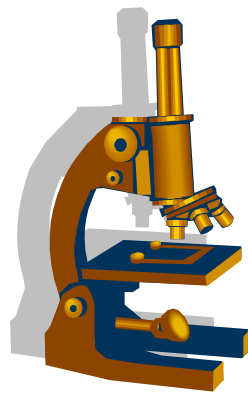


# GRADE 6 SCIENCE



**September/October Grade 6 Science**

**Essential Understanding:** 1) Renewable and nonrenewable resources of energy have emerging scientific issues of usage and management. 2) Scientific knowledge must be based on evidence and grows as new evidence is discovered. Collecting, organizing, and analyzing data contributes to informed problem solving.

**Indicators:**

**6PS5** Explain that the energy found in nonrenewable resources such as fossil fuels (e.g., oil, coal and natural gas) originally came from the sun and may renew slowly over millions of years.

**6PS6** Explain that energy derived from renewable resources such as wind and water is assumed to be available indefinitely.

**6PS7** Describe how electric energy can be produced from a variety of sources (e.g., sun, wind and coal).

**6PS8** Describe how renewable and nonrenewable energy resources can be managed (e.g., fossil fuels, trees and water).

**6SK1** Identify that hypotheses are valuable even when they are not supported.

**6SK2** Describe why it is important to keep clear, thorough and accurate records.

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**November Grade 6 Science**

**Essential Understanding: 1) Technology sometimes contributes and sometimes distracts an individual's ability to survive.**

**Indicators:**

**6ST1** Explain how technology influences the quality of life.

**6ST2** Explain how decisions about the use of products and systems can result in desirable or undesirable consequences (e.g., social and environmental).

**6ST3** Describe how automation (e.g., robots) has changed manufacturing including manual labor being replaced by highly-skilled jobs.

**6ST4** Explain how the usefulness of manufactured parts of an object depends on how well their properties allow them to fit and interact with other materials.

**6ES2** Explain that rocks are made of one or more minerals.

**6ES3** Identify minerals by their characteristic properties.

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**December/January    Grade 6    Science**

**Essential Understanding:** 1) Solutions to problems can come in several ways due to varying constraints. 2) Rocks, of which there are three types, are formed in different ways, and have distinct properties.

**Indicators:**

**6SI3**    Distinguish between observation and inference.

**6ES1**    Describe the rock cycle and explain that there are sedimentary, igneous and metamorphic rocks that have distinct properties (e.g., color, texture) and are formed in different ways.

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**February Grade 6 Science**

**Essential Understanding:** Chemical changes affect the properties of the original substance, while with physical changes the properties remain unchanged.

**Indicators:**

**6PS1** Explain that equal volumes of different substances usually have different masses.

**6PS2** Describe that in a chemical change new substances are formed with different properties than the original substance (e.g., rusting, burning).

**6PS3** Describe that in a physical change (e.g., state, shape and size) the chemical properties of a substance remain unchanged.

**6PS4** Describe that chemical and physical changes occur all around us (e.g., in the human body, cooking and industry).

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**March Grade 6 Science****Essential Understanding: NEED****Indicators:**

**6ST5** Design and build a product or create a solution to a problem given one constraint (e.g., limits of cost and time for design and production, supply of materials and environmental effects).

**6SI4** Explain that a single example can never prove that something is always correct, but sometimes a single example can disprove something.

**6LS1** Explain that many of the basic functions of organisms are carried out by or within cells and are similar in all organisms.

**6LS2** Explain that multi-cellular organisms have a variety of specialized cells, tissues, organs and organ systems that perform specialized functions.

**6LS3** Identify how plant cells differ from animal cells (e.g., cell wall and chloroplasts).

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**April Grade 6 Science**

**Essential Understanding:** Continuation of species is through reproduction and a combination of inherited traits. Different sets of procedures guide scientific investigations. The nature of the investigation leads to safety considerations and appropriate tools.

**Indicators:**

**6LS4** Recognize that an individual organism does not live forever; therefore reproduction is necessary for the continuation of every species and traits are passed on to the next generation through reproduction.

**6LS5** Describe that in asexual reproduction all the inherited traits come from a single parent.

**6LS6** Describe that in sexual reproduction an egg and sperm unite and some traits come from each parent, so the offspring is never identical to either of its parents.

**6LS7** Recognize that likenesses between parents and offspring (e.g., eye color, flower color) are inherited. Other likenesses, such as table manners are learned.

**6SI1** Explain that there are not fixed procedures for guiding scientific investigations; however, the nature of an investigation determines the procedures needed.

**6SI2** Choose the appropriate tools or instruments and use relevant safety procedures to complete scientific investigations.

