

**VOORHEES, NEW JERSEY 08043** 

# SCIENCE CURRICULUM GUIDE

Kindergarten through Eighth Grade

Completed:January 2011Board Approved:May 2011Implemented:September 2011

## VOORHEES TOWNSHIP PUBLIC SCHOOLS BOARD OF EDUCATION

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## SCIENCE CURRICULUM PHILOSOPHY

## VOORHEES TOWNSHIP

The purpose of this curriculum is to provide the science teaching staff with direction and guidance in the teaching of science, as well as correlate the curriculum objectives with the 2009 Science Core Curriculum Content Standards of the State of New Jersey (<u>http://njcccs.nj.gov/</u>) and the Benchmarks for Science Literacy 2061 by American Association for the Advancement of Science.

The district curriculum spirals content from the Life, Earth, and the Physical Science fields at every grade level. The principle is held that these sciences are interrelated and that the knowledge and application of one is dependent on the others. Moreover, science is an inter-disciplinary field that affects all aspects of the environment.

Each staff member uses an overview of the curriculum to insure cognitive development, sequence, continuity, and a holistic understanding for the learner. The planning and implementation of science classes utilize an appropriate variety of strategies and media to carry out the objectives in this curriculum. Provisions are made for hands-on experiments, computer programs, and outdoor activities and these are encouraged.

The expected outcome is that students will possess a strong sense of science principles, see their relevance to everyday life, and will thrive, with confidence and success, in the high-tech environment of the twenty-first century.

## SCIENCE CURRICULUM GOALS

The science curriculum is designed to nurture and foster these goals:

- Provide a curriculum that links instruction to real life experiences.
- Utilize numerous resources to provide a variety of learning experiences.
- Actively engage students in developing relevant process skills, critical thinking, and decision making to effect problem solving.
- Promote science literacy as a functional survival skill, recognizing that altering the environment can bring about negative consequences.
- Encourage learners to take an active role in learning and applying science concepts.
- Stimulate an interest in science and its impact on society.

## **EVALUATION**

The successful attainment of the objectives listed in this guide by students shall be assessed in the following manner:

- 1. Teacher observation.
- 2. Teacher constructed test.
- 3. When appropriate, the district approved standardized test, Terra Nova, Second Edition
- 4. Where appropriate, the New Jersey Assessment of Skills and Knowledge (NJ ASK) grades four and eight

## ADAPTABILITY

This course of instruction shall be modified through varying techniques, strategies, materials, etc. to meet the needs of all students, including, but not limited to, special education, ESL, and basic skills. Programs shall be modified based on IEP's, ISIP's, etc.

## DISTRICT APPROVED SCIENCE PROGRAM/TEXTBOOKS

## Kindergarten through Grade Six:

• MacMillan/McGraw-Hill Science, ©2005

## Grades Seven and Eight:

• MacMillan/McGraw-Hill Glencoe Science; ©2005

#### Enrichment Program:

• Chemistry Level 1; Gravitas Publications; ©2008

## Standards and Strands

There are four standards, each of which has a number of identified strands. These standards and their associated strands are listed below:

#### **5.1 Science Practices**

- Understand Scientific Explanations
- Generate Scientific Evidence Through Active Investigations
- Reflect on Scientific Knowledge
- Participate Productively in Science

## 5.2 Physical Science

- Properties of Matter
- Changes in Matter
- Forms of Energy
- Energy Transfer and Conservation
- Forces and Motion

#### 5.3 Life Science

- Organization and Development
- Matter and Energy Transformations
- Independence
- Heredity and Reproduction
- Evolution and Diversity

#### 5.4 Earth Systems Science

- Objects in the Universe
- History of Earth
- Properties of Earth Materials
- Tectonics
- Energy in Earth Systems
- Climate and Weather
- Biogeochemical Cycles

<u>Curriculum Guide Note</u>: All content areas meet standards: 5.1.8.A.1, 2, 3, 5.1.8.B.1, 2, 3, 4, 5.1.8.C.1, 2, 3 (Includes scientific inquiry and processing skills)—these standards are embedded throughout the entire science program.

