

Science DesCartes: General Science – Earth and Space Systems

Skills: Understand Scientific Theories of Origin and Subsequent Changes in the Universe and Earth Systems

Students:	DesCartes Skills: (Highlight the skills related to your chosen standard/concept)	
	RIT Above 240: <ul style="list-style-type: none"> • Compares wind speed of storms • Predicts what will result from the collision of two oceanic plates • Recognizes that the major form of pollution produced by nuclear reactors is heat 	<ul style="list-style-type: none"> energy released during an earthquake • Explains how sea floor spreading is caused by movement of tectonic plates • Predicts the landform that will result from the collision of two continental plates • Interprets diagrams showing divergent plate movement • Recognizes that the mid-Atlantic ridge is the result of sea-floor spreading • Explains features of the Earth's surface using plate tectonic theory • Recognizes that most of the world's volcanoes are located along the Pacific rim • Describes the structure of the geological time scale • Names the characteristics used to classify stars • Explains that part of the Milky Way galaxy can be seen as a bright band of light in the night sky • Describes characteristics of the planet Jupiter • Explains that during a solar eclipse, the Moon's shadow falls on the Earth • Identifies the phases of the Moon • Calculates the weight of an object on various planets, when given the acceleration due to gravity for each planet • Analyzes the formation of the solar system • Explains how algal blooms are produced • Explains how inversions can affect air quality
	RIT 231-240: <ul style="list-style-type: none"> • Orders steps of the water cycle • Makes inferences from data about dew formation • Predicts the movement of air that will result from uneven heating of air at the ocean shore interface • Describes climate conditions accompanying high and low pressure systems • Describes the relationship between the Coriolis effect and wind patterns • Describes the measurement of an earthquake's magnitude using the Richter scale • Explains how volcanic eruptions are caused by movement of tectonic plates • Explains how sea floor spreading is caused by movement of tectonic plates • Explains how plate movement produces sea floor spreading • Predicts what will result from the collision of two oceanic plates • Describes characteristics of the solar system • Classifies comets and asteroids by the shape of their orbits • Compares composition of planets • Determines how the Earth moves in relation to the Moon • Uses models to show how the relative location of the Sun, Moon, and Earth are responsible for tides • Recognizes that the planets are kept in orbit around the Sun due to gravity and inertia • Describes the effects of gravity on Earth's motion • Infers that a spacecraft or object attempting to leave a larger planet will require more force than when leaving a smaller planet, due to differences in gravity between the two planets • Describes the life cycle of a star (stellar evolution) 	RIT 211-220: <ul style="list-style-type: none"> • Differentiates among artesian wells, springs and geysers • Describes the composition of the Earth's bodies of water • Orders steps of the water cycle • Describes processes that make up water cycle • Analyzes processes which comprise the water cycle • Describes humus • Describes cloud formation in weather systems • Describes the structure of weather systems (e.g., hurricanes) • Analyzes humidity in weather systems • Describes how weather conditions are measured • Explains how barometric pressure is interpreted • Defines climate • Explains how uneven heating at the shore/ocean interface by the Sun creates winds • Analyzes the role of temperature in producing ocean currents • Describes results of interacting air masses • Defines rotation of planets • Analyzes diagrams showing the effect of Earth's tilt on seasons • Labels a diagram of Earth (four layers) to show Earth's outer core • Labels a diagram of Earth (four layers) to show Earth's mantle • Describes how slow and rapid processes cause the Earth's surface to change constantly • Describes how constructive forces create land forms • Analyzes the role of destructive forces in shaping Earth's surface • Gives examples of fault zones • Recognizes that faults are breakages in rock associated with movement of Earth's plates • Explains how mountain building is caused by movement of tectonic plates • Relates plate movement to geologic events • Explains how plate tectonic theory accounts for movement of landforms over time • Defines magma • Recognizes that in most fossils, living tissue is
	RIT 221-230: <ul style="list-style-type: none"> • Orders steps of the water cycle • Describes runoff as movement of water across Earth's surface as streams and rivers • Recognizes that the organic material in soil is called humus • Describes how living things contribute to erosion resistance • Classifies clouds by composition, height, and type of precipitation • Explains how uneven heating at the shore/ocean interface by the Sun creates winds • Relates differences in air pressure to movement of surface winds • Identifies diagrams illustrating convection • Describes how the Earth's tilt affects weather patterns • Describes the composition of Earth's atmosphere • Analyzes the role of destructive forces in shaping Earth's surface • Sequences events that occur during a volcanic eruption • Explains that faults are associated with earthquakes • Explains that seismographs measure the 	

