

Science ISAT: General Science – Earth and Space Systems
 Skills: Understand Scientific Theories of Origin and Subsequent Changes
 in the Universe and Earth Systems

Students:	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
------------------	---

Students:	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)
------------------	---

Students:	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 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
------------------	---

Students:	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 the water cycle • Analyzes processes which comprise the water cycle • Describes humus • Describes cloud formation in weather systems
------------------	---

Science ISAT: General Science – Earth and Space Systems

Skills: Understand Scientific Theories of Origin and Subsequent Changes in the Universe and Earth 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 replaced with minerals, but in certain fossils (e.g., amber, frozen organisms), biological matter (DNA) may remain
- 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

Students:

RIT 201-210:

- 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 winter
- Labels diagrams of Earth (three layers) to show Earth's mantle
- Recognizes Earth's three layers
- Orders Earth's three layers

Science ISAT: General Science – Earth and Space Systems

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

- 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 life forms appeared, diversified, and went extinct
- 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

Students:

RIT 191-200:

- 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

Science ISAT: General Science – Earth and Space Systems

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

- 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
- 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

Students:

RIT 181-190:

- 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

Students:

RIT 171-180:

- 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

Students:

RIT Below 171:

- Recognizes that the Sun can only be seen in the daytime