

Science Glossary

Science as a content area has an almost overwhelming amount of vocabulary for students to learn. This document does not attempt to include content vocabulary that would normally appear, and be defined, within a grade-level curriculum. Words such as minerals, energy, photosynthesis, or ecosystem are left to the teacher and the text resources to define at grade-appropriate levels.

What the Glossary does include are two categories of words:

- words that appear in the Science Grade Level Expectations and/or in science assessment items that students should understand and be prepared to use in context [e.g., justify, function, phenomenon, or variable]
- words that have multiple interpretations for which teachers may need clarification about how the word might be used in assessment theory, constants, hypothesis, or reliable]

The purpose of the Science Glossary is to provide information about how these words might be used in assessment, and therefore how they should be used in the classroom. It is not recommended that the glossary become a spelling and vocabulary test for students. Instead, the glossary should be thought of as a resource for you as teachers so that you may use the words with your students deliberately, frequently and consistently, embedding the words in your instruction and in your classroom assessments. Students will not be required to define these terms on state assessments but will be required to comprehend them within the context of the assessment.

An excellent resource for vocabulary development is Robert Marzano's book, Building Background Knowledge for Academic Achievement: Research on What Works in Schools, published by ASCD.

Word	Definition	Sample Item
accurate	correct	Why is an accurate measurement necessary?
advantage	a factor or circumstance that benefits its possessor	Describe an advantage camels have over many other animals that enables them to survive long in the desert.

analyze	to separate something into its parts in order to examine them; to study or examine carefully	Analyze the problem for possible solutions.
apparent	appearing such, but not necessarily so; seeming	What is the cause of the apparent movement of the sun throughout the day?
assess	determine the value, significance, or extent of; appraise	Assess the proposed solution to the erosion problem by identifying one benefit and one drawback.
balance	1. device used to measure mass; it works by balancing an "unknown" with a standard mass that is known 2. a state of equilibrium, as in an ecosystem	1. What is the mass of the beaker shown on the balance? 2. How will the introduction of a new predator affect the balance of organisms in the forest ecosystem?
bar graph	A graph which answers the question: "What is the measurement for each item?" Note: a bar graph is appropriate when each item is has a discrete or categorical value .	Use the data in your data table to construct a bar graph of the experiment's results.
beneficial	providing benefits or advantages	Describe one way a mutation might be beneficial to an organism.
bias	a mental leaning, inclination, or prejudice	Describe one method scientists used to prevent bias in their experiment.
calculate	to ascertain by computation; reckon	Calculate the area of the circle below.
category	a collection of things sharing a common attribute	Be sure to include category labels on the horizontal axis.
characteristic	A feature that helps to identify, tell apart, or describe recognizably; a distinguishing mark or trait.	Identify two characteristics of the plant.

chart	a visual display of information	Examine the chart below and identify the surface with the least friction.
classify	to arrange in classes or categories	Examine the rock in the picture and classify it as igneous or sedimentary. Justify your answer.
composed	to form by continuum, make up	Table salt is composed of which two elements?
compare	to examine the character or qualities of especially in order to discover resemblances or differences	Compare the hand skeleton of the whale and the hand skeleton of the human, describing two ways they are similar.
compass rose	a symbol on a compass or map that is circular with graded points for the directions; also called rose	Use the compass rose to identify where the tree is in relation to the house.
component	one element of a larger system	A hardware component can be a device as small as a transistor.
conclusion	The result or outcome of an act or process.	Use the data table and the graph above to write an appropriate conclusion for this experiment.
conduct	to do, manage, or lead	What equipment will be needed when you conduct your experiment?
confirm	to support or establish the certainty or validity of	Does the data from the experiment confirm Linda's conclusion?
constants [in experimental design]	all factors that remain the same and have a fixed value, for example, <i>amount of light and water</i>	Identify two other variables that will need to be held constant in order for the experiment to be valid.