## Voorhees Township Schools Science Course of Study/Kindergarten Objectives Macmillan/McGraw-Hill Science © 2005

Unit	Chapter(s)	Lesson(s)
A - Plants		2 - 4
B – Animals		1, 2, 4, 7
D - Weather		5
C – Our Earth, Our Home		1, 3
F - Moving Right Along		3, 4

## New Jersey Core Curriculum Content Standards Added

## Unit A - Plants

Core Standards: 5.1.P. A1, 5.1.P. B1, 5.1.P. D1, 5.2.P. A1, 5.3.P. A1, 5.3.P. B1, 5.3.P. C1, 5.3.P. D1

- 1. Understand how plant parts help the plant get what it needs to grow and mature
- 2. Recognize that a plant needs air, water, light, and soil to survive
- 3. Recognize that a plant's seeds are found in its fruit, and that the same type of plant will grow from the seed
- 4. Recognize that plants can be identified by their parts
- 5. Identify and explore plants that we eat and the foods that come from different plants

## Unit B - Animals

Core Standards: 5.1.P. A.1, 5.1.P. D1, 5.3.P. A1, 5.3.P. B1, 5.3.P. C1, 5.3.P. D1, 5.4.P. E1

- 1. Understand the basic definition of an animal and explore animals in your neighborhood
- 2. Learn about bugs, their attributes, and where they live
- 3. Understand the basic definition of a reptile, its attributes, and where it lives
- 4. Understand what animals need in order to survive

- 5. Learn about birds, fish, and other water animals
- 6. Explore how animals have adapted to their environments
- 7. Understand how animals grow and change as they mature
- 8. Explore relationships between people and animals

## Unit C - Our Earth, Our Home

Core Standards: 5.1.P. A1, 5.1.P. D1, 5.2.P. A1, 5.3.P. D1, 5.4.P. C1, 5.4.P. G1

- 1. Explore the composition and uses of soil
- 2. Investigate the characteristics of different rocks
- 3. Learn characteristics of geographic features that are high and low
- 4. Learn Characteristics of rivers, streams, lakes, and oceans and identify water as a natural resource
- 5. Learn different reasons for and way s of recycling

## Unit D - Weather

## Core Standards: 5.1.P. B1, 5.1.P. B2, 5.2.P. C1, 5.4.P. E1, 5.4.P. F.1

- 1. Recognize the characteristics of different kinds of weather such as wind, sun, rain, and snow
- 2. Recognize and describe different types of clouds
- 3. Identify what occurs in nature and what people do in different seasons
- 4. Recognize that the Sun creates shadows and appears to move through the sky
- 5. Recognize elements in the night sky, such as the Moon and stars, and understand that the night sky changes

## Unit F - Moving Right Along

Core Standards: 5.1.P. B1, 5.1.P. C1, 5.1.P. D1, 5.2.P. A1, 5.2.P. B1, 5.2.P. C1, 5.2.P. E1

- 1. Recognize that wheels affect speed and motion and make moving easier
- 2. Explore ways objects move and forces that cause movement
- 3. Describe sounds and understand how they are made
- 4. Recognize that magnets can be used to make some objects move without being touched

## Voorhees Township Schools Science Course of Study/Grade 1 Objectives Macmillan/McGraw-Hill Science © 2005

## New Jersey Core Curriculum Content Standards Added

Unit	Chapter(s)	Lesson(s)	Time Frame
C - Sky and Weather	5 - Sky 6 - Weather/Weather Changes	All 4, 5	September – November
F - On the Move	12 - Magnets	All	December - February
D - Caring for Earth	7 - Resources	All	February - March
A - Plants are Living Things	1 - Living Things 2 - Plants	All All	April - June
B - Animals are Living Things	3 - Animals	All	April - June
E - Matter(time permitting)	9 - Matter	All	June

#### Chapter 1 – Living Things

Core Standards: 5.1.4. B1, 5.3.4. A1, 5.3.4. A2

- 1. Explore using your senses to make observations
- 2. Identify the five senses and communicate how they are used
- 3. Explore living and nonliving things by comparing
- 4. Recognize the characteristics of living and nonliving things

#### Chapter 2 - Plants

Core Standards: 5.1.4. B1, 5.3.4. A2, 5.3.4. B1, 5.3.4. C1, 5.3.4. C2, 5.3.4. D1, 5.3.4. E1

- 5. Explore through observation what happens when plants do not get water
- 6. Recognize that plants are able to grow in a variety of places as long as their needs are met
- 7. Explore comparing differences and similarities among seed plants
- 8. Identify the parts common to most seed plants
- 9. Explore and communicate about the roots of a plant
- 10. Explain the structure and function of roots
- 11. Explore the function of stems through inference
- 12. Explain the structure and function of stems and leaves
- 13. Explore through comparison that there is a variety among seeds
- 14. Explain the structure and function of seeds and fruits
- 15. Explore and predict the need for water in germinating seeds

- 16. Explain the growth process of plants
- 17. Recognize that flowering plants and conifers make seeds

## Chapter 3 - Animals

Core Standards: 5.1.4. B1, 5.3.4. A1, 5.3.4. A2, 5.3.4. D1, 5.3.4. E1

- 18. Explore through inference why birds are living things
- 19. Describe ways animals are alike and different
- 20. Explore and communicate how pets are alike
- 21. Identify characteristics of mammals
- 22. Explore differences in animals through classifying
- 23. Distinguish between and identify characteristics of birds, fish, amphibians, reptiles, and insects
- 24. Explore growth changes between young animals and adult animals by comparing
- 25. Compare growth differences and similarities among animals

## Chapter 5 - Sky

Core Standards: 5.1.4. A3, 5.4.4. A1, 5.4.4. A2, 5.4.4. A3, 5.4.4. A4, 5.4.4. E1, 5.4.4. F1

- 26. Explore and predict warm places using a thermometer
- 27. Recognize that the Sun provides Earth with light and heat
- 28. Recognize the pattern of the Sun's position in the sky
- 29. Explain why we have day and night
- 30. Explore and observe objects in the dark
- 31. Recognize that the Moon gets its light from the Sun
- 32. Explain that groups of stars form constellations
- 33. Explore by modeling how the Earth moves around the Sun
- 34. Discuss likenesses and differences among the planets

## Chapter 6 - Weather and Seasons

Core Standards: 5.1.4. A1, 5.4.4. A1, 5.4.4. F1, 5.4.4. G2, 5.4.4. G3, 5.4.4. G4

- 35. Explore wind and observe that it can move things
- 36. Define weather
- 37. Understand how rain and snow form
- 38. Explore and communicate daily weather changes through the use of a chart
- 39. Describe some daily weather changes, including weather changes that are harmful to living things
- 40. Identify tools used to measure weather

- 41. Explore and communicate seasonal weather changes through the year
- 42. Discuss weather and light conditions in spring and summer
- 43. Discuss the activities and life processes of living in spring and summer
- 44. Explore through observation how to keep cold away from your skin
- 45. Discuss weather and light conditions in fall and winter
- 46. Discuss the activities and life processes of living things in fall and winter

## Chapter 7 - Earth's Resources

Core Standards: 5.1.4. B1, 5.4.4. C1, 5.4.4. C2, 5.4.4. F1, 5.4.4. G3, 5.4.4. G4

- 47. Explore ways to classify rocks
- 48. Define a natural resource
- 49. Identify ways that people use rocks and minerals
- 50. Explore and compare different soils
- 51. Identify the components of soil and understand that soils are different
- 52. Recognize the importance of soil as a natural resource
- 53. Explore and communicate how rain water travels
- 54. Identify places where water is found on Earth
- 55. Recognize the importance of water as a natural resource
- 56. Explore through inferring that air can move things
- 57. Recognize the importance of air as a natural resource
- 58. Explore and classify things we use that come from plants and animals
- 59. Name ways plants and animals are important natural resources

## Chapter 9 - Describe and Measure Matter

Core Standards: 5.1.4. B2, 5.2.4. A1, 5.2.4. A2, 5.2.4. A3

- 60. Explore the properties of objects through observation
- 61. Recognize that all things are made of matter
- 62. Recognize that all matter takes up space and has mass
- 63. Explore and compare the properties of solids
- 64. Define a solid in terms of its properties
- 65. Identify tools used to measure solids
- 66. Explore and conclude that water takes the shape of the container it is in
- 67. Define a liquid in terms of its properties
- 68. Identify tools used to measure liquids
- 69. Explore the properties of a gas through inference
- 70. Define a gas in terms of its properties

## Chapter 12 - Magnets and Sound

Core Standards: 5.1.4. B3, 5.2.4. C1, 5.2.4. E3

- 71. Explore and draw a conclusion about the kinds of things that will move to magnet
- 72. Recognize that magnets attract thing that have iron in them
- 73. Explore and infer that sound may be made by the movement of a rubber band
- 74. Explain the relationship between sound and vibration
- 75. Explore through observation that a magnet can pull through some things
- 76. Identify some things magnets can pull through
- 77. Name ways that people use magnets
- 78. Explore and infer that sound may be made by the movement of a rubber band
- 79. Explain the relationship between sound and vibration
- 80. Explore differences and similarities of sounds by comparing
- 81. Describe how sounds may be different and what they can communicate to us

## Voorhees Township Schools Science Course of Study/Grade 2 Objectives Macmillan/McGraw-Hill Science © 2005

#### Unit Chapter(s) Lesson(s) Time Frame 5 - Weather and Earth Changes C - Changes on Earth 1, 4, 5, 6 6 - Earth Yesterday and Today Sept.-Nov. 7 - The Sun and the Earth D - The Sun and Its Family 1, 2, 6 8 - Moon, Stars, and Planets 9 - Matter E - Matter and Energy 1, 2, 4, 5, 6 Dec.-Feb. 10 - Energy A - Plants and Animals 2 - Animals 5, 6, 7 3 - Land Habitats B - Homes for Plants and March-June All 4 - Water Habitats Animals

#### New Jersey Core Curriculum Content Standards Added

#### Chapter 2 - Animals

Core Standards: 5.3.2. A1, 5.3.4. A2, 5.3.2. B1, 5.3.2. B2, 5.3.4. D1

- 1. Explore and classify animals to show how they are alike and different
- 2. Identify animal groups as mammals, birds, reptiles, amphibians, fish, and insects
- 3. Explore and communicate what a pet needs to live
- 4. Identify and understand that animals need air, water, food, and shelter
- 5. Explore and put in order life cycles of various animals
- 6. Identify the stages in the life cycle of a black bear
- 7. Identify the stages in the life cycle of a butterfly

## Chapter 3 - Land Habitats

Core Standards: 5.1.4. B1, 5.1.4. C3, 5.3.2. C2

- 8. Explore and classify animals by where they live
- 9. Define habitats and identify the needs of plants and animals
- 10. Explore and make a model of a woodland forest
- 11. Identify features of a woodland forest and plants and animals that live there
- 12. Discuss how a woodland forest changes through the seasons
- 13. Explore and infer how some rain forest animals find shelter
- 14. Explore and draw a conclusion about how a leaf shape helps a plant to retain water
- 15. Identify features of a desert and plants and animals that live there
- 16. Explore and predict how camouflage helps animals to survive Identify the features of an Arctic habitat and the plants and animals that live there

## Chapter 4 - Water Habitats Core Standards: 5.1.4. D4, 5.3.2. C1, 5.3.2. C2, 5.3.4. E1

- 17. Explore and infer how a duck's features help it to stay dry
- 18. Identify the features of a pond and the plants and animals that live there
- 19. Identify the features of a stream and the plants and animals that live there
- 20. Explore and observe how brine shrimp hatch in a salt water environment
- 21. Identify the features of an ocean and the plants and animals that live there
- 22. Understand a food web
- 23. Explore and predict how an oil spill can harm animals
- 24. Discuss ways habitats can be destroyed
- 25. Understand how we can help to protect the water and air and land

## Chapter 5 - Weather and Earth Changes

## Core Standards: 5.4.2. G1, 5.4.4. C1, 5.4.6. B2, 5.4.6. B3

- 26. Explore and draw a conclusion about where rainwater comes from
- 27. Understand evaporation, condensation, and the water cycle
- 28. Identify different types of weather, such as hurricane, tornado, drought, and flood
- 29. Explore and communicate how rocks can change
- 30. Understand erosion of rocks, sand, and soil
- 31. Explore and observe how earthquakes change Earth
- 32. Explain earthquakes, landslides, and volcanoes

## Chapter 6 - Earth Yesterday and Today Core Standards: 5.1.4. A2, 5.4.4. B1, 5.4.8. B1

- 33. Explore and draw a conclusion about how imprints are made
- 34. Define fossils and understand how they are formed, and what they tell us about the past
- 35. Explore and make a model of dinosaur bones
- 36. Define paleontologist and explain how they work with fossils
- 37. Discuss how scientists infer information about the past from observing animals today
- 38. Explore and infer what happens to animals when they cannot meet their needs
- 39. Understand extinction as well as the role of humans in a population's extinction
- 40. Understand endangered animals and the role that humans can play in protecting a species

## Chapter 7 - The Sun and the Earth Core Standards: 5.1.4. A2, 5.4.2. A1, 5.4.4. A1, 5.4.6. A1

- 41. Explore and make a model of Earth to show how the Sun shines on it
- 42. Understand that the Sun is a star the gives Earth heat and light
- 43. Understand the Earth rotates on its axis and this rotation causes day and night
- 44. Explore and observe when the Sun gives Earth most of its light
- 45. Discuss that Earth orbits around the Sun
- 46. Understand how seasons change due to Earth's orbit around the Sun
- 47. Recognize that seasons are different at different places around the world

## Chapter 8 - *Moon, Stars, and Planets* Core Standards: 5.4.2. A1, 5.4.4. A3, 5.4.4. A4

- 48. Explore and infer how moonlight can be seen from Earth
- 49. Describe the Moon and understand what moonlight is
- 50. Discuss the apparent motion of the Moon across the sky
- 51. Explore and put in order the phases of the Moon
- 52. Define Moon phases and understand that the Moon phases cycle each month
- 53. Understand that the Moon's orbit around Earth allows us to see the Moon phases
- 54. Explore and observe what stars look like in the night sky
- 55. Define stars and understand that they are far away and too numerous to count
- 56. Define and discuss constellations
- 57. Explore and make a model of an orbit
- 58. Discuss that the planets in our solar system orbit the sun at different rates
- 59. Understand that each planet has unique characteristics
- 60. Discuss various methods of space exploration that are used by scientists

#### Chapter 9 - Matter

#### Core Standards: 5.2.2. A1, 5.2.2. A2, 5.2.2. B1, 5.2.4. B1

- 61. Explore and observe matter inside containers
- 62. Define the terms matter and mass
- 63. Describe matter by its observable properties
- 64. Explore and order the mass of objects
- 65. Identify and distinguish differences between solids, liquids, and gases
- 66. Explore and investigate ways that matter can change
- 67. Define and understand physical change
- 68. Define and understand chemical change

## Chapter 10 - *Energy* Core Standards: 5.1.8. C2, 5.1.8. D1, 5.2.4. B1, 5.2.4. C1, 5.2.6. C1, 5.1.8. D1

- 69. Explore and communicate how heat can change matter
- 70. Understand how water can change states by freezing and evaporating
- 71. Identify how heat energy can be used, including fuels
- 72. Explore and observe how light can reflect off an object
- 73. Understand the basic properties of light, including reflection and refraction
- 74. Explore and observe how sounds are made
- 75. Identify how sounds move, or vibrate, through the air
- 76. Understand loudness and pitch

## Voorhees Township Schools Science Course of Study/Grade 3 Objectives Macmillan/McGraw-Hill Science © 2005

## New Jersey Core Curriculum Content Standards Added

Unit	Chapter(s)	Lesson(s)	Time Frame
A - Looking at Plants and	1 - Plants	All	SeptOct.
Animals	2 - Animals	All	OctDec.
E - Forces and Motion	9 - How Things Move	All	DecJan
C - Our Earth	5 - Earth's Resources	1, 2, 3, 4	FebApril
	6 - Forces Shape the Land	All	April-May
E - Forces and Motion	10 - Work and Machines	All	May-June

#### Chapter 1 - Plants

Core Standards: 5.1.4. A1, 5.1.4. A2, 5.1.4. C3, 5.3.4. A1, 5.3.4. A2, 5.3.6. A2

- 1. Explore how seeds, which are living, and gravel, which is not living, compare when placed in water
- 2. Compare the characteristics of living things and nonliving things
- 3. Identify the cells as the building block of living things
- 4. Describe some of the components of cells
- 5. Explore how water and light are necessary to plants
- 6. Explain the jobs of a plant's parts
- 7. Explain the food-making process in chloroplasts
- 8. Discuss how plants respond to the environment
- 9. Explore how seeds can grow into new plants
- 10. Describe how germination takes place
- 11. Compare flowering plants and conifers
- 12. Identify ways that plants can reproduce

## Chapter 2 - Animals

Core Standards: 5.1.4. A1, 5.1.4. A2, 5.3.4. A1, 5.3.4. A2, 5.3.4. D1

- 13. Explore the needs of an animal
- 14. Explain why animals need food, water, air, and shelter
- 15. Give examples of how animals meet their inner needs
- 16. Discuss ways that animals respond to changes in their environment
- 17. Explore how an animal changes as it grows

- 18. Identify stages of an animal's life cycle
- 19. Define metamorphosis and list some animals that undergo it as part of their life cycles
- 20. Contrast inherited traits with learned traits
- 21. Explore the parts of an insect
- 22. Identify parts that animals use to carry out their life activities
- 23. Explore ways to classify animals
- 24. Contrast vertebrates and invertebrates
- 25. Distinguish between fish, amphibians, reptiles, birds, and mammals

## Chapter 5 - Earth's Resources

Core Standards: 5.1.4. B2, 5.1.4. B3, 5.1.4. C2, 5.3.2. C.3, 5.4.4. B1, 5.4.4. C1, 5.4.4. C2, 5.4.4. G3, 5.4.4. G4

- 26. Explore the properties of rocks
- 27. Identify properties of minerals
- 28. Explain the three ways that rocks form
- 29. Discuss how people use rocks and minerals
- 30. Explore the content of soil
- 31. Compare different kinds of soil
- 32. Explain how soil forms
- 33. Discuss why soil is important
- 34. Explore how fossils form
- 35. Compare how different fossils form
- 36. Identify kinds of fossil fuels
- 37. Explore where lakes form
- 38. Compare Earth's supplies of fresh water and salt water
- 39. Describe the steps of the water cycle
- 40. Identify Earth's sources of fresh water
- 41. Discuss the importance of conserving water
- 42. Explore how mining affects the land
- 43. Classify resources as renewable and nonrenewable
- 44. Explain why people should conserve resources
- 45. Identify ways to conserve resources

## Chapter 6 - Forces Shape the Land

Core Standards: 5.1.4. B3, 5.1.4. C2, 5.3.4. C2, 5.4.6. C2, 5.4.8. C2

- 46. Explore how to compare Earth's surface features
- 47. Identify Earth's surface features
- 48. Discuss the surface features found in the United States

- 49. Explore how rocks change
- 50. Compare weathering and erosion
- 51. Identify ways humans change Earth's surface
- 52. Make a hypothesis about how layers settle in water
- 53. Explore how the intensity of rain affects soil erosion
- 54. Explain how storms, Earthquakes, and other natural events can change land quickly
- 55. Discuss how weather and human actions contributed to the Dust Bowl of the 1930s

#### Chapter 9 - How Things Move

Core Standards: 5.1.4. B1, 5.1.4. B2, 5.2.2. E1, 5.2.2. E2, 5.2.2. E3, 5.2.2. E4, 5.2.4. E1, 5.2.4. E4, 5.2.6. E3

- 56. Explore how long it takes you to walk and run 10 meters
- 57. Define position, distance, motion, and speed
- 58. Explain how to find speeds using values of distance and time
- 59. Use maps to locate positions
- 60. Explore the forces needed to lift objects
- 61. Discuss forces using examples of common forces, such as gravity
- 62. Define weight as the pull of gravity on an object
- 63. Identify two units that measure forces
- 64. Explore the results of balancing and unbalancing the forces on an object
- 65. Explain that motion comes from unbalanced forces
- 66. Identify friction as a force that slows an object's motion
- 67. Discuss ways to control friction

## Chapter 10 - Work and Machines

## Core Standards: 5.1.4. B1, 5.1.4. B2, 5.2.2. E1

- 68. Explore how work is defined
- 69. Define energy as the ability to do work
- 70. Discuss how energy can change one form to another
- 71. Explore ways to design a machine to lift an object
- 72. Define what machines do and identify some simple machines
- 73. Discuss how a lever, wheel and axle, and pulley make work easier
- 74. Explore how ramps can make work easier
- 75. Discuss how a ramp, wedge, and screw make work easier
- 76. Define a compound machine and give an example

## Voorhees Township Schools Science Course of Study/Grade 4 Objectives Macmillan/McGraw-Hill Science © 2005

Unit	Chapter(s)	Lesson(s)	Time Frame
C - Earth and Beyond	6 - Earth's Surface and Interior 7 - Sun, Moon, and Planets	5,6,7	Sept Nov.
E - Matter	10 - Properties of Matter 11 - Changes in Matter	All	Dec Early March.
F - Energy	12 - Forms of Energy	3, 4, 5	Mid- March- Early May
B - Animals as Living Things (time permitting)	3 - Describing Animals 4 - Life Processes	2, 3, 5	Mid-May- June

## New Jersey Core Curriculum Content Standards Added

## Chapter 3 - Describing Animals

Core Standards: 5.1.4. A1, 5.1.4. A2, 5.3.4. C1, 5.3.4. E1

- 1. Explore the characteristics of animals
- 2. Compare and contrast characteristics of animals including the presence or absence of a backbone and body plan (symmetry)
- 3. Classify animals based on symmetry
- 4. Explore the characteristics of invertebrates
- 5. Compare and contrast the characteristics of invertebrates, including sponges, cnidarians, flatworms, roundworms, segmented worms, mollusks, echinoderms, and arthropods
- 6. Describe the kind of animals that live in a coral reef
- 7. Explore how to compare and contrast vertebrates
- 8. Compare and contrast the characteristics of vertebrates, including three classes of fish, amphibians, reptiles, birds, and mammals
- 9. Describe ways animals can help people

## Chapter 4- Life Processes

Core Standards: 5.3.2. C1, 5.3.4. A1, 5.3.4. A2, 5.3.4. E1, 5.3.8. D1

- 10. Explore the differences in the hearts of a fish and an amphibian
- 11. Compare and contrast the structures of organ systems in animals
- 12. Describe the functions of organ systems in animals
- 13. Explore that animals must reproduce for their species to survive
- 14. Describe the ways animals change as they grow
- 15. Compare and contrast different ways animals reproduce
- 16. Describe cloning as another example of asexual reproduction
- 17. Infer the importance of camouflage to survival
- 18. Recognize adaptations and explain how each benefits different animals
- 19. Compare and contrast inherited and learned behaviors
- 20. Describe ways animals can be trained to help people

## Chapter 6- Earth's Surface and Interior

Core Standards: 5.1.4. A2, 5.1.4. B2, 5.1.4. B3, 5.4.6. B1, 5.4.6. B2, 5.4.6. B3, 5.4.6. B4, 5.4.6. C1

- 21. Explore the features left behind by glaciers and propose a possible explanation for how they were formed
- 22. Explain how glaciers form and change Earth's surface
- 23. Explain that glaciers move today and have moved in the past
- 24. Identify agents that wear away Earth's surface features
- 25. Explore and describe three different soil samples
- 26. Describe what soil is
- 27. Relate pore spaces to soil permeability
- 28. Explain the importance of soil and ways that we can help preserve it
- 29. Explore ways to make indirect observations
- 30. Describe how scientists gather information about Earth's interior
- 31. Explain how information from earthquake waves provides information about Earth's interior structure
- 32. Describe the structures of Earth