**AUTHENTIC ASSESSMENT**

Teacher  
Use  
Only

**May Grade 6 Science**

**Essential Understanding:** 1) Scientific knowledge reflects the historical and cultural contributions of women and men who provide us with a more reliable and comprehensive understanding of the natural world in daily life.

**Indicators:**

**6SK3** Identify ways scientific thinking is helpful in a variety of everyday settings.

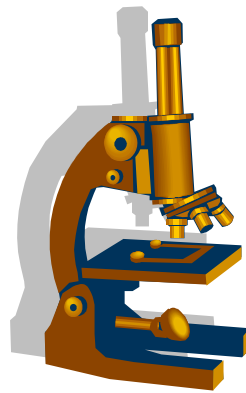
**6SK4** Describe how the pursuit of scientific knowledge is beneficial for any career and for daily life.

**6SK5** Research how men and women of all countries and cultures have contributed to the development of science.

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

# GRADE 7 SCIENCE



**September**      **Grade 7 Science**

**Essential Understanding:** Energy entering an ecosystem as sunlight provides life for all organisms in an ecosystem.

**Indicators:**

**7LS2** Investigate how organisms or populations may interact with one another through symbiotic relationships and how some species have become so adapted to each other that neither could survive without one another. (predator-prey, parasitism, mutualism and commensalism)

**7LS3** Explain how the number of organisms an ecosystem can support depends on adequate biotic (living) resources (plants, animals and abiotic (non-living) resources (light, water, soil)

**7LS4** Investigate how overpopulation impacts an ecosystem.

**7LS5** Explain that some environmental changes occur slowly while others occur rapidly (forest and pond succession, fires and decomposition).

**LS7** Explain that photosynthetic cells convert solar energy into chemical energy that is used to carry on life functions or is transferred to consumers and used to carry on their life functions.

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**October Grade 7 Science**

**Essential Understanding:** The interaction of Earth's systems creates distinct and habitable ecosystems. Technology affects our quality of life.

**Indicators:**

**7ES1** Explain the biogeochemical cycles which move material between the atmosphere, hydrosphere and stratosphere.

**7ST1** Explain how needs, attitudes and values influence the direction of technological development in various cultures.

**7ST2** Describe how decisions to develop and use technologies often put environmental and economic concerns in direct competition with each other.

**7ST3** Recognize that science can only answer some questions and technology can only solve some human problems.

**Authentic Assessment**

Teacher  
Use Only

**November Grade 7 Science****Essential Understanding:** .

Students will know and identify climate zones based on latitude and precipitation

Students will design an experiment, formulating appropriate questions, and identifying dependent and independent variable.

**Indicators:**

**ES8- Describe how temperature and precipitation determine climatic zones (biomes)- desert, grasslands, forests, tundra, and alpine**

**S14 – Choose the appropriate tools and instruments and use relevant safety procedures to complete scientific investigations**

S11- Explain that variables and controls can affect the results of an investigation and that ideally one variable should be tested at a time: however, it is not always possible to control variable

S12- Identify simple independent and dependent variables

S13- Formulate and identify questions to guide scientific investigations that connect to science concepts and can be answered through scientific investigations

**Authentic Assessment**

Teacher  
Use Only

**December      Grade 7 Science****Essential Understanding: Biogeochemical cycles are affected by technology****The scientific inquiry method is used to develop plans of action to create and evaluate a variety of conclusions.****Indicators:**

**7ES1- Analyze data on the availability of fresh water that is essential for life and for most industrial and agricultural processes. Describe how rivers, lakes and groundwater can be depleted or polluted becoming less hospitable to life and even becoming unavailable or unsuitable for life.**

**7LS6 – Summarize the ways that natural occurrences and human activity affect the transfer of energy in Earth’s ecosystems**

**AUTHENTIC ASSESSMENTS**

Teacher  
Use Only

**January Grade 7 Science**

**Essential Understanding:** The amount of matter remains constant. The amount of energy remains constant. Variables and controls affect the result of an investigation.

**Indicators:**

**7SK1** Show that the reproducibility of results is essential to reduce bias in scientific investigations.

**7SK2** Describe how repetition of an experiment may reduce bias.

**7PS1** Investigate how matter can change forms but the total amount of matter remain constant.

**7PS2** Describe how an object can have potential energy due to its position or chemical composition and can have kinetic energy due to its motion.

**AUTHENTIC ASSESSMENTS**

Teacher  
Use Only

**February Grade 7 Science**

**Essential Understanding:** The amount of matter remains constant. The amount of energy remains constant. Molecular models showing a chemical reaction.