contrast	Identify the degree of difference	Contrast the physical adaptations of the snowshoe hare compared to the desert hare.
contribute	to give or supply in common with others; to help bring about a result	How did the work of Mendel contribute to our understanding of inheritance?
control	a standard of comparison for checking the results of an experiment	The control in the experiment on the effect of different fertilizers was the group of plants grown with no fertilizer at all.
controlled (experiment)	an investigation that holds all factors the same except for the independent variable; a "fair test"	Why is a controlled experiment essential in determining cause and effect?
construct	to make or form by combining or arranging parts or elements	Identify two materials birds might use to construct a nest.
credible sources	(credible) offering reasonable grounds for being believed; (source) a point of origin or procurement	Of the following list, which is the most credible source for information about global warming:
credit	To bring honor or distinction to	Watson and Crick are given credit for the description of how DNA molecules are formed.
cultural perspectives	a point of view or way of looking at things based on the ideas, skills, arts, tools and way of life of a certain people at a certain time	The cultural perspective of scientists often influences the questions asked or methods used in research.
daily	happening every day	The data was collected daily.
data	the pieces of observable information collected in an investigation	Identify the data that Tom and Susan would need to collect in their experiment.

data table	A chart made of columns and rows for recording information	Construct a data table that could be used to record the data from your experiment.
demonstrate	To present by experiments, examples, or practical application; explain or illustration.	Describe how Kim might demonstrate the effect of friction on the speed of a toy car.
dependent variable	the variable that responds [in an experiment], for example, <i>height of bean plants</i>	Identify the dependent variable in Kim's experiment on the effect of friction on speed.
depend	to be controlled or determined by; to rely upon	Scientists depend on the control of an experiment to ensure they can determine the effect of the experimental variable.
describe	to represent or give an account of in words; to give an account of something by giving details of its characteristics	Describe how Kim might demonstrate the effect of friction on the speed of a toy car.
design constraint	something that limits the design or plan within certain parameters	With the following design constraints, demonstrate how friction affects the motion of an object.
design	1. to conceive or fashion in the mind; invent 2. to formulate a plan for; devise	Design an experiment that would test your hypothesis.
detrimental	causing damage or harm; injurious	Describe one way a mutation might be detrimental to the survival of an organism.
development	1. the act of developing 2. the state of being developed	Describe the development of the frog from an egg to an adult.
devices	pieces of equipment or mechanisms designed to serve special purposes	Identify a device for measuring the weight of an object
diagram	a drawing, plan, or chart that helps explain a thing by showing all its parts, how it is put together, or how it works	Make a diagram to show how a sedimentary rock might form.

differences	Noticeable changes or effects	Describe two differences between the young and the adult Monarch butterfly.
differentiate	to make a distinction between	Differentiate between a carnivore and an herbivore.
digital	of, pertaining to, or using data in the form of numerical digits	Which is easier to read, a digital scale or a balance scale? Explain your reasoning.
discovery	the act or process of discovering; something discovered	The discovery of the mid-Atlantic rift system provided support for the theory of Plate Tectonics.
distinguish	To perceive as being different or distinct; to be aware of a difference between two or more groups or things; to show that two or more groups or things are different from each other	What are two ways scientists distinguish between plants and animals?
enhance	heighten or intensify qualities, powers, value; improve (something already of good quality)	Rosiland Franklin's x-rays of DNA enhanced Watson's and Crick's understanding of DNA.
equal arm balance	an instrument for determining weight, typically by the equilibrium of a bar with a fulcrum	Use the equal arm balance to determine the mass of the object.
equipment	the clothes, machines, tools etc. necessary for a particular kind of work or activity	Name two pieces of equipment that would be necessary to conduct the experiment above.
errors in observation	Incorrect or false knowledge due to the act or noting or recording something	The odd results in Trial 3 could be the result of errors in observation. How do multiple trials help minimize the effects of these kinds of errors?
estimate	to determine roughly the size, extent, or nature of	How do scientists use sampling to estimate the number of hawks in Missouri?
ethical	being in accordance with accepted principles of right and wrong that govern the conduct of a group of people	Did the way the scientists conducted the experiment raise any ethical concerns?

