

VTAAP Science GE Entry Points

Grades 9-11

2016-2017

This document contains the VTAAP Science assessment targets, also known as “entry points”. GE entry points are not to be confused with the assessed target behaviors. Entry points can be found in the VTAAP Student Performance Scoring Guide.

Each entry point is written to reflect the assessment of academic learning as demonstrated at different levels of symbolic development. The student’s level of symbolic development, indicated on VTAAP Form 2, will determine which set of entry points will be used as their instructional outcome measures. The entry points in this document have been grouped according to the levels A, B, and C, as the student will use the same level for all strands and across all content areas. Please refer to the Student Performance Scoring Guide when selecting entry points for the VTAAP Form 2. PLEASE DO NOT select entry points from this document.

Since there is no separate generalization score, the strength of learning must be demonstrated within the assessment target. Efforts were made to identify applications of each entry point that are associated with strength of performance. *As a general rule, the emphasis of all the entry points is the strength of learning of the concepts, skills and knowledge.* Teams can expect endline scoring to reflect this focus on demonstration of learning that is enduring and meaningful, not just an isolated performance task. *The use of supports and applications of skills across contexts, materials and content are presumed criteria for all GE entry points, at all levels.*

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
	<i>Given...</i>	<i>Students will demonstrate understanding that one substance can be distinguished from another through comparison of physical and chemical properties by:</i>	<i>As demonstrated by a Student Product that...</i>
A	AT supports if needed	Using both physical and chemical properties of matter to distinguish one substance from another.	Explains or describes differences among at least 3 different substances based on at least 2 physical and 1 chemical property* (e.g., compares the density, melting point, and propensity to rust of a stainless cube, an iron cube, and aluminum cube).
B	AT supports	Comparing physical and chemical properties of substances.	Compares the physical and chemical* properties of at least 4 different substances (e.g., charts the boiling point, density, pH for fresh water, sea water, and vinegar).
C	AT supports	Indicating characteristic properties of different substances.	Indicates at least 2 different properties for at least 3 different objects (e.g., metal block is hard, non-combustible, and sinks in water; pine block is soft, combustible, and floats).

*Chemical properties include flammability (ease of burning) and reactivity (reaction to another substance-rust, bubbling).

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
	<i>Given...</i>	<i>Student will demonstrate understanding that temperature and pressure cause predictable changes in solids, liquids and gases by:</i>	<i>As demonstrated by a Student Product that...</i>
A	AT supports if needed	Predicting changes in states of matter due to changes in temperature and/or pressure.	Predicts and tests how states of matter change for at least 5 different substances due to changes in temperature and/or pressure (e.g., shows heat causes solid ice cube to become liquid water and then water vapor; pressure causes carbon dioxide gas to become dry ice; glass liquefies and can be reshaped when heated, solder melts, flows, and re-solidifies, etc.).
B	AT supports	Examining how change in temperature or pressure applied to matter can cause changes in state.	Illustrates with labels how states of matter of at least 5 different substances change due to temperature or pressure (e.g., shows how gas becomes a liquid under pressure; and liquid juice becomes a solid popsicle when frozen; solder melts when heat is applied).
C	AT supports	Indicating the effects of heating and cooling on different materials.	Indicates how heating and cooling affect the same substance for at least 3 different substances (e.g., melts ice cube to water with hair dryer, then back to ice cube in freezer; melts chocolate bar with heat and re-solidifies with cold; butter is soft at room temperature and hard in the refrigerator).

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
	<i>Given...</i>	<i>Student will demonstrate understanding that force affects the direction, speed and distance which objects move by:</i>	<i>As demonstrated by a Student Product that...</i>
A	AT supports if needed	Predicting direction, speed, and distance of movement of objects based on change of force.	Predicts and tests the direction, speed, and distance of movement of an object using a variety of different ramps to demonstrate that the greater the force, the greater the distance traveled in the direction of the applied force (e.g., predicts and measures the speed, direction, and distance traveled of a marble on 4 different inclines to support/not support a prediction).
B	AT supports	Identifying and measuring change of speed and distance of an object in response to varying forces.	Compares the change in speed and distances of an object in at least 4 different situations of applied force (e.g., uses a marble ball and 4 position spring loaded launcher to measure the difference in speed and distance traveled for each of 4 different strength forces).
C	AT supports	Associating the distance an object travels with the strength of force applied.	Connects the strength of force necessary to move an object a specified distance for an object and 3 different inclines (e.g., links the high ramp with the longest distance for a marble, the medium ramp for medium distance and the low ramp with the shortest distance).

