

Alignment of *Alien Rescue* with the Texas Essential Knowledge and Skills (TEKS)

Introduction

112.22. Science, Grade 6.	Alien Rescue
<p>(a)(1) In Grade 6, the study of science includes conducting field and laboratory investigations using scientific methods, analyzing data, making informed decisions, and using tools such as beakers, test tubes, and spring scales to collect, analyze, and record information. Students also use computers and information technology tools to support scientific investigations.</p>	<ul style="list-style-type: none"> • Students plan and conduct an investigation to discover the alien needs and find worlds within our solar system that meets those needs. • Students use virtual scientific tools to gather information they determine they need to develop a solution. These virtual tools include a thermometer, barometer, seismograph, magnetometer, and mass spectrometer. • Students analyze the data returned from these instruments and apply the information they gather to the problem at hand. • Students use computers to support all aspects of their scientific investigation.
<p>(a)(2) As students learn science skills, they identify components of the solar system including the Sun, planets, moon, and asteroids and learn how seasons and the length of the day are caused by the tilt and rotation of the Earth as it orbits the Sun. Students investigate the rock cycle and identify sources of water in a watershed. In addition, students identify changes in objects including position, direction, and speed when acted upon by a force.</p>	<ul style="list-style-type: none"> • Students identify components of the solar system, including the Sun, the nine planets, and ten of the moons orbiting those planets. • Students read and discuss forces on other worlds that determine constancy and change of surface features.
<p>(a)(4) Science is a way of learning about the natural world. Students should know how science has built a vast body of changing and increasing knowledge described by physical, mathematical, and conceptual models, and also should know that science may not answer all questions.</p>	<ul style="list-style-type: none"> • Students wrestle with a lack of existing scientific knowledge and develop plans to gather needed information. • Students must make decisions even though they lack answers to all the questions they generate.

<p>(a)(5) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.</p>	<ul style="list-style-type: none"> • Students study the planets and their large moons. They recognize that the solar system contains planetary systems, and that the systems interact to affect the motion of each other. • Students study the effects of Jupiter’s size and powerful gravitational pull on the four Galilean moons. Students learn how the components of the Jovian system interact to create observable patterns and account for the structural conditions of these moons.
<p>(a)(6) Investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and that methods, models, and conclusions built from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.</p>	<ul style="list-style-type: none"> • Students plan and carry out investigations of the solar system. • Students distinguish between questions that can be answered through probe missions and those that cannot. • Students study databases of existing knowledge about our solar system, then modify this knowledge as new information is gleaned from new observations.

Knowledge and Skills

<p>(b)(6.1) Scientific processes. The student conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:</p> <p>(B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.</p>	<ul style="list-style-type: none">• Students deal with budgetary constraints in the design of their probes, making it necessary to make wise choices and conserve their resources.
<p>(b)(6.2) Scientific processes. The student uses scientific inquiry methods during field and laboratory investigations. The student is expected to:</p> <p>(A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting and using equipment and technology;</p> <p>(B) collect data by observing and measuring;</p> <p>(C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence;</p> <p>(D) communicate valid conclusions; and</p> <p>(E) construct graphs, tables, maps, and charts using tools including computers to organize, examine, and evaluate data.</p>	<ul style="list-style-type: none">• Students plan and implement investigations throughout their work in <i>Alien Rescue</i>. They ask questions about the worlds in our solar system based on what the different species need, gather information from existing databases to develop hypotheses about the suitability of a world for a particular species, and select the scientific instruments necessary to gather the information they need to test their hypotheses.• In their solution, students construct explanations for their decisions using the data they have collected as evidence.• Students communicate their decisions using an online solution form and presentation tool.