evaluate	to consider or examine something in order to judge its value, quality, importance, extent or condition	Read through Liam's experimental procedure and evaluate whether or not it will produce valid results.
Evidence	Information that helps you figure out whether or not something is true; observable support for an explanation, inference or prediction	Describe two pieces of evidence for the theory of Plate Tectonics.
experiment	a scientific investigation that tests a hypothesis	Write a new question that could be the basis of a scientific experiment.
explanation	Something that explains; a statement made to clarify something and makes it understandable	What is a possible explanation for the unusual results in Trial 3?
extension	an additional part of anything	How do the extensions of a jellyfish help it capture food?
extrapolate	to infer an unknown from something that is known	Students should be able to use their line graph to extrapolate the next data point.
fair test	a test in which everything about the things being tested is equal, except the item being tested	Why is it important that scientists conduct a fair test?
faulty reasoning	forming an imperfect conclusion	People who once believed the Earth was flat were guilty of faulty reasoning.
finite	having bounds; limited	There is a finite amount of fossil fuels on the planet.
formulate	To devise or invent; to express or communicate something carefully or in specific words	Formulate a reasonable hypothesis for the experiment you have designed.
frequency	2. rate of occurrence 3. Physics: a. the number of periods or regularly occurring events of any given kind in a unit of time, usually in one second, b. the number of cycles or completed alternations per unit of time of a wave or oscillation	2. In a hybrid cross, what is the frequency of black-coated guinea pigs to white-coated guinea pigs? 3. Examine the electromagnetic spectrum in the picture and compare the frequency of red visible light and blue visible light.

function	2. what something is used for; "the function of an auger is to bore holes" 3. the actions and activities assigned to or required or expected of a person or group; "the function of a teacher" 7. serve a purpose, role, function; "The table functions as	What is the function of the liver in the human body?
gender	the property of belonging to a certain class such as a person's sex	The father determines the gender of a human.
graduated cylinder	a tall narrow container with a volume scale used especially for measuring liquids	Record the volume shown in the graduated cylinder above.
grid	1. a pattern of regularly spaced horizontal and vertical lines [do we need the others?]	Use the grid below to construct a line graph with the data from the experiment.
hand lens	a lens that makes the item seen through it look larger; magnifying glass	Use the hand lens to make observations of the penny.
horizontal [X] axis	the line along the bottom of a graph on which the scale for the independent variable is placed	Label the horizontal axis.
hypothesis	a prediction about the relationship between the variables that can be tested, for example, <i>If older compost is applied, then plant growth will be increased</i>	Write a reasonable hypothesis for the question you have suggested.
illustrate	give one or more concise examples; provide a visual feature intended to explain	Which pair of organisms above illustrates commensalism?
identify	choose, select, name	Identify the producer in the food chain.
Independent variable	the variable that is purposefully changed by the experimenter, such as <i>age of compost</i>	Identify the independent variable in Kim's experiment on the effect of friction on speed.

Individual	Existing as a distinct entity	Identify the individual simple machine in the complex machines above.
infer	To conclude from evidence or premises. To reason from circumstance	Examine the jaw and teeth of this animal. What can you infer about the food the animal eats?
influence	to affect the nature, development or condition of; modify	Explain how choosing a grass plot to study by something other than random selection could influence the results.
interact	act reciprocally: act on each other	How do the fox and the wolf interact within their habitat?
interpret	to explain the meaning of; to understand in one's own way	Interpret the data in the data table above.
intrinsic	inherent, relating to the essential nature of a thing	All metals have the intrinsic ability to bend.
investigation	A detailed inquiry or systematic examination	Write a testable question that could be the basis of a new investigation.
justify	to demonstrate or prove to be just, right, or valid Synonym: warrant	Do you think recycling is necessary? Justify your opinion.
key	a legend that explains the coding used to distinguish between graphic representations of multiple variables on a single graph	Be sure to provide a key for your graph.
label	Noun: 3. a word or phrase indicating that what follows belongs in a particular category or classification [we need the definition for a verb also] Verb: 1. To attach a label to 2. To identify or designate with a label	Draw arrows from the labels to the simple machines they match. Or Label the reproductive parts of the flower in the diagram.
law	A statement describing a relationship observed to be invariable between or among phenomena for all cases in which the specific conditions are met: <i>the law of gravity</i>	Newton's laws of motion let us predict how objects will behave.

