

## VTAAP SCIENCE GE ENTRY POINTS

GRADES 9-11

DOMAIN: PHYSICAL SCIENCE (1 of 3)

GE: S9-12: 9 (1 of 4)

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>
<b>A</b>	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 1 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).  *Chemical properties include: reaction to heat (combustion), oxidation (rust), and reaction to acid (bubbling).
<b>B</b>	AT supports	Comparing physical and chemical properties.	Compares the physical and chemical* properties of at least 2 substances (e.g., charts the boiling point, density, pH for water and vinegar).  *Chemical properties include: reaction to heat (combustion), oxidation (rust), and reaction to acid (bubbling).
<b>C</b>	AT supports	Indicating that characteristic properties of different objects are unique.	Indicates that properties of at least 3 different objects can be similar or different (e.g., finds the outlier in table, table, water; rock, rock, milk; and floating wood block, floating wood block, sinking metal block).

## VTAAP SCIENCE GE ENTRY POINTS

GRADES 9-11

DOMAIN: PHYSICAL SCIENCE (1 of 3)

GE: S9-12: 14 (2 of 4)

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>
<b>A</b>	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 3 different substances due to changes in temperature and/or pressure (e.g., shows heat causes solid ice cube to become liquid water to water vapor; pressure causes carbon dioxide gas to become dry ice; and glass liquefies and can be reshaped when heated).
<b>B</b>	AT supports	Examining how heat or pressure applied to matter can cause changes in state.	Demonstrates how states of matter of at least 3 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).
<b>C</b>	AT supports	Indicating the effects of temperature on objects.	Indicates a change in temperature on at least 2 objects (e.g., signals a change in temperature in warm water, warm water, cold water grouping; warm metal cube, warm metal cube, cold cube).

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### GRADES 9-11

**DOMAIN: PHYSICAL SCIENCE (1 of 3)**

**GE: S9-12: 19 (3 of 4)**

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>
<b>A</b>	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 at least 3 objects to demonstrate that the greater the force, the greater the distance traveled in the direction of the applied force (e.g., measures the speed, direction, and distance traveled of 3 different model race cars to support/not support a prediction).
<b>B</b>	AT supports	Identifying and measuring change of direction, speed or distance of motion in response to varying forces.	Compares the change of an object in at least 3 different situations of applied force (e.g., uses a marble ball to measure the difference in distance traveled between a strong and a weak push; the difference in direction for a force from behind and a force from the side; and the difference in speed for ramps with different inclines).
<b>C</b>	AT supports	Associating the distance an object travels with the strength of force applied.	Connecting the strength of force necessary to move an object a specified distance (e.g., links the high ramp with the longer distance and the low ramp with the shorter distance).

**VTAAP SCIENCE GE ENTRY POINTS****GRADES 9-11****DOMAIN: PHYSICAL SCIENCE** (1 of 3)**GE: S9-12: 24** (4 of 4)

<b>Entry Point</b>	<b>CONDITIONS</b>	<b>TARGET BEHAVIORS</b>	<b>CRITERIA</b>
	<i>Given...</i>	<i>Student will demonstrate understanding that electrical force arises from the attraction or repulsion of like and unlike charges (e.g., electrostatic forces and electromagnetic forces) by:</i>	<i>As demonstrated by a Student Product that...</i>
<b>A</b>	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 in a simple motor (e.g., shows how electricity passes through a wire coil wrapped around an iron bar to create an electromagnet that attracts and repels other magnets).
<b>B</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 a system (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).
<b>C</b>	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).

## VTAAP SCIENCE GE ENTRY POINTS

GRADES 9-11

DOMAIN: LIFE SCIENCE (2 of 3)

GE: S9-12: 33 (1 of 5)

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>
<b>A</b>	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>B</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 photosynthesis and respiration to obtain energy and shows how animal cells can only perform cellular respiration to obtain energy).
<b>C</b>	AT supports	Indicating the association between healthy green plants and sunlight.	Associates healthy plants with sunlight and unhealthy or dead plants with lack of sunlight (e.g., links healthy green tomato plant with sun and yellow/dry tomato plant with extended darkness).

**VTAAP SCIENCE GE ENTRY POINTS****GRADES 9-11****DOMAIN: LIFE SCIENCE (2 of 3)****GE: S9-12: 35 (2 of 5)**

	<b>CONDITIONS</b>	<b>TARGET BEHAVIORS</b>	<b>CRITERIA</b>
<b>Entry Point</b>	<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>
<b>A</b>	AT supports if needed	Describing how carbon or nitrogen cycles through organisms at the cellular level.	Explains or demonstrates how plants use CO <sub>2</sub> to produce carbon compounds through photosynthesis and use oxygen with carbon compounds in cellular respiration to produce energy and release CO <sub>2</sub> (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 <sub>2</sub> and water as waste products that are released back into the environment).
<b>B</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 <sub>2</sub> to photosynthesize and produce food for grasshoppers that are eaten by birds that die and decompose releasing CO <sub>2</sub> back into the air; OR shows how nitrogen in grass is cycled through deer whose solid waste is exposed to bacteria during decomposition and releases nitrogen back into the environment).
<b>C</b>	AT supports	Identifying organisms in a food change.	Matches at least 3 organisms in a food web (e.g., connects grass to grass, grasshopper to grasshopper, bird to bird).

**VTAAP SCIENCE GE ENTRY POINTS****GRADES 9-11****DOMAIN: LIFE SCIENCE (2 of 3)****GE: S9-12: 40 (3 of 5)**

<b>Entry Point</b>	<b>CONDITIONS</b>	<b>TARGET BEHAVIORS</b>	<b>CRITERIA</b>
	<i>Given...</i>	<i>Student will demonstrate understanding that humans inherit physical features from parents through genetic information contained within chromosomes by:</i>	<i>As demonstrated by a Student Product that...</i>
<b>A</b>	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 cell anemia).
<b>B</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., identifies 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 features of the offspring).
<b>C</b>	AT supports	Indicating the child exhibits features from both 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).

**VTAAP SCIENCE GE ENTRY POINTS**

**GRADES 9-11**

**DOMAIN: LIFE SCIENCE (2 of 3)**

**GE: S9-12: 41 (4 of 5)**

<b>Entry Point</b>	<b>CONDITIONS</b>	<b>TARGET BEHAVIORS</b>	<b>CRITERIA</b>
	<i>Given...</i>	<i>Student will demonstrate understanding that all systems of the human body are continually working together to maintain homeostasis by:</i>	<i>As demonstrated by a Student Product that...</i>
<b>A</b>	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 oxygen to contract to keep us running).
<b>B</b>	AT supports	Identifying the interactive relationship between body systems.	Response identifies how 2 body systems work together (e.g., shows how breathing oxygen through the respiratory system is necessary for the muscles in the muscle system to perform work).
<b>C</b>	AT supports	Matching human sense organs to their functions.	Matches at least 3 human sense organs to their primary function (e.g., points to mouth or tongue for tasting, nose for smelling, skin for touching/feeling).

**VTAAP SCIENCE GE ENTRY POINTS**

**GRADES 9-11**

**DOMAIN: LIFE SCIENCE (2 of 3)**

**GE: S9-12: 43 (5 of 5)**

<b>Entry Point</b>	<b>CONDITIONS</b>	<b>TARGET BEHAVIORS</b>	<b>CRITERIA</b>
	<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>
<b>A</b>	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>B</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., shows 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).
<b>C</b>	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).