## Chapter 7 - Sun, Moon, and Planets

Core Standards: 5.1.4. B1, 5.1.4. B3, 5.1.4. D1, 5.4.4. A1, 5.4.4. A2, 5.4.6. A2, 5.4.6. A4

- 33. Explore how Earth, the Moon, and the Sun move through space
- 34. Describe how Earth's rotation causes the cycle of day and night
- 35. Explain how Earth's tilt and its revolution around the Sun cause the seasons
- 36. Discuss the phases of the Moon
- 37. Explore the relationship between the distance of an object and how large it appears to be

- 38. Define the Sun as a star that lies in the center of the solar system
- 39. Identify the planets and other bodies in the solar system
- 40. Discuss how stars are grouped into constellations

## Chapter 10- Properties of Matter

Core Standards: 5.1.4. B2, 5.2.4. A1, 5.2.4. A2, 5.2.4. A3, 5.2.4. E4, 5.2.6. A2, 5.4.P. G1

- 41. Explore how to identify matter
- 42. Describe matter as anything that has properties that can be observed and described
- 43. Define matter as anything that takes up space and has mass, regardless of its state
- 44. Relate recycling and reusing matter to reducing waste on Earth
- 45. Explore nonstandard and standard units of measure
- 46. Describe how metric units are used to measure length, calculate areas, and measure volume
- 47. Explain the difference between mass and weight and the relationship between mass and density

## Chapter 11- Changes in Matter

Core Standards: 5.1.4. B1, 5.1.4. B4, 5.2.4. A1, 5.2.4. B1, 5.2.6. B1

- 48. Explore that matter can be classified according to its properties
- 49. Define an element as a substance made up of only one type of matter
- 50. Compare and contrast mixtures and compounds
- 51. Describe an alloy as a mixture of two or more metals
- 52. Explore how matter changes
- 53. Define physical change and describe different kinds of physical changes
- 54. Explain how heat energy causes matter to change state
- 55. Compare and contrast the movement of particles in solids, liquids, and gases
- 56. Explore what types of changes metals undergo
- 57. Describe two characteristics of chemical changes
- 58. Explain what causes chemical change
- 59. Describe the products of chemical change
- 60. List and describe example of real-world physical and chemical changes

## Chapter 12- Forms of Energy

Core Standards: 5.1.4. C2, 5.2.4. A4, 5.2.4. C2, 5.2.4 C3, 5.2.6. C1, 5.2.6. C2

- 61. Explore how maps show relative position
- 62. Measure the (average) speed of a moving object

- 63. Discuss how forces can cause acceleration
- 64. Define inertia
- 65. List examples of forms and sources of energy
- 66. Explore ways to move something using a simple machine
- 67. Compare how the six simple machines make work easier
- 68. Describe how gears and compound machines do work
- 69. Explain what efficiency means
- 70. Explore what keeps walruses warm
- 71. Describe heat as a flow of energy
- 72. Explain how temperature is measured
- 73. Compare ways that heat is transferred
- 74. Describe some effects of heat
- 75. Explore colors of light
- 76. Describe visible light as a part of the electromagnetic spectrum
- 77. Compare the reflection and refraction of light
- 78. Explain why we see colors
- 79. Classify materials as transparent, translucent, or opaque
- 80. Explore how sounds can be produced and changed
- 81. Identify vibrations as the source of sound
- 82. Describe how the ear receives and transmits sound
- 83. Compare pitches, volumes, and intensities
- 84. Explain how sounds can be amplified

## Voorhees Township Schools Science Course of Study/Grade 5 Objectives Macmillan/McGraw-Hill Science © 2005

#### New Jersey Core Curriculum Content Standards Added

Unit	Chapter(s)	Lesson(s)	Time Frame
E - Properties of Matter and Energy	12 - Properties and Structure of Matter 13 - Forms of Matter and Energy	1, 2, 4, 5	Sept. – Dec.
F - Motion and Energy	15 - Sound Energy 16 - Light Energy	All	Jan Feb.
A - Characteristics of Living Things	1 - Classifying Living Things 2 - Plant Structure and Functions 3 - Plant Diversity	1, 2, 3, 4, 5, 6, 7	March - April
B - Living Things and Their Environments	5 - Interactions of Living Things 6 - Ecosystems	1, 2, 3, 4	May - June
D - Astronomy, Weather, and Climate (If Possible)	9 - Astronomy 10 - Weather 11 - Weather Patterns and Climate	All	May - June