line graph	a graph used to show change over time with points connected by line segments	Use the data in the data table to construct a line graph for the experiment Natika conducted.
line of best fit	a smooth line drawn [on a graph] so that the totals of the distances between the line and the points above and below it are equal	Students are allowed to use an appropriate line of best fit on the high school assessment.
location	a point or extent in space	What is the location of the high pressure system in the weather map below?
magnifier	Hand held lens than enlarges images. Also known as hand lens; magnifier; magnifying glass.	Use the magnifier to identify the external features.
map legend	an explanation of the symbols used on a map	Use the map legend to estimate the distance between City A and City B.
mass	Noun: the amount of matter in an object or substance Verb: to measure the amount of matter in an object or substance	Predict the mass of the system after the nail has rusted. Or Mass the chemicals carefully before doing the experiment..
materials	the elements, constituents, or substances of which something is composed or can be made	What organic materials can be found in forest soils?
mean	the sum of data divided by the number of data measurements [one kind of average]	Twenty is the mean of 13, 37, 26, 14 and 10.
mechanism	<u>Biology</u> The involuntary and consistent response of an organism to a given stimulus. An instrument or a process, physical or mental, by which something is done or comes into being:	Sexual reproduction is a mechanism for change within a population.

median	the value that falls in the middle of a set of data	Fourteen is the median of 13, 37, 26, 14, 10.
microscope	a science tool that uses lenses to make tiny things look larger so they can be observed	How did the invention of the microscope help doctors in their fight against communicable diseases?
minute	very small	The microscope helps scientists see minute organisms
monitor	to watch closely for purposes of control, surveillance, etc.; keep track of; check continually	Stream scientists monitor the dissolved oxygen on a daily basis to check the health of the stream.
multiple trials	repeating an investigation in order to ensure validity [a minimum of 3 to 5 trials is accepted in classroom investigations but students should be made aware that this would not be sufficient for purposes of actual scientific testing]	Why are multiple trials important to an experiment?
non-standard measurement	Non-standard or arbitrary measurement is measurement that is different from the norm. Examples of non-standard measurement are paper clips, buttons, pencils, eraser, or coins.	Identify two objects that could be used to make non-standard measurements.
non-standard units	Units that are not set up and established by authority as a rule for the measure of quantity, weight, extent, value or quality. Units that are not serving as accurate bases for comparison.	Why were non-standard units, such as hands, replaced by standard units like meters?
object	a material thing that can be seen or touched; the person or thing to which action or feeling is directed	Which object above is biodegradable? or The object of our investigation will be competition for nesting sites.
observe/ observations	to watch carefully especially with attention to details or behavior for the purpose of arriving at a judgment	Scientists observe many animals over long periods of time. Their observations help them make valid inferences about what is normal behavior and what is not.

order	n. A condition of logical or comprehensible arrangement among the separate elements of a group	Arrange the organisms in order from simplest to most complex.
peers	a person who has equal standing with another	Write an experiment that your peers would be able to correctly repeat.
percent	one part of a hundred	What percent of the atmosphere is nitrogen?
phenomenon	an occurrence, circumstance or fact that is perceptible by the senses	The phenomenon of the Northern Lights has intrigued people for thousands of years.
pictograph	a graph that uses pictures or symbols to show data	Make a pictograph to show the kinds of pets we have in our classroom.
position	condition with reference to place; location; situation	Look at the diagram of the Earth and the sun. Draw the Earth and its axis to show the position it will be in relative to the sun six months from now.
predict	make a precise guess based upon reason and study of the situation	Predict what the different amounts of sunlight will have on a plant.
primary	1. of first rank or importance or value; "primary goals" or "primary effect"	What gas is a primary contributor to global warming? Or Name a primary consumer in the food pyramid above.
prior knowledge	(prior) earlier in time or order; (knowledge) the fact or condition of being aware of something	How does your prior knowledge affect your ability to formulate a reasonable hypothesis?
problem	A question to be considered, solved, or answered	What are two ways human beings contribute to the problem of global warming?
procedure	a series of steps taken to accomplish an end	Write a procedure that could be followed to test your hypothesis.