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
A	AT supports if needed	Explaining the effects of attraction and repulsion in a simple motor.	Explains or demonstrates 1 effect of attraction and repulsion of charges to produce motion in a simple motor (e.g., shows how electricity passes through a wire coil wrapped around an iron bar to create an electromagnet that is attracted and repelled by other magnets).
B	AT supports	Identifying how the amount of charge affects the strength of an electrical force.	Identifies at least 1 effect of changing the amount of electromagnetic and electrostatic energy in 2 systems (e.g., shows how the more a balloon is rubbed on a wool rug, the more the build-up of static electricity and the longer the balloon will cling to the wall AND shows how increasing the number of coils around an iron bar increases the strength of the electromagnet).
C	AT supports	Creating an electrostatic charge.	Imitates the motion required to produce an electric charge through friction (e.g., copies the movement necessary to create an electrical charge through friction for a balloon and then shows that the charged balloon attracts a person's hair and sticks to the wall).

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
	<i>Given...</i>	<i>Student will demonstrate understanding that energy obtained through chemical reactions within cells of plants and animals is critical for survival (photosynthesis and cellular respiration) by:</i>	<i>As demonstrated by a Student Product that...</i>
A	AT supports if needed	Describing the flow of energy that plant cells and animal cells use to obtain energy for survival, including photosynthesis and cellular respiration.	Describes or illustrates with labels the flow of energy from the sun through a plant to an animal to the cellular level (e.g., shows how green plants use energy from the sun for photosynthesis (making food) within chloroplasts and use oxygen for cellular respiration (producing energy) in mitochondria. Animals obtain food that is digested in stomach and is carried through blood to cells to use with oxygen for cellular respiration (producing energy) in mitochondria).
B	AT supports	Identifying how plant and animal cells use cellular processes (photosynthesis and/or cellular respiration) to produce energy for survival.	Demonstrates how photosynthesis and/or respiration are used by green plant cells and animal cells to obtain energy (e.g., shows how plant cells carry out both photo-synthesis and respiration to obtain energy and shows how animal cells can only perform cellular respiration to obtain energy).
C	AT supports	Indicating the association between healthy green plants and sunlight and healthy animals and food.	Associates healthy plants with sunlight. AND Healthy animals with the need to ingest good food (e.g., links healthy green tomato plant with sun and yellow/dry tomato plant with extended darkness; links healthy horse with hay and grain and emaciated horses with sparse feed conditions).

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
	<i>Given...</i>	<i>Student will demonstrate understanding that matter (e.g., oxygen, carbon, nitrogen) is cycled within food webs through cellular processes by:</i>	<i>As demonstrated by a Student Product that...</i>
A	AT supports if needed	Describing how carbon or nitrogen cycle through organisms at the cellular level.	Explains or demonstrates how plants use CO ₂ to produce carbon compounds through photo-synthesis and use oxygen with carbon compounds in cellular respiration to produce energy and release CO ₂ (e.g., demonstrates how a cow takes in oxygen by breathing and eats grass which is broken down through digestion to provide nutrients and oxygen to individual cells with CO ₂ and water as waste products that are released back into the environment). OR Explains or demonstrates how plants use nitrogen to build protein (e.g., crop rotation can recycle nitrogen into the soil).
B	AT supports	Identifying how carbon, oxygen or nitrogen cycles through organisms in a food web.	Identifies at least 1 cycle of matter within a specific ecosystem (e.g., shows how carbon is cycled when grass uses CO ₂ to photosynthesize and produce food for grasshoppers that are eaten by birds that die and decompose releasing CO ₂ back into the air; OR Shows how nitrogen in grass is cycled through deer whose liquid waste is exposed to bacteria during decomposition and releases nitrogen back into the environment).
C	AT supports	Identifying organisms in a food chain.	Matches at least 3 organisms in a coherent food chain for 2 different food chains (e.g., connects grass, grasshopper and bird to same food chain; connects owl, mouse, seeds in same food chain).

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
	<i>Given...</i>	<i>Student will demonstrate understanding that humans inherit physical features from parents through genetic information</i>	<i>As demonstrated by a Student Product that...</i>
A	AT supports if needed	Explaining how an alteration of a chromosome may affect physical or chemical characteristics of the human body.	Explains or demonstrates how the alteration of a chromosome (mutation) may affect physical or chemical characteristics of the human body (e.g., shows how chromosome mutation causes the production of C-shaped red blood cells that are not able to carry oxygen as effectively as a normal red blood cell and produce the symptoms of sickle
B	AT supports	Identifying how chromosomes in human male and female cells combine to produce offspring that resemble the parents.	Identifies that each parent contributes the same number of chromosomes to the offspring, resulting in physical characteristics that resemble the parents (e.g., uses models of chromosome structure to represent that human reproductive cells have 23 chromosomes each and human body cells have 46 chromosomes each and naming the contributions from each parent to the physical
C	AT supports	Indicating the child exhibits features from both biological parents.	Indicates that offspring combines facial features from each parent (e.g., combines different individual features such as eyes, ears, nose, hair, etc. from model or other representation of mother’s face and father’s face to make combined face for offspring).