**VTAAP SCIENCE GE ENTRY POINTS**

**GRADES 9-11**

**DOMAIN: EARTH & SPACE SCIENCE (3 of 3)**

**GE: S9-12: 44 (1 of 5)**

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>
<b>A</b>	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 outer planets (Jupiter, Saturn, Uranus, Neptune) of our solar system, using at least 1 example from each (e.g., shows how the inner planet of Mars has a thin atmosphere made mostly of CO <sub>2</sub> 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>B</b>	AT supports	Identifying the unique characteristics of planet Earth.	Identifies at least 3 characteristics of Earth (e.g., shows the size, temperature, and distribution of land and water on the planet Earth).
<b>C</b>	AT supports	Indicating the order of planets in our solar system.	Matches the sequence of either the 4 inner planet or the 4 outer planets of our solar system (e.g., uses a 3-D model in the correct order from the Sun to match Mercury to Mercury, Venus to Venus, Earth to Earth, and Mars to Mars OR Jupiter to Jupiter, Saturn to Saturn, Uranus to Uranus, and Neptune to Neptune).

## VTAAP SCIENCE GE ENTRY POINTS

GRADES 9-11

DOMAIN: EARTH AND SPACE SCIENCE (3 of 3)

GE: S9-12: 46 (2 of 5)

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>
<b>A</b>	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, demonstrates, illustrates with labels 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).
<b>B</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 under ground are deposited on the earth's surface).
<b>C</b>	AT supports	Matching same types of rocks from the Rock Cycle.	Matches 3 types of rocks from the Rock Cycle (e.g., matches a layered rock with a layered rock; matches a rock with crystals with a rock with crystals; and matches a conglomerate to a conglomerate).

**VTAAP SCIENCE GE ENTRY POINTS**

**GRADES 9-11**

**DOMAIN: EARTH AND SPACE SCIENCE (3 of 3)**

**GE: S9-12: 47 (3 of 5)**

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, volcanoes) by:</i>	<i>As demonstrated by a Student Product that...</i>
<b>A</b>	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>B</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).
<b>C</b>	AT supports	Recognizing continents on a model of Earth.	Indicates at least 3 continents on a 3-D model of the earth (e.g., points to 3 major landmasses on a globe with topographical features).

**VTAAP SCIENCE GE ENTRY POINTS**

**GRADES 9-11**

**DOMAIN: EARTH AND SPACE SCIENCE (3 of 3)**

**GE: S9-12: 48 (4 of 5)**

<b>Entry Point</b>	<b>CONDITIONS</b>	<b>TARGET BEHAVIORS</b>	<b>CRITERIA</b>
	<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>
<b>A</b>	AT supports if needed	Explaining how large bodies water affect local or global climate.	Explains or demonstrates at least 2 examples of how large bodies water affect local or global climate (e.g., shows how more snow, called lake effect snow, occurs east of a large body of water due evaporation of water during the winter where the lake cools more slowly than the land; and ocean breezes in the summer occur because the water is cooler than the land).
<b>B</b>	AT supports	Indicating how a body of water can affect weather.	Indicates at least 1 way 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 regions at the same approximate elevation further away from the lake).
<b>C</b>	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).

## VTAAP SCIENCE GE ENTRY POINTS

GRADES 9-11

**DOMAIN: EARTH AND SPACE SCIENCE (3 of 3)**

**GE: S9-12: 49 (5 of 5)**

Entry Point	CONDITIONS	TARGET BEHAVIORS	CRITERIA
	<i>Given...</i>	<i>Student will demonstrate understanding that human choices can affect the natural environment (e.g. pollution, logging, management/protection of natural resources) by:</i>	<i>As demonstrated by a Student Product that...</i>
<b>A</b>	AT supports if needed	Explaining how management of natural resources can be beneficial for the environment and for humans.	Explains or demonstrates at least 3 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).
<b>B</b>	AT supports	Identifying positive and negative changes that human activity have caused in the natural environment.	Identifies at least 1 positive and 1 negative effect of human behavior on the natural environment (e.g., shows how careless management of campfires can lead to devastating forest fires; and construction of jetties along the coast may prevent beach erosion).
<b>C</b>	AT supports	Identifies materials that can be recycled.	Matches at least 3 recyclable items (e.g., matches glass bottle to glass bottle; tin can to tin can; and plastic cup to plastic cup).