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<p>replaced with minerals, but in certain fossils (e.g., amber, frozen organisms), biological matter (DNA) may remain</p> <ul style="list-style-type: none"> • Describes conditions that are usually needed for a fossil to form • Explains that the geologic processes we observe today have also occurred in the geologic past • Describes chemical and physical characteristics of stars • Compares characteristics of stars and star systems (e.g., temperature, color, size, elements, energy, number of stars in system) • Identifies arrangement of bodies within our galaxy • Describes characteristics of meteors • Classifies asteroids, comets, and meteors, meteoroids and meteorites by location • Recognizes characteristics of meteorites • Describes characteristics of the planet Mercury • Recognizes that the Moon is a natural satellite of Earth • Compares size of astronomical planets • Explains the concept of seasons in terms of Earth's motion • Relates the regular predictable motion of the Earth to the regular length of a year • Identifies the phase of the moon during which a lunar eclipse may occur • Explains how both the relative mass of the Moon and Sun, as well as their distance from Earth, result in differences in the effect each has on Earth's tides • Explains the effect of gravity on orbital shape and speed • Analyzes the effect of gravity on tides • Recognizes that changes in the energy output of the Sun would cause significant changes in Earth processes that depend on the Sun's energy • Evaluates impacts of activities that modify the environment • Describes how human activities affect air quality • Explains how global warming modifies the environment 	<p>winter</p> <ul style="list-style-type: none"> • Labels diagrams of Earth (three layers) to show Earth's mantle • Recognizes Earth's three layers • Orders Earth's three layers • Describes characteristics of Earth's three layers • Recognizes characteristics of each layer of Earth (e.g., cold brittle lithosphere, hot convecting mantle, dense metallic core) • Recognizes that the Earth is spherical in shape • Explains why the equator is used to divide the Earth into two hemispheres • Recognizes that rapid processes which change Earth's surface include landslides, volcanic eruptions, and earthquakes • Distinguishes among processes that do and do not change Earth's surface • Infers that Earth's surface is constantly changing • Describes how destructive forces create land forms • Explains how processes such as erosion, weathering, and flow cause slow change to Earth's surface features • Infers that effects of an earthquake depend on its strength • Understands that earthquakes cause differences in the movement of land • Describes causes of earthquakes • Describes tools used to measure earthquakes • Describes folding and faulting • Recognizes that plate tectonics is the theory that accounts for the movement of the continents • Draws conclusions about the past from fossils or fossil data • Explains how sedimentary rocks record events of Earth's history • Uses the law of superposition to determine the relative ages of rock layers • Describes relative dating techniques • Explains that astronomical objects are separated by great distances • Recognizes that the Sun, Moon and planets are spherical in shape • Describes characteristics of comets • Compares characteristics of meteors and meteorites • Describes formation of meteors • Recognizes how meteor showers are produced • Describes the relationship between the Moon and the Earth (the Moon is a satellite of the Earth, and therefore orbits around the Earth) • Recognizes that it takes about 29 days for the Moon to orbit Earth • Describes how the Moon's surface has been affected by meteorites • Defines satellite as one body which orbits around another • Orders the planets in terms of distance from the Sun • Explains that Earth is the only planet in our solar system that contains water in liquid form • Explains that the Moon and planets shine by reflected sunlight, not their own light • Explains the concept of a year in terms of a planet's motion • Explains the concept of a full day and night in terms of Earth's motion • Explains the phases of the Moon • Infers that an object thrown up from a planet will not travel as far as an object thrown with the same force from a planet with less gravity • Recognizes that the fossil record gives geological evidence that documents when many
<p>RIT 201-210:</p> <ul style="list-style-type: none"> • Defines a spring as underground water which seeps onto the Earth's surface • Analyzes processes which comprise the water cycle • Describes the movement of water through a complete turn of the water cycle • Describes the water cycle • Interprets models that show how water is recycled in the Earth system • Describes how dew forms on surfaces • Defines humidity • Understands that meteorologists use multiple measurements of weather conditions to make forecasts • Describes how changes in the composition of the atmosphere can affect Earth's climate • Recognizes that air takes up space • Recognizes that air can cause changes in the environment • Recognizes that uneven heating of air by the Sun causes convection currents • Relates the Earth's rotation on its axis to the length of a day • Explains how Earth's tilt causes seasons • Explains how the Earth's tilt affects the intensity of sunlight in summer and winter • Analyzes diagrams showing how the relative intensity of sunlight differs in summer and 	

