter, energy, or information from a system; a change of matter or energy in the system; a living organism produces and excretes a substance.

**Phenomena:** Events or objects occurring in the natural world.

**Prediction:** The skill of extrapolating to a future event or process based on theory, investigation, or experience.

**Principles:** Rules or laws concerning the functioning of systems of the natural world.

**Properties:** The basic or essential attributes shared by all members of a group.

**Proprietary discovery:** Ideas, artifacts, devices, or processes that are patentable.

**Relationship:** The connections between systems, subsystems, or parts of systems described by the concepts and principles of science that may range from correlational to causal (cause-effect).

**Reliability:** An attribute of any investigation that describes the consistency of producing the same observations or data.

**Responding variable:** The factor of a system being investigated that changes in response to the manipulated variable and is measured.

**Science:** The systematized knowledge of the natural world derived from observation, study, and investigation; also the activity of specialists to add to the body of this knowledge.

**Skepticism:** The attitude in scientific thinking that emphasizes that no fact or principle can be known with complete certainty; the tenet that all knowledge is uncertain.

**Solutions:** Artifacts of the scientific design process in response to human problems that can include devices or processes such as environmental impact statements.

**Subsystem:** The subset of inter-related parts within the larger system.

**System:** An assemblage of inter-related parts or conditions through which matter, energy, and information flow.

**Technology:** The application of science to solve practical problems, do something more efficiently, or improve the quality of life.

**Theory:** An integrated, comprehensive explanation of many facts capable of generating hypotheses and testable predictions about the natural world.

**Transfer:** The movement of energy from one location in a system to another system or subsystem.

**Transformation:** The changes in the kind of energy that take place in moving through a system.

**Trials:** Repetitions of data collection protocols in an investigation.

**Validity:** An attribute of an investigation that describes the quality of data produced in an investigation; the investigative question is answered with confidence; insures that the manipulated variable caused the change in the responding or dependent variable.

**Variable:** Any changed or changing factor used to test a hypothesis or prediction in an investigation that could affect the results.