properties	characteristics of a substance including physical traits [the way an object sounds, feels, looks, smells and tastes] and chemical traits [how a substance responds to interactions with matter or energy]	What are two properties of metals scientists use to identify them?
proximity	nearness, sense, or fact of being near or next; closeness	How does a city's proximity to the ocean affect its climate?
qualitative	Information expressed in qualities or characteristics, usually found with the five senses	Make five qualitative observations using your senses
quantitative data	Information expressed in numbers or amounts, usually found using a tool or measuring instrument	Use quantitative data to support a reasonable explanation.
ramification	a development or consequence growing out of and sometimes complicating a problem, plan or statement	The environmental ramifications of global warming are finally being seriously discussed.
range	1. the difference between the lowest and highest values in the data set 2. to extend over or occupy	1. The populations range from 3 bluebirds per square mile to 25 per square mile. 2. Lions range over a large expanse of grassland.
ratio	the relationship in quantity, amount, or size between two or more things	What is the ratio of tall plants to short plants in the Punnett square shown below?
recognize	to take notice of in some definite way; to perceive to be something or someone previously known	How can we recognize the difference between carnivores and herbivores?
reasonable	showing reason or sound judgment; fair, not excessive or extreme	Is 450 kg a reasonable measurement for the mass of an adult male? Or Is Jim's conclusion reasonable, based on the data?
reasoning	arguments used in thinking	Which conclusion below is more valid? Explain your reasoning.

relationship	a state of affairs existing between two or more subjects; the connections between systems, subsystems, or parts of systems described by the concepts and principles of science that may range from the correlational to causal	What is the relationship between the fox and the mouse in the food web above?
reliability	dependability and suitability; an attribute of any investigation that describes the consistency of producing the same observations or data	How does using different equipment affect the reliability of the experiment's results?
reliable data	reliable: yielding the same or comparable results in different clinical experiments or statistical trials data: factual information, especially information organized for analysis or used to reason or make decisions	Would the experiment as it is described produce reliable data?
replicate	To duplicate, copy, reproduce, or repeat.	Why is it important for scientists to be able to replicate an experiment?
reproducible	yields a specific quality or result when copied	Science is based on observations and data obtained from controlled experiments and these experiments must be reproducible by other scientists before they are accepted as valid.
residue	1. the remainder of something after the removal of parts or a part 2. matter remaining after completion of an abstractive chemical or physical process, such as evaporation, combustion, distillation or filtration	Identify the residue at the bottom of your test tube.
risk	a chance or possibility of danger, loss, injury, or other adverse consequences	The Food and Drug Administration requires people in drug trials to be informed of the risks to them when they use the new drug
scale	a series of equal intervals and values placed on each axis of a graph	Your graph should have an appropriate number scale written along the axis.

scenario	an outline for the way something might happen or is planned to happen	Read the following scenario to answer questions about experimental design.
scientific credibility	the condition of being credible or believable	Gregor Mendel gained scientific credibility after his death with the discover of units of inheritance called chromosomes.
scientific explanation	A theory, hypothesis, inference or conclusion, based on observable evidence and scientific principles	Some primitive peoples explained thunder as the gods rolling heavy balls. What is a scientific explanation of thunder?
scientific inquiry	the processes of formulating scientifically-oriented questions, giving priority to evidence, formulating explanations, evaluating explanations in light of alternative explanations, and communicating and justifying proposed explanations	Theories are developed as a result of scientific inquiry.
scientific method	The principles and empirical processes of discovery and demonstration considered characteristic of or necessary for scientific investigation, generally involving the observation of phenomena, the formulation of a hypothesis concerning the phenomena, exper	There is no single scientific method.
scientific models	a simplified version of some part of the natural world that helps explain how it functions; 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.	Scientific models of sea-floor spreading helped support the theory of plate tectonics.