**Indicators:**

**7PS3** Identify different forms of energy (electrical, mechanical, chemical, thermal, nuclear, radiant and acoustic)

**7PS4** Explain how energy can change forms but the total amount of energy remains constant.

**7PS5** Trace energy transformation in a simple closed system (flashlight)

**7SI7** Use graphs, tables and charts to study physical phenomena and infer mathematical relationships between variables (speed, density)

**AUTHENTIC ASSESSMENTS**

Teacher  
Use Only

**March Grade 7 Science**

**Essential Understanding: Similarities and differences can be found in multi-cellular organisms**

**Indicators:**

**7LS1** Investigate the great variety of body plans and internal structures found in multi-cellular organism.

**7LS8** Investigate the great diversity among organism.

Note – continues into april

**AUTHENTIC ASSESSMENTS**

Teacher  
Use Only

**April Grade 7 Science**

**Essential Understanding:** Evolution is a process that occurs as a result of genetic and environmental conditions. Interpretations and comparison of scientific data requires accurate records.

**Indicators:**

**7LS1** Investigate the great variety of body plans and internal structures found in multi-cellular organisms.

**7LS8** Investigate the great diversity among organisms.

**7SK3** Describe how the work of science requires a variety of human abilities and qualities that are helpful in daily life (reasoning, creativity, skepticism and openness)

**7SI5** Analyze alternative scientific explanations and predictions and recognize that there may be more than one good way to interpret a given set of data.

**7SI6** Identify faulty reasoning and statements that go beyond the evidence or misinterpret the evidence.

**AUTHENTIC ASSESSMENTS**

Teacher  
Use Only

**May Grade 7 Science**

**Essential Understanding:** The interaction of matter and energy throughout the lithosphere, atmosphere and hydrosphere produces weather.

**Indicators:**

**7ES3** Describe the water cycle and explain the transfer of energy between the atmosphere and hydrosphere.

**7ES5** Make simple weather predications based on the changing cloud types associated with frontal systems.

**7ES6** Determine how weather observations and measurements are combined to produce weather maps and that data for a specific location at one point in time can be displayed in a station model.

**7ES7** Read a weather map to interpret local, regional and national weather.

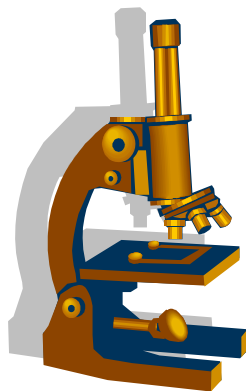
**7ES9** Describe the connection between the water cycle and weather-related phenomena (tornadoes, floods, droughts and hurricanes.)

**7ST4** Design and build a product or create a solution to a problem given two constraints (limits of cost and time for design and production or supply of materials and environmental effects).

**AUTHENTIC ASSESSMENTS**

Teacher  
Use Only

# GRADE 8 SCIENCE



**September      Grade 8 Science**

**Essential Understanding: Following specific rules gives us a way of finding new information.**

**Technical advances are made in order to solve the problems of the time and place.**

**Indicators:**

**8SK1** Identify the difference between description (e.g., observation and summary) and explanation (e.g., inference, prediction, significance and importance).

**8SK2** Explain why it is important to examine data objectively and not let bias affect observations.

**8SI2** Describe the concepts of sample size and control and explain how these affect scientific investigations.

**8SI3** Read, construct and interpret data in various forms produced by self and others in both written and oral form (e.g., tables, charts, maps, graphs, diagrams and symbols).

**8SI4** Apply appropriate math skills to interpret quantitative data (e.g., mean, median and mode).

**8ST4** Evaluate the overall effectiveness of a product design or solution.

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**October Grade 8 Science**

**Essential Understanding:** Technical advances are made in order to solve the problems of the time and place.

**Waves transmit energy, not matter, with different strength.**

**Indicators:**

**8SI1** 1. Choose the appropriate tools or instruments and use relevant safety procedures to complete scientific investigations. (**Chapter 2**)

**8ST1** 1. Examine how science and technology have advanced through the contributions of many different people, cultures and times in history.

**8ST2** 2. Examine how choices regarding the use of technology are influenced by constraints caused by various unavoidable factors (e.g., geographic location, limited resources, social, political and economic considerations). (**Chapter 3**)

**8PS4** 4. Demonstrate that waves transfer energy.

**8PS5** 5. Demonstrate that vibrations in materials may produce waves that spread away from the source in all directions (e.g., earthquake waves and sound waves).

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**November Grade 8 Science**

**Essential Understanding:** Waves transmit energy not matter with different strengths.  
Space is vast and in order to study it, many different tools are used.

**Indicators:**

**8PS4** 4. Demonstrate that waves transfer energy. (**Chapter 1**)

**8PS5** 5. Demonstrate that vibrations in materials may produce waves that spread away from the source in all directions (e.g., earthquake waves and sound waves). (**Chapter 1, sec 4**)

**8ES6** 6. Explain interstellar distances are measured in light years (e.g., the nearest star beyond the sun is 4.3 light years away).