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	<p>life forms appeared, diversified, and went extinct</p> <ul style="list-style-type: none"> • Recognizes ways that humans have attempted to control pollution • Describes how human activities affect air quality • Gives examples of substances that decrease the quality of air and/or produce smog • Gives examples of pollutants 		<ul style="list-style-type: none"> • Identifies daily patterns caused by Earth's rotation • Explains that gravity is a force producing attraction between matter • Explains that fossils provide evidence about organisms that lived long ago • Gives examples of actions and events that produce pollution • Describes effects of pollution on living things • Makes inferences about the effect of pollution on living things • Explains how wind can cause pollution (dust) • Describes basic characteristics of polluted air • Explains how human population growth modifies the environment
	<p>RIT 191-200:</p> <ul style="list-style-type: none"> • Describes the distribution of water on Earth • Recognizes that clouds and fog are made up of tiny water droplets (condensed from vapor or gaseous form) • Describes how clouds form • Gives examples of forms of precipitation • Classifies rain, sleet, snow, etc., as precipitation • Recognizes that climate depends on an interaction of factors (e.g., latitude, atmospheric composition, prevailing wind, ocean temperature, pollution) • Explains how volcanoes cause pollution • Recognizes that "empty" spaces and containers are not really empty, because they contain air • Recognizes that air may contain water and particulate pollutants (e.g., pollen, smoke, dust) • Compares properties of different wind forms (e.g., tornadoes, gusts, breezes, drafts, gales) • Recognizes that day and night are caused by the Earth's rotation on its axis • Defines atmosphere as the air surrounding Earth • Recognizes Earth's three layers • Orders Earth's three layers • Analyzes a model that shows Earth's internal structure • Labels a diagram of Earth to show Earth's core • Labels a diagram of Earth to show its crust • Understands that life on Earth would not be able to exist in Earth's mantle and core • Recognizes that rapid processes which change Earth's surface include landslides, volcanic eruptions, and earthquakes • Explains how plate movement produces earthquakes • Explains how magma and lava are involved in volcanic eruptions • Explains that a small object that is close to Earth may appear larger than a bigger object that is more distant from Earth • Recognizes that the Sun is a medium-sized star • Compares the Sun to other stars and star systems • Describes components of the solar system • Recognizes that the solar system includes the Sun, nine planets including Earth, the Moon and satellites orbiting other planets, asteroids, and comets • Describes characteristics of the planet Mars • Describes the motion of Earth around the Sun • Analyzes the motion of the Moon around Earth • Compares Earth to other planets in terms of size • Describes distance of individual planets from the Sun • Identifies characteristics of planets • Recognizes that Earth is somewhat unique in its characteristics • Explains that the Moon and planets shine by reflected sunlight, not their own light 		<p>RIT 181-190:</p> <ul style="list-style-type: none"> • Recognizes that Earth is made of land masses surrounded by large bodies of water, and that most of the Earth's surface is covered by water • Recognizes that oceans are bodies of salt water • Recognizes processes that make up the water cycle • Analyzes precipitation in weather systems • Draws conclusions about the role of clouds in reflecting the Sun's light • Interprets data to identify existing weather conditions • Compares weather from season to season • Describes seasonal patterns in weather • Measures air temperature • Chooses the appropriate tool to measure changes in air temperature (term not used) • Recognizes that wind is air that is moving around us • Recognizes that day and night are caused by the Earth's rotation on its axis • Explains how the Earth's rotation on its axis causes day and night • Describes how the Earth's tilt affects seasons • Explains how Earth's tilt affects the length of daylight during the year • Explains how Earth's tilt affects the heating of Earth's surface • Labels a diagram of Earth to show Earth's core • Describes components of the solar system • Identifies the location of planets relative to the sun • Describes the order of planets and the asteroid belt in the solar system • Recognizes that stars (like the Sun) are the source of light for all bright objects in space • Makes inferences about the effect of pollution on living things • Explains that most pollution results from human activities • Recognizes that air pollution is caused by things that dirty the air
			<p>RIT 171-180:</p> <ul style="list-style-type: none"> • Relates the type of weather experienced to personal choices and activities (e.g., dressing warmly in cold weather, sunglasses on sunny days) • Explains that temperature is a measurement of how hot or cold something is • Recognizes that wind is air that is moving around us • Recognizes that the Sun is not a planet • Describes the Sun, Moon, stars, and Earth
			<p>RIT Below 171:</p> <ul style="list-style-type: none"> • Recognizes that the Sun can only be seen in the daytime

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Lesson Title:

Standard/Concept for All:

Introduction: (Get Attention; Connect to Prior Knowledge)

For Students Ready for a Challenge:

Lesson/Activity:

Resources:

Means of Assessment:

For Most Students:

Lesson/Activity:

Resources:

Means of Assessment:

For Students Needing Extra Support:

Lesson/Activity:

Resources:

Means of Assessment:

Closure/Summary for All:

