

8th Grade

Scope & Sequence

Safety

1 week

TEKS

(8.1) Scientific processes. The student conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:

- (A) demonstrate safe practices during field and laboratory investigations; and
- (B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.

(8.2) Scientific processes. The student uses scientific inquiry methods during field and laboratory investigations. The student is expected to:

- (A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting and using equipment and technology;
- (B) collect data by observing and measuring;
- (C) organize, analyze, evaluate, make inferences, and predict trends from direct and indirect evidence;
- (D) communicate valid conclusions; and
- (E) construct graphs, tables, maps, and charts using tools including computers to organize, examine, and evaluate data.

(8.3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to:

- (A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;
- (B) draw inferences based on data related to promotional materials for products and services;
- (C) represent the natural world using models and identify their limitations;
- (D) evaluate the impact of research on scientific thought, society, and the environment; and
- (E) connect Grade 8 science concepts with the history of science and contributions of scientists.

(8.4) Scientific processes. The student knows how to use a variety of tools and methods to conduct science inquiry. The student is expected to:

- (A) collect, record, and analyze information using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, hot plates, dissecting equipment, test tubes, safety goggles, spring scales, balances, microscopes, telescopes, thermometers, calculators, field equipment, computers, computer probes, water test kits, and timing devices; and
- (B) extrapolate from collected information to make predictions.

(8.5) Scientific processes. The student knows that relationships exist between science and technology. The student is expected to:

- (A) identify a design problem and propose a solution;
- (B) design and test a model to solve the problem; and
- (C) evaluate the model and make recommendations for improving the model.

Instructional Goals	Resources
Discuss the grade level safety guide.	Eighth Grade Lab Safety Guide
Discuss the grade level equipment.	Eighth Grade Lab Safety Guide
Students must score 100% on lab safety test.	Eighth Grade Lab Safety Test

Chemistry

6 Weeks

Established Goals: (TEKS)

(8.8) Science concepts. The student knows that matter is composed of atoms. The student is expected to:

- (A) describe the structure and parts of an atom; and (C)
- (B) identify the properties of an atom including mass and electrical charge. (C)

(8.9) Science concepts. The student knows that substances have chemical and physical properties. The student is expected to:

- (A) demonstrate that substances may react chemically to form new substances; (C)
- (B) interpret formation on the periodic table to understand that physical properties are used to group elements; (C)
- (C) recognize the importance of formulas and equations to express what happens in a chemical reaction; and (C)
- (D) identify that physical and chemical properties influence the development and application of everyday materials such as cooking surfaces, insulation, adhesives, and plastics. (S)

(8.10) Science concepts. The student knows that complex interactions occur between matter and energy. The student is expected to:

- (A) illustrate interactions between matter and energy including specific heat; and (C)
- (C) identify and demonstrate that loss or gain of heat energy occurs during exothermic and endothermic chemical reactions. (S)

Enduring Understandings: (for teachers)	Essential Questions: (for teachers and students)
<p>Students will understand that...</p> <ul style="list-style-type: none"> • matter is composed of smaller parts. • substances have specific properties. • chemical reactions can be represented by formulas. • there is a pattern to the periodic table. • matter and energy are connected. 	<ul style="list-style-type: none"> • What are characteristics of atoms? • How would you know when a chemical reaction has occurred? • What patterns do you see on the periodic table? • What can we tell by looking at formulas and equations? • How do properties of a substance determine its use in the real world? • How are matter and energy related?

Students will know...	Students will be able to...
<ul style="list-style-type: none">• the parts of an atom and locations of those parts.• what atomic mass and electrical charges mean as they relate to subatomic particles.• that chemical reactions create new substances.• that similar physical properties are grouped together on the periodic table.• the difference between a formula and a chemical equation.• how to identify interactions between matter and energy, including specific heat.• that heat can be lost or gained during chemical reactions.	<ul style="list-style-type: none">• compare the structure of different atoms.• calculate the atomic mass of an atom.• label the electrical charges on an atom model.• demonstrate a chemical reaction in a lab situation.• explain what happens in a chemical reaction by using equations and formulas.• interpret the periodic table and identify physical properties.• identify what happens to elements during a chemical reaction.• compare the specific heat of different substances.• compare and contrast exothermic and endothermic chemical reactions.

Force & Motion

4 Weeks

Established Goals: (TEKS)

(8.7) Science concepts. The student knows that there is a relationship between force and motion. The student is expected to:

- (A) demonstrate how unbalanced forces cause changes in the speed or direction of an object's motion; and (C)
- (B) recognize that waves are generated and can travel through different media. (C)

<p>Enduring Understandings: (for teachers)</p> <p>Students will understand that...</p> <ul style="list-style-type: none"> • an object's motion can be changed by outside forces. • motion and energy are related. • waves are generated by nature. • waves can travel through different media. • an object's motion can be measured and predicted. 	<p>Essential Questions: (for teachers and students)</p> <ul style="list-style-type: none"> • How do unbalanced forces affect motion? • How would you know when the velocity of an object changed? • How are motion and energy related? • How can we predict an object's motion? • How are waves generated? • How can waves be compared?
<p>Students will know...</p> <ul style="list-style-type: none"> • the difference between balanced and unbalanced forces. • how forces affect motion. • the definition of velocity. • how energy is related to motion. • Newton's three laws of motion. • the three types of waves. • the parts of a wave. • that waves are classified by how they travel. 	<p>Students will be able to...</p> <ul style="list-style-type: none"> • describe an object's motion. • explain how velocity changes. • calculate speed, force, and work as it applies to Newton's laws. • apply Newton's three laws to an object. • explain how waves relate to their everyday lives. • identify and compare different types of waves and their parts. • describe the basic properties of waves (amplitude, frequency, wavelength, and speed). • classify waves by how they travel.

Characteristics of the Universe

4 1/2 Weeks

**Established Goals:
(TEKS)**

(8.12) The student knows that cycles exist in Earth's systems. The student is expected to:

(A) analyze and predict the sequence of events in the lunar cycle **(C)**

(8.13) The student knows characteristics of the universe. The student is expected to:

(A) describe characteristics of the universe such as stars and galaxies; **(C)**

(B) explain the use of light year to describe distances in the universe; and **(S)**

(C) research and describe historical scientific theories of the origin of the universe. **(S)**

<p>Enduring Understandings: (for teachers)</p> <p>Students will understand that...</p> <ul style="list-style-type: none"> • objects rotate and revolve in a system. • the universe is composed of many parts. • there are different scientific theories of the origin of the universe. • the size of the universe can be measured. 	<p>Essential Questions (for teachers and students)</p> <ul style="list-style-type: none"> • Why does the moon appear to change? • In what ways do stars change over time? • How do the characteristics of galaxies differ? • What are the common scientific theories of the origin of the universe? • How is the universe measured?
<p>Students will know...</p> <ul style="list-style-type: none"> • the differences between rotation and revolution. • how to describe the sequence of lunar phases. • that stars are classified by size, temperature and brightness (absolute and apparent magnitude). • the three types of galaxies. • the most common theories used to explain the origin of the universe. • that light years are a unit of measure for distances in the universe. 	<p>Students will be able to...</p> <ul style="list-style-type: none"> • illustrate or demonstrate the lunar cycle. • distinguish between absolute and apparent magnitude. • read and interpret the HR diagram. • illustrate the life cycle of a star. • name the common types of galaxies. • research the most common theories used to explain the origin of the universe. • identify that light years are a unit of measure for distances in the universe.

Planet Earth

7 Weeks

Established Goals: (TEKS)

(8.10) The student knows that complex interactions occur between matter and energy. The student is expected:

- (B) describe interactions among solar, weather, and ocean systems. (C)

(8.12) The student knows that cycles exist on Earth. The student is expected to:

- (A) analyze and predict the sequences of events in the lunar and rock cycles; (C)
- (B) relate the role of oceans to climatic changes; and (S)
- (C) predict the results of modifying the Earth's nitrogen, water, and carbon cycles. (C)

(8.14) The student knows that natural events and human activity can alter Earth systems. The student is expected to:

- (A) predict land features resulting from gradual changes, such as mountain building, beach erosion, land subsidence and continental drift; and (C)
- (C) describe how human activities have modified soil, water, and air qualities. (C)

Enduring Understandings: (for teachers)	Essential Questions (for teachers and students)
<p>Students will understand that ...</p> <ul style="list-style-type: none"> • Earth systems interact. • oceans create climatic changes. • changes in one system can impact another system. • land features change over time. • the Earth is composed of parts. • human activities modify soil, water, and air quality. 	<ul style="list-style-type: none"> • How do solar, weather, and ocean systems interact? • How does a rock change? • What are the effects of El Niño? • What are the consequences of modifying Earth's nitrogen, water, and carbon cycles? • What causes change to the Earth? • What are the consequences of human activities on soil, water, and air quality?
Students will know...	Students will be able to...
<ul style="list-style-type: none"> • that interactions occur between solar, weather, and ocean systems. • the steps of the rock cycle. • the role of the rock cycle within plate tectonics. • that oceans create climatic changes such as El Niño. • the sequence of events of the nitrogen, water, and carbon cycles. 	<ul style="list-style-type: none"> • describe how oceans affect weather. • describe how the sun creates and affects the weather. • interpret the rock cycle. • differentiate among rock types. • understand how El Niño occurs. • describe the effects of El Niño. • sequence the events of the nitrogen, water, and carbon cycles

<ul style="list-style-type: none"> • the effects of modifying the Earth's cycles. • the main forces that change Earth's surface. • the characteristics of Earth's layers. • that continents are attached to plates. • that plates float on the mantle. • the processes involved in plate tectonics. • the history of the continental drift theory. • the different types of plate boundaries. • what events occur at plate boundaries. • that humans and natural events can alter land features. • that human activities can modify soil, water, and air quality. 	<ul style="list-style-type: none"> • elaborate on the effects of modifying the Earth's nitrogen, water, and carbon cycles • distinguish between constructive and destructive forces. • create a model of Earth's layers. • demonstrate movement of plates. • demonstrate sea-floor spreading, subduction, mountain building, volcanic activity, and earthquakes. • describe Wegener's theory. • sketch, label or make a model of convergent, divergent, and transform boundaries. • compare events at plate boundaries. • analyze how humans and natural events contribute to beach erosion and land subsidence. • describe the effects of human activities on air, soil, and water quality.
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Interdependence Among Living Systems

2 1/2 Weeks

Established Goals: (TEKS)

- (8.6) The student knows that interdependence occurs among living systems. The student is expected to:
- (A) describe interactions among systems in the human organism; (C)
 - (B) identify feedback mechanisms that maintain equilibrium of systems such as body temperature, turgor pressure, and chemical reactions; and (C)
 - (C) describe interactions within ecosystems. (C)

<p>Enduring Understandings: (for teachers)</p> <p>Students will understand that...</p> <ul style="list-style-type: none"> • systems interact. • there are mechanisms for maintaining equilibrium in a system. • there are interactions between organisms within an ecosystem. 	<p>Essential Questions: (for teachers and students)</p> <ul style="list-style-type: none"> • How is the human body organized? • What are some interactions between body systems in humans? • What are feedback mechanisms? • How do feedback mechanisms maintain equilibrium in organisms? • How do organisms interact with each other in an ecosystem?
<p>Students will know...</p> <ul style="list-style-type: none"> • the levels of organization in humans. • that interactions occur among systems in the human body. • examples of feedback mechanisms (osmosis, diffusion, and turgor pressure). • that interactions occur between organisms within an ecosystem (symbiosis). 	<p>Students will be able to...</p> <ul style="list-style-type: none"> • sequence the levels of organization in humans. • describe how body systems interact. • identify and describe feedback mechanisms. • distinguish between the three forms of symbiotic relationships. • identify examples of symbiotic relationships. • interpret food chains, food webs, and the food pyramid.

Change Over Time

2 1/2 Weeks

Established Goals: (TEKS)

(8.11) Science concepts. The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms. The student is expected to:

- (A) identify the change in environmental conditions can affect the survival of individuals and of species. (C)

(8.14) The student knows that natural events and human activities can alter Earth's systems. The student is expected to:

- (B) analyze how natural or human events may have contributed to the extinction of some species. (C)

<p>Enduring Understandings: (for teachers)</p> <p>Students will understand that...</p> <ul style="list-style-type: none"> • environmental changes can cause changes in species. • traits are inherited. • environmental change is a result of human and natural events. 	<p>Essential Questions: (for teachers and students)</p> <ul style="list-style-type: none"> • How does the environment change? • How does the ability to adapt affect an organisms' survival? • How do species interact with the environment? • How are inherited traits different from acquired characteristics? • Why might an organism become extinct? • What impact do humans have on other species? • What impact does nature have on species?
<p>Students will know...</p> <ul style="list-style-type: none"> • that humans and natural events can change the environment. • how to describe adaptations. • that adaptations are necessary for survival of a species. • that species interact with the environment. • that the environment can change a species. • the difference between inherited traits and acquired characteristics. 	<p>Students will be able to...</p> <ul style="list-style-type: none"> • identify adaptations that have enabled species to survive. • identify interactions among species in an environment. • explain natural selection and its role in change over time. • compare inherited traits with acquired characteristics. • describe examples of extinct species.

<ul style="list-style-type: none">• the definition of extinction.• that humans can contribute to or prevent extinction.• that natural events can contribute to changes in a species or extinction.	<ul style="list-style-type: none">• identify ways that humans interfere with the survival of a species.• predict how an organism will adapt in a changing environment.• interpret a branching tree.
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Genetics

3 1/2 Weeks

Established Goals: (TEKS)

- (8.11) Science concepts: The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms. The student is expected to:
- (A) Identify that change in environmental conditions can affect the survival of individuals and of species (C)
 - (B) Distinguish between inherited traits and other characteristics that result from interactions with the environment. (C)
 - (C) Make predictions about possible outcomes of various genetic combinations of inherited characteristics. (C)

<p>Enduring Understandings: (for teachers)</p> <p>Students will understand that...</p> <ul style="list-style-type: none"> as the environment changes species must adapt to environmental changes to survive. species interact with the environment. species inherit traits from parents. there are different types of traits. genes carry traits. the outcomes of genetic crosses can be predicted. 	<p>Essential Questions (for teachers and students)</p> <ul style="list-style-type: none"> What causes environmental changes? How do species interact with the environment? What are some examples of how the environment can change a species? How are inherited traits different from acquired characteristics? How are traits inherited? How can probability be applied to patterns of inheritance?
<p>Students will know...</p> <ul style="list-style-type: none"> that humans and natural events can change the environment. how to describe adaptations. that adaptations are necessary for survival of a species. that species interact with the environment. that the environment can change a species. the difference between inherited traits and acquired characteristics. that genes carry traits. that traits are inherited from parents. how to use probability to make predictions. 	<p>Students will be able to...</p> <ul style="list-style-type: none"> identify adaptations that have enabled species to survive. identify ways species interact with the environment. explain natural selection and its role in change over time. compare inherited traits with acquired characteristics. identify that genes carry traits. identify what type of traits are inherited. calculate probability of various genetic combinations.

- how to construct and use a Punnett square.
- how to interpret the results of a Punnett square cross.

- use probability to make predictions.
- construct, use and interpret a Punnett square.
- interpret pedigree charts.