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
A	AT supports if needed	Explaining how human body systems depend upon each other for survival in response to an external stimulus.	Explains or demonstrates how 3 internal body systems of humans depend upon each other for survival in response to an external stimulus (e.g., shows how the respiratory system brings oxygen to the body during exercise, the circulatory system distributes the oxygen to cells throughout the body, and the muscle system uses
B	AT supports	Identifying the interactive relationship between body systems.	Response identifies how 2 body systems work together (e.g., uses labeled diagram to show how breathing oxygen through the respiratory system is necessary for the muscles in the muscle system to perform work).
C	AT supports	Matching body organs or structures to corresponding system.	Matches at least 3 human body parts to corresponding organ or structure on model (e.g., connects palpated backbone to spine on model of skeletal system; connects upper arm to bicep on model of musculature system; connects beating heart/pulse to pulsing circulatory system in organ model).

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
	<i>Given...</i>	<i>Student will demonstrate understanding that there are critical events that occur during each stage of human embryo development by:</i>	<i>As demonstrated by a Student Product that...</i>
A	AT supports if needed	Comparing the development of the human embryo to the development of other vertebrate organisms.	Illustrates with labels the difference in development of the human embryo and at least 1 other vertebrate organism (e.g., uses a timeline to compare the development of human embryos during the 40 week gestation period within the mother in contrast to an alligator that lays eggs and offspring develop in 60-75 days outside the mother).
B	AT supports	Identifying the sequence of events in human embryo development.	Identifies at least 2 important events that occur in each of the 3 stages of human embryo development (e.g., constructs a timeline with models to show that in the first trimester the embryo is ball of cells and organs begin to form; in the second trimester the fetus develops and begins to mature; and in the third trimester there is overall organ growth and an increase in body size).
C	AT supports	Identifying pregnancy in sequence of human development.	Identifies sequence of adult female, pregnant female, and child (e.g., matches models or other representations to place adult female, pregnant female, and child in correct progression).

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
	<i>Given...</i>	<i>Student will demonstrate understanding that there are distinct differences in composition of the atmospheres of inner and outer planets of our solar system by:</i>	<i>As demonstrated by a Student Product that...</i>
A	AT supports if needed	Comparing the general characteristics of the atmospheres of inner planets and outer planets of our solar system.	Compares the atmospheres of the inner planets (Mercury, Venus, Earth, and Mars) and the outer planets (Jupiter, Saturn, Uranus, Neptune) of our solar system group, using at least 1 example from each (e.g., shows how the inner planet of Mars has a thin atmosphere made mostly of CO ₂ with a temperature range of 20 degrees to -123 degrees Celsius: and the atmosphere of the outer planet of Jupiter is very thick, composed of mostly hydrogen gas, with a temperature of approximately -160 degrees Celsius).
B	AT supports	Identifying the unique characteristics of a planet in the solar system.	Identifies at least 6 characteristics of one (e.g., uses labeled diagrams to illustrate that the planet Earth has a spherical shape, is composed of 30% land and 70% water, has an atmosphere of gases including O ₂ and CO ₂ , has magnetic fields with North and South poles, has moderate temperatures that support life, etc.).
C	AT supports	Indicating the order of planets in our solar system.	Matches the sequence of the Sun and planets in the solar system (e.g., uses a 3-D model in the correct order from the Sun to match Sun to Sun Mercury to Mercury, Venus to Venus, Earth to Earth, and Mars to Mars Jupiter to Jupiter, Saturn to Saturn, Uranus to Uranus, and Neptune to Neptune).