**8ES8** 8. Name and describe tools used to study the universe (e.g., telescopes, probes, satellites and spacecraft). (**Chapter 4, sect 1**)

**8ES2** 2. Explain that gravitational force is the dominant force determining motions in the solar system and in particular keeps the planets in orbit around the sun.

**8ES3** 3. Compare the orbits and composition of comets and asteroids with that of Earth.

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**December Grade 8 Science****Essential Understanding: Space is vast and in order to study it, many different tools are used. NEOs have different characteristics.****Indicators:**

**8ES2** Explain that gravitational force is the dominant force determining motions in the solar system and in particular keeps the planets in orbit around the sun.

**8ES3** Compare the orbits and composition of comets and asteroids with that of Earth.

**8ES4** Describe the effects that asteroids or meteoroids have when moving through space and sometimes entering planetary atmospheres (e.g., meteors – “shooting stars” – and meteorites).

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**January Grade 8 Science**

**Essential Understanding:** The formation and evolution of stars and galaxies occur in predictable stages.  
Forces affect the motion of objects.

**Indicators:**

**8ES7** Examine the life cycle of a star and predict the next likely stage of a star. (**Chapter 4**)

**8ES5** Explain that the universe consists of billions of galaxies that are classified by shape. (**Chapter 4**)

**8PS1** Describe how the change in the position (motion) of an object is always judged and described in comparison to a reference point.

**8PS2** Explain that motion describes the change in the position of an object (characterized by a speed and direction) as time changes.

**8PS3** Explain that an unbalanced force acting on an object changes that object's speed and/or direction.

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**February**      **Grade 8 Science**

**Essential Understanding:**    **Positions and motions of the objects in the universe cause predictable and cyclic events.**

**Indicators:**

**8ES1**    Describe how objects in the solar system are in regular and predictable motions that explain such phenomena as days, years, seasons, eclipses, tides and moon cycles.

**8ES2**    Explain that gravitational force is the dominant force determining motions in the solar system and in particular keeps the planets in orbit around the sun.

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**March Grade 8 Science**

**Essential Understanding: Major forces above and below the Earth's surface are continually reshaping the surface.**

**Indicators:**

**8ES9** Describe the interior structure of Earth and Earth's crust as divided into tectonic plates riding on top of the slow moving currents of magma in the mantle.

**8ES10** Explain that most major geological events (e.g., earthquakes, volcanic eruptions, hot spots and mountain building) result from plate motion.

**8ES11** Use models to analyze the size and shape of Earth, its surface and its interior (e.g., globes, topographic maps, satellite images).

**8ES12** Explain that some processes involved in the rock cycle are directly related to thermal energy and forces in the mantle that drive plate motions.

**8ES13** Describe how landforms are created through a combination of destructive (e.g., weathering and erosion) and constructive processes (e.g., crustal deformation, volcanic eruptions and deposition of sediment).

**8ES14** Explain that folding, faulting and uplifting can rearrange the rock layers so the youngest is not always found on top.

**8ES15** Illustrate how the three primary types of plate boundaries (transform, divergent and convergent) cause different landforms (e.g., mountains, volcanoes and ocean trenches).

**8PS5** Demonstrate that vibrations in materials may produce waves that spread away from the source in all directions (e.g., earthquake waves and sound waves).

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**April Grade 8 Science****Essential Understanding: Evolution is a process that occurs as a result of genetics and environmental conditions.****Indicators:**

**8LS1** Describe that asexual reproduction limits the spread of detrimental characteristics through a species and allows for genetic continuity.

**8LS2** Recognize that in sexual reproduction new combinations of traits are produced which may increase or decrease an organism's chances for survival.

**8LS3** Explain how variations in structure, behavior or physiology allow some organisms to enhance their reproductive success and survival in a particular environment.

**8LS4** Explain that diversity of species is developed through gradual processes over many generations (e.g., fossil record).

**8LS5** Investigate how an organism adapted to a particular environment may become extinct if the environment, as shown by the fossil record, changes.

**\*\*\*Two weeks of OAT review of non-eighth grade materials.\*\*\***

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

**May/June            Grade 8 Science**

**Essential Understanding:    Creating a product entails using scientific problem-solving skills to deal with various constraints.**

**Indicators:**

**8SI1**    Choose the appropriate tools or instruments and use relevant safety procedures to complete scientific investigations.

**8ST3**    Examine how choices regarding the use of technology are influenced by constraints caused by various unavoidable factors (e.g., geographic location, limited resources, social, political, and economic considerations).

**8ST3**    Design and build a product or create a solution to a problem given more than two constraints (e.g., limits of cost and time for design and production, supply of materials and environmental effects).

**8ST4**    Evaluate the overall effectiveness of a product design or solution.

**AUTHENTIC ASSESSMENT**

Teacher  
Use Only

