**Curriculum**

**6th Grade Integrated Science**

**Course Overview**

The sixth grade course surveys topics from each of the traditional science disciplines – physical, life, and earth – to show their interrelatedness. This course provides a foundation in historical development, concepts and processes, methodology, and terminology of these sciences. Students are given the opportunity to develop skills such as observing, identifying, describing, comparing, classifying, stating a conclusion, inferring, constructing models, and measuring. They are urged to ask what, how, and why questions that lead to and reinforce critical thinking and problem solving skills.

More specifically, units of study include: Science process skills, Heat Transfer, The Nature of Matter, Energy Sources, The Changing Surfaces of Earth, Astronomy and Marine Biology. These topics are in alignment with the Core Knowledge Sequence.

**Department Standards**

**STANDARD 1: THE NATURE OF SCIENCE**

**STANDARD 2: SCIENCE AND TECHNOLOGY**

**STANDARD 3: THE PHYSICAL SETTING**

**STANDARD 4: THE LIVING ENVIRONMENT**

**STANDARD 5: SCIENCE AND SOCIETY**

**Benchmarks**:

[Science Department Standards & Benchmarks](http://acidale.on-rev.com/dante/Science/Standards&BenchmarksK-12.docx)

**Performance Indicators**

**Science 6**

**Performance Indicators**

**First Quarter**

-generates a list of lab safety rules in a poster format-understands and can explain the importance of the SI units for standards of measurement for temperature, time, volume, mass and length including prefixes from kilo to milli (1.10)

-attributes the correct SI unit of measure to time, volume, mass, and length and temperature.(1.23,1.24)

-records observations and produces table of results that either support or reject a hypothesis(1.4, 1.30, 1.34)

-recognizes, classifies and organizes observations based on quantitative or qualitative attributes.(1.1, 1.23, 1.30)

**Second Quarter**

-understand the relationship between size/distance and gravitational pull (3.6, 3.51, 3.52, 3.57, 3.58)

-summarize the factors of rotation, revolution and tilt of axis to constellation and moon viewing. (3.7)

-compare various masses that are apart of the solar system including comets, asteroids, planets, etc. (3.4, 2.1)

-classify galaxies based on Hubble’s system (3.1, 3.2, 2.1)

-interpret constellations (1.9)

-classify stars using the H-R diagram (1.18, 3.49)

-produce an illustration and a skit of either a low-mass or high-mass star’s life cycle (1.12,1.13,1.14, 1.22)

-compare the layers of the earth. (3.14, 3.15, 3.25)

-interpret the evidence for continental drift and the theory of plate tectonics. (3.17, 3.20, 3.22, 3.24, 1.3)

-explain the possible role of convection and conduction in plate movement (3.14, 3.15, 3.25)

-produce a model of plate boundaries (1.2, 1.12, 1.14)

-critique the importance of the theory of plate tectonics to our understanding of geological phenomena. (1.3, 3.26)

-attribute magnitude of earthquake by observations of damage (1.13, 1.20, 1.22)-identifies forms and transformations of energy (3.45)

**Third Quarter**

-explains the relationship between temperature, heat and molecular motion.(3.46, 3.48)

-analyzes scenarios involving at least one form of heat transfer and correctly identify the type of energy transfer. (3.45, 3.47)

-produces a story board which clearly depicts all three types of energy transformation. (1.36, 3.45)

-applies the law of conservation of energy during an experiment.

-summarizes how electricity is produced using a generator(2.12, 2.13, 2.15, 3.45)

-compare the various sources of energy for electricity such as wind, water, solar, coal, gas, oil, geothermal and nuclear (2.13, 2.16, 2.19)

-summarize how fossil fuels are formed and used. (3.19, 3.22)

-differentiate whether a source of energy is renewable or non-renewable. (3.12, 2.21)

-critique the benefits and costs of certain sources of energy for a particular community (2.10, 2.14, 2.17, 2.20, 1.33, 1.35).