<p>(b)(6.3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to:</p> <ul style="list-style-type: none">(A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;(D) evaluate the impact of research on scientific thought, society, and the environment; and(E) connect Grade 6 science concepts with the history of science and contributions of scientists.	<ul style="list-style-type: none">• As students discuss their hypotheses, investigation plans, and findings with their classmates, they engage in critique of both their own and others' ideas. They support their opinions with scientific evidence gained through their investigations.• Galileo's contribution to the study of our solar system is discussed in several sections of the solar system database. Teachers are also encouraged to weave this information into class discussions.• Class discussion in <i>Alien Rescue</i> often turns to technological advancement and the impact of these changes on society.• Students read about the history of space flight in the missions database, and use this information as a model in their design of probes.
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<p>(6.4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry.</p>	<p>(A) collect, analyze, and record information using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, timing devices, hot plates, test tubes, safety goggles, spring scales, magnets, balances, microscopes, telescopes, thermometers, calculators, field equipment, compasses, computers, and computer probes; and</p> <p>(B) identify patterns in collected information using percent, average, range, and frequency.</p>	<ul style="list-style-type: none"> • Students collect information about the solar system using virtual tools, including a thermometer, barometer, magnetometer, mass spectrometer, seismograph, RADAR, and infrared, narrow angle, and wide angle cameras. • Students record information in an online notebook. • Data returned from the instruments is presented in a variety of formats, including, percents, averages, and ranges.
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<p>(6.5) Scientific concepts. The student knows that systems may combine with other systems to form a larger system.</p>	<p>(A) identify and describe a system that results from the combination of two or more systems such as in the solar system; and (B) describe how the properties of a system are different from the properties of its parts.</p>	<ul style="list-style-type: none"> • Students learn about the planets and their moons and relate each of these subsystems to the larger solar system in which they exist.
<p>(6.6) Science concepts. The student knows that there is a relationship between force and motion.</p>	<p>(A) identify and describe the changes in position, direction of motion, and speed of an object when acted upon by force; (B) demonstrate that changes in motion can be measured and graphically represented; and (C) identify forces that shape features of the Earth including uplifting, movement of water, and volcanic activity.</p>	<ul style="list-style-type: none"> • Students read about and discuss the forces that shape Io, a moon of Jupiter. They learn how Jupiter's gravitational pull causes volcanic activity on Io, and contrast Io with Earth.

<p>(6.7) Science concepts. The student knows that substances have physical and chemical properties.</p>	<p>(B) classify substances by their physical and chemical properties.</p>	<ul style="list-style-type: none"> • Students use spectrograms to identify the elements the alien species need in the atmospheres and surfaces of their new home worlds. While students do not study spectroscopy in depth, they recognize that every element has a spectral signature, and that this fact can be used to gather useful information.
<p>(6.10) Science concepts. The student knows the relationship between structure and function in living systems.</p>	<p>(C) identify how structure complements function at different levels of organization including organs, organ systems, organisms, and populations.</p>	<ul style="list-style-type: none"> • Students study the alien species to determine their needs. The teacher is encouraged to help students compare these species to ones on Earth to account for their structures. Discussion often includes an examination of how each species adapted to its environment and how these adaptations in turn affected their development of technology.
<p>(6.12) Science concepts. The student knows that the responses of organisms are caused by internal or external stimuli.</p>	<p>(C) identify components of an ecosystem to which organisms may respond.</p>	<ul style="list-style-type: none"> • Students identify components of the ecosystems on the alien worlds that are essential to their survival. They seek worlds in our solar system with similar ecosystems where the alien species will be able to survive and adapt.

<p>(6.13) Science concepts. The student knows components of our solar system.</p>	<p>(A) identify characteristics of objects in our solar system including the Sun, planets, meteorites, comets, asteroids, and moons; and (B) describe types of equipment and transportation needed for space travel.</p>	<ul style="list-style-type: none"> • Students discuss the differences between planets and moons. • Students learn that craters are the result of the impact of meteorites, and that the characteristics of a world determine what happens to craters. • Students identify the characteristics of a world that define it, including atmospheric and surface features, chemical composition, temperature, magnetic field, and seismic activity. • As students design probes, they learn about probe types, communication devices, power sources, and instruments that are used in the exploration of our solar system. They use the mission database to learn about the equipment used in space travel in the past.
<p>(6.14) Science concepts. The student knows the structures and functions of Earth systems.</p>	<p>(C) describe components of the atmosphere, including oxygen, nitrogen, and water vapor, and identify the role of atmospheric movement in weather change.</p>	<ul style="list-style-type: none"> • Students learn about the atmospheres of other worlds in our solar system and compare it to their prior knowledge of Earth's atmosphere.