significance	the quality of being important	What could be the significance of fewer students going into engineering?
similarities	the state of being similar; likeness, resemblance	What are two similarities shared by frogs and fish?
Simple investigation	Testable question, hypothesis, plan an experiment, collect data, and write a conclusion.	Use the following steps to conduct a simple investigation: Make a prediction, Write a testable question, Conduct an experiment, Record data, Write a conclusion
social priorities	Social: of or relating to society or its organization, concerned with the mutual relations Priority: precedence, especially established by order of importance or urgency	Social priorities often make conservation difficult.
solution [to a problem]	the answer to a problem	What is a possible solution to the problem of deer overpopulation?
sort	To arrange according to class, kind, or size; classify	Sort the pictures into living or nonliving.
source	person or document which provided information	What was the source of your information?
spring scale	a balance that measure weight by the tension on a helical spring	A spring scale depends upon the force of gravity acting upon the object being weighed.
standard measurement	a number and a unit that define a quantity such as length, volume or mass	Why are standard measurements essential in science?
standard units	a measurement unit that many people agree to use, such as the inch and the centimeter	What is the standard unit of measurement for weight in the metric system?

stationary	a. standing still; not moving b. having a fixed position; not movable c. established in one place; not migratory d. remaining in the same condition or state; not changing	Identify the body of water that is stationary.
structure	a part of something; how something is put together	Identify two structures that invertebrates use for support or protection.
substance	the essential material forming a thing, a particular kind of material having uniform properties, the real meaning or essence of a thing	The substance of inheritance is DNA.
support	to provide with substantiation	<u>Does Jana's data support her conclusion? Explain your reasoning.</u>
system	an orderly, interconnected, complex arrangement of parts	Name three parts of the circulatory system or Does the diagram represent a closed system or an open system?
technique	a method used in dealing with something	Why is it important to use the same technique each time to determine the mass of the plant?
technological advances	Progress affected by or resulting from scientific and industrial progress	Identify two technological advances that have allowed us to learn about the universe outside our solar system.
testable question	a question that can be tested by experiment or observation	Explain why this is not a testable question: "Which is better, organic fertilizer or chemical fertilizer?"
theory	a well-substantiated explanation of some aspect of the natural world; an organized system of accepted knowledge that applies in a variety of circumstances to explain a specific set of phenomena and is capable of generating hypotheses and testable predictions	Give one reason why Wegener's theory of continental drift was replaced by the current theory of plate tectonics.

thrive	to grow vigorously; flourish	In which soil will the tree thrive, the soil with humus or the soil without humus?
trace	1. a. A visible mark, such as a footprint, made or left by the passage of a person, animal, or thing. b. Evidence or an indication of the former presence or existence of something; a vestige. An extremely small amount. 3. A constituent, such as a chemi	
trial	repetitions of data collection protocols in an investigation	Explain why multiple trials are necessary in an experiment.
transfer	to move from one place to another 2.	Describe the transfer of enegy in the food web below.
transform	1. to make a thorough or dramatic change in the form, outward appearance, character; to undergo a change; 2. change the voltage etc. of (a current)	Give an example of electrical energy transformed into mechanical energy.
transport	to transfer or convey from one place to another	Describe how oxygen is transported to cells.
unintended consequences	that which typically would not follow something and arises from it unintentionally	Name two intended consequences of damming a river.
unique	being the only one of its kind	What is a characteristic unique to birds?
valid experiment		
validity	accurate, justifiable, logically correct	Explain why Justin's experiment will have no validity if it is conducted as it is written.

variable	things or factors that can be assigned or take on different values in an experiment	Identify the independent and the dependent variables in your new experiment.
variation	the act, process, or accident of varying in condition, character or degree	Variation in offspring makes evolution possible.
vertical [y] axis	the line drawn on the left side of a graph on which the scale for the dependent variable is placed	Label the vertical axis with an appropriate number scale.

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