-remembers the evidence that all matter consists of particles called atoms that are made up of certain smaller particles (atomic theory)(3.37, 3.34)

-identifies a substance based on its physical properties (3.41)

-compares the motion of particles of matter in different states. (3.31, 3.32)

-differentiates between the states of matter based on their attributes with regards to definite volume and shape (3.29, 3.32)

-differentiates between amorphous and crystalline solids. (3.29)

-explains how a substance can combine with different substances in different ways, depending on the conditions and the properties of each substance.(3.31)

-executes a lab which applies the law of conservation of matter. (3.38)

-attribute movement of ocean currents due to temperature and density differences (3.11)

-understand the water cycle, interpret symbols and then label a diagram (3.9)

-infer the differences in mineral content and uses of deep ocean rock and from that found in continental shelf (3.12)

**Fourth Quarter**

-organize their presentation on marine biology by focussing on the differences between plants and animals and microscopic organisms including the differences in body structures(4.1, 4.2)

-species produce offspring (4.5, 4.37)

-cells visible mainly through microscope (4.11)

-plan and generate a food web that illustrates the flow of energy from the sun as the main source of energy demonstrating that organisms compete or at least interact (through symbiosis and parasites) for basic necessities (4.19, 4.20, 4.23, 4.78, 4.28, 4.29, 4.30)- scavenge and decompose (4.21)

-populations flourish or limited by resources (4.22)

- will classify water pollution sources as point or nonpoint (3.10)

-critique through discussion each ocean environments limited capacity of the Earth’s resources to absorb resources and the effect of pollution on each of these environments(3.14, 3.21)

-produce a slide show based on groupwork on a paticular ocean environment (1.33, 1.35, 1.37)

-summarize the role of organs and organ systems and how the composition of cells related to function, infer that cells continually grow and are repaired (4.11, 4.12, 4.14, 4.15, 4.16, 4.38)

-recognize the role of digestion in supply of nutrients for a multi-cellular organism (4.39)

-classify organs and their functions based on their role in the respiratory and circulatory system (4.40)

-differentiate the roles of various components of the lymphatic and immune system as well as the current use of transplants and the use of drugs to fight infection (2.24, 2.25 2.26, 4.41)

**Assessments**

**Science 6**

**Assessments**

Every quarter students will be assessed with rubrics on their science journal and binder organization.

**First Quarter**

Mobius Strip Lab

Labs using metric measurement tools to measure mass, volume and distance

pHet simulation on Gravity and Orbit

Gravity poster

Tide Clock

Test on Earth-Moon-Sun system

On-line lab with star color H-R diagram

life cycle of a star poster and skit Summative

Quiz on sun and constellations

Test on Stars and Galaxies

**Second Quarter**

Webquest on Plate Tectonics

Modeling of continental and oceanic crusts

Lab using the Mercalli’s Scale to assess location of epicentre

Earthquake Report

Labs on Forms of Energy and Energy Transfer

**Third Quarter**

Lab on Thermal Energy transfers

Test on Energy forms, transformations and resources

Insulator vs Conductor Labs

Phase Change Lab

Quizzes: Science Process Skills, Lab Safety and Metric System, Transfer of Thermal Energy and Phase Changes.

Test on Matter Unit

Quiz on Ocean Floor features

Oceanography test

**Fourth Quarter**

Completion of Packet provided for Marine Biology Project

Slide show and presentation on Marine Biology Project: interaction of life and physical features of a marine environment.

Lab on spread of microorganisms

Research the different causes of non-infectious and infectious diseases.

Create a Timeline of one infectious disease

**Core Topics**

**Science 6**

**Core Topics**

**First Quarter**

Science Process Skills

SI Units of Measure

Astronomy

**Second Quarter**

Plate TectonicsForms of Energy

**Third Quarter**

Sources of Energy

Heat

States of Matter

**Fourth Quarter**

OceanographyMarine Biology

Immunology: Cardiovascular, Respiratory and Immune Systems

**Specific Content**

**Science 6**

**Specific Content**

**First Quarter**

Introduction

-lab safety

-science process skills

-metric system

-estimation

Astronomy

-Moon-Earth-Sun System

-Gravity: Newtown’s Laws

-Stars: Life Cycles

-Galaxies

**Second Quarter**

Earth Science

-Earth’s Surface

-Tectonic Plates

-Earth’s Forces: Earthquakes, Volcanoes

Forms of Energy

-law of conservation of energy: energy cannot be created or destroyed but only

transformed from one form to another

Thermal Energy

-temperature scales

-heat: conduction, convection, radiation

-thermal conductors vs insulators

**Third Quarter**

-heat: transfer of energy and temperature (how vigorously atoms are moving and

colliding)