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
	<i>Given...</i>	<i>Student will demonstrate understanding that earth materials are conserved during the Rock Cycle by:</i>	<i>As demonstrated by a Student Product that...</i>
A	AT supports if needed	Explaining how the amount of earth materials is conserved, even though earth materials undergo changes in form during the Rock Cycle.	Explains or illustrates with labels for at least 6 transformations how the amount of earth materials is conserved during the Rock Cycle (e.g., shows that in the transformation from shale to slate, as a result of compression, the amount of material does not change and mass is conserved, etc.).
B	AT supports	Identifying the processes in the Rock Cycle.	Identifies or illustrates with labels the 4 processes in the Rock Cycle (e.g., shows sedimentation as a process in which earth materials are deposited in layers, often under water, and formed into rocks; heat and compression as a process in which earth materials under pressure are formed into new rocks; erosion as a process in which earth materials are broken apart by the action of wind, water, ice; and volcanic activity as a process in which materials from deep underground are deposited on the earth’s surface).
C	AT supports	Matching same types of rocks from the Rock Cycle.	Matches 3 types of rocks from the Rock Cycle for at least 6 dissimilar samples (e.g., matches a red-layered rock with a tan-layered rock; matches a rock with large crystals with a rock with smaller crystals; and matches a brown conglomerate to a black conglomerate, etc.).

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
	<i>Given...</i>	<i>Student will demonstrate understanding of the processes that change Earth’s land surface (e.g., tectonic plate movement, earthquakes,</i>	<i>As demonstrated by a Student Product that...</i>
A	AT supports if needed	Analyzing how the locations of the earth’s earthquakes and volcanoes correlate with crustal plate boundaries.	Analyzes the connection between the locations of earthquakes and volcanoes and specific crustal plate boundaries (e.g., shows how the locations along the Ring of Fire of Mt. Hood and Mt. St. Helen on the Pacific Northwest coast of the united States coincide with the junction of 3 crustal plates; and the location of the San Andreas Fault defines the boundary of the Pacific and North American plates, and is the site of numerous earthquakes).
B	AT supports	Identifying how the process of crustal plate movements has affected the position of Earth’s continents.	Illustrates with labels or uses model to demonstrate how the process of crustal plate movement has influenced the position of Earth’s continents (e.g., shows how a model in the shape of the super-continent Pangaea can be broken into 7 parts representing the present shape and location of today’s largest landmasses - North and South America, Antarctica, Australia, Africa and Eurasia).
C	AT supports	Recognizing continents on a model of Earth.	Indicates at least 6 continents on a 3-D model of the earth (e.g., points to 6 major landmasses on a globe with topographical features).

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
	<i>Given...</i>	<i>Student will demonstrate understanding that the unique properties of water impact the earth's weather patterns by:</i>	<i>As demonstrated by a Student Product that...</i>
A	AT supports if needed	Explaining how large bodies water affect local or global climate.	Explains at least 3 specific examples of how large bodies water affect local or global climate (e.g., shows how more snow, called lake effect snow, occurs in Buffalo east of the Great Lakes due evaporation of water during the winter where the lake cools more slowly than the land; and ocean breezes in Cape Cod during the summer occur because the seawater is cooler than the land, and the growing season is longer in Burlington because of the
B	AT supports	Indicating how a body of water can affect weather.	Indicates at least 2 ways that large body of water can affect air temperature (e.g., shows how temperatures in Burlington next to Lake Champlain are warmer in September, October and November than they are in other regions in Vermont or New York at the same approximate elevation further away from the lake and winter weather conditions are colder and windier
C	AT supports	Associating state of water with specific seasons.	Connects the state of water with an appropriate season for at least 3 seasons (e.g., connects warm water to summer, cool water to spring or fall, and frozen water to winter).

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
A	AT supports if needed	Explaining how management of natural resources can be beneficial for both the environment and for humans.	Explains or demonstrates at least 5 ways that management of natural resources can be beneficial for the environment and for humans (e.g., shows how managed farming, including use of fertilizer to produce greater yield and plowing patterns to prevent erosion; how a logging plan that utilizes selective cutting and leaves parent trees promotes healthy re-growth of forests; and how recycling of waste materials conserves resources and decreases solid waste in landfills, etc.).
B	AT supports	Correlating human behavior with the effect on the global environment.	Connects human behavior to the environmental consequence, and provides an illustrative example of, for at least 8 behaviors (e.g., connects careless management of campfires to devastating forest fires that destroy timber resources and affect air quality in Texas; links excessive reliance on the auto-mobile in LA causes over reliance on fossil fuel which increases CO2 in atmosphere, relates the use of PV solar panels and wind farms in Germany to cleaner air and diminished reliance on fossil fuel, connects oil spills in the Gulf to bird kill & inedible marine life, etc.).
C	AT supports	Connects human behavior to local environmental consequences.	Links human behavior to local consequence for at least 6 different behaviors (e.g., gardening linked to meals, recycling beverage cans linked to clean roadsides, planting trees and flowers attracts animals and birds, etc.).