-Three ways of heat transfer (convection, radiation, conduction)

-sources of energy (fossil fuels, nuclear energy, inexhaustible resources and

renewable resources)

Physical Changes and States of Matter

-phase changes

-expansion and contraction

-physical changes vs chemical changes

-law of conservation of matter

**Fourth Quarter**

Physical Geography of Oceans

-Tides, Waves, and Currents

-Ocean Exploration

-Ocean Floor Structures

Biology

-Marine Life- adaptations to environments

-Biodiversity- ecosystem and food webs

-Immune System: Circulatory, Respiratory and Lymphatic responses

**Resources**

**Science 6**

**Resources**

**First Quarter**

*Inquiry Skills Activities Book1,*  *Pearsons 2012*

Chapter 1 lessons 1-5 *Astronomy and Space Science*, Interactive Science, Pearson 2011

*Earth, Sun & Moon* Delta Science Modcule 3rd Ed. 2006

Chapter 3 Lesson 3 4 *Astronomy and Space Science*, Interactive Science, Pearson 2011

Chapter 4 Lesson 2-4 *Astronomy and Space Science*, Interactive Science, Pearson 2011

*Astronomy* DSM 3rd Ed. 2006

”Talking About Gravity” pg. 97 Uncovering Student Ideas in Science vol. 1

“Where do Stars go?” pg. 191 Uncovering Student Ideas in Science vol. 3

Internet:

Digital lessons and videos <https://www.pearsonsuccessnet.com/snpapp/login/PsnLandingPage.jsp?showLandingPage=true>

Content Videos for extra support Brainpop.com

on-line activities for extension and support LMS Science 6 Resources

pHet Simulations Gravity and Orbit

http://cse.ssl.berkeley.edu/SegwayEd/lessons/classifying\_galaxies/galaxy.htm

**Second Quarter**

**Textbooks:**

Chapter 1 *Earth Structure and Function.* Interactive Science, Pearson 2011

Chapter 3 *Earth Structure and Function.* Interactive Science, Pearson 2011

Earth Processes, Delta Science Module 3rd ed. 2006

**Internet:**

Digital Lessons and videos <https://www.pearsonsuccessnet.com/snpapp/login/PsnLandingPage.jsp?showLandingPage=true>

http://school.discoveryeducation.com/lessonplans/programs/continentaldrift/#mat

Websites for Plate Tectonic are located on the LMS but here are also two direct links for teacher reference: http://geology.com/nsta/http://www.pbs.org/wnet/savageearth/animations/hellscrust/main.html

www.Brainpop.com: pangea

**Third Quarter**

Textbook:

Energy and Matter iScience Glencoe 2012

Videos for classroom use:

“Methods Of Heat Transfer” (2007) and “Changes of States of Matter” (2005) Produced by: Video Education Australia Distributed by Boulton-Hawker Films Limited.

Websites:

www.brainpop.com for videos on the topics of temperature, molecules, states of matter

Uncovering Student Ideas in Science vol. 1, 2 and 3 “Ice Cubes in a Bag” pg. 49 of vol. 1 “Lemonade”pg.55 of vol. 1

**Fourth Quarter**

Textbook:

Oceans by Delta Science

App:

National Geographic Deep Sea Challenge

[https://itunes.apple.com/us/app/deepsea-challenge/id899164288 ?mt=8](https://itunes.apple.com/us/app/deepsea-challenge/id899164288?mt=8" \t "_blank)

Videos:

BBC Series: The Blue Planet 4 DVD Special Edition Box Set 2005.

‘The Human Body in Action: The Immune System.” Viewtech educational media. 2001

Websites:

LMS resources

<http://nobelprize.org/educational/medicine/landsteiner/readmore.html>