## Chapter 1 - Classify Living Things

Core Standards: 5.1.8. A1, 5.1.8. D1, 5.3.4. A2, 5.3.6. B2, 5.3.6. C3

- 1. Explore similarities among living things
- 2. Describe the levels of organization of many-celled organisms
- 3. Understand traits that are used to classify organisms
- 4. Describe characteristics of the kingdoms of life
- 5. Understand the differences between organisms that belong to different kingdoms
- 6. Explore the use of classification keys

#### Chapter 2 - Plant Structure and Functions

Core Standards: 5.1.8. D1, 5.3.4. C1, 5.3.6. A2, 5.3.6. B1

- 7. Explore how a plant's parts help it survive
- 8. Understand the functions of roots, leaves, and stems
- 9. Describe the process of photosynthesis and respiration in plants
- 10. Explore how seed roots grow
- 11. Identify tropisms
- 12. Identify various adaptations plants have for survival

## Chapter 3 - Plant Diversity

Core Standards: 5.1.8. A1, 5.1.8. D1, 5.3.4. D1, 5.3.6. C2, 5.3.6. C3

- 13. Explore parts mosses have for living in a moist environment
- 14. Compare and contrast seedless nonvascular plants with seedless vascular plants
- 15. Describe the life cycles of mosses and ferns
- 16. Describe the adaptations of plants for living on land
- 17. Explore how seed plants are alike and different
- 18. Compare gymnosperms with angiosperms
- 19. Compare and contrast monocots and dicots
- 20. Identify why plants have aromas
- 21. Explore the relationship between the parts of a flower and how the flower reproduces
- 22. Identify the different parts of a flower and infer the function of each
- 23. Explain the processes of seed dispersal, germination, and growth

## Chapter 5 Interactions of Living Things

Core Standards: 5.1.8. D1, 5.3.4. C1, 5.3.4. C2, 5.3.6. C2, 5.3.6. C3, 5.3.6. D1

- 24. Explore land environments to test what living things need to survive
- 25. Describe ecosystems and the biotic and abiotic factors involved in them
- 26. Explain how organisms survive in variable and harsh environments
- 27. Explore how a change in a population can affect an ecosystem
- 28. Understand the relationship between food chains and food webs
- 29. Describe a food pyramid and the roles various organisms play in them
- 30. Understand the interactions of organisms in symbiosis, mutualism, parasitism, and commensalisms
- 31. Discuss variables that can affect population size and survival
- 32. Describe the role of limiting factors, including competition
- 33. Explain how environmental changes affect population survival
- 34. Discuss ways in which human activity affects the environment

## Chapter 6 - Ecosystems

Core Standards: 5.1.8. D1, 5.3.6. C1, 5.3.6. E1, 5.4.6. C1, 5.4.6. G2, 5.4.6. G3

- 35. Explore how water evaporates and condenses in a closed system
- 36. Describe how water and nutrients cycle through the environment
- 37. Describe how carbon and nitrogen cycle through the environment
- 38. Discuss the benefits of reuse, reduce, and recycle

- 39. Explore the importance of soil
- 40. Identify and locate Earth's six major land biomes
- 41. Compare and contrast the various biomes and aquatic ecosystems
- 42. Discuss how whales are threatened with extinction and how they are being protected
- 43. Explore how ecosystems change over time
- 44. Describe the changes to an ecosystem that occur during primary and secondary succession
- 45. Explain how catastrophic (sudden) changes can affect an ecosystem

## Chapter 9 - Astronomy

## Core Standards: 5.1.8. A2, 5.4.6. A1, 5.4.6. A2, 5.4.6. A3, 5.4.6. A4

- 46. Explore the orbit of a planet around the Sun
- 47. Describe the effect of gravity between objects in the solar system
- 48. Identify the effects of the Sun on Earth
- 49. Describe the phases of the Moon
- 50. Explore the problems involved in building a scale model of the solar system
- 51. Compare the characteristics of the inner planets
- 52. Compare the characteristics of the outer planets
- 53. Discuss the search for planets beyond our own solar system

## Chapter 10 - Weather

Core Standards: 5.1.8. C2, 5.1.8. D1, 5.4.4. G1, 5.4.4. G2, 5.4.6. F1, 5.4.6. F2

- 54. Explore how the angle of light affects temperature
- 55. Identify factors that affect temperatures on Earth
- 56. Explain how the atmosphere changes with elevation
- 57. Identify conditions that make up the weather
- 58. Explore how water changes as a result of heating and cooling
- 59. Relate humidity to the processes of evaporation
- 60. Explain what happens to water vapor with cooling
- 61. Describe a series of changes that water goes through
- 62. Explore how clouds form
- 63. Identify causes and types of clouds and precipitation
- 64. Describe how to compare amounts of rainfall and cloud cover
- 65. Explore what causes air pressure to change
- 66. Explain how air pressure is related to winds
- 67. Describe the paths of winds in global wind zones
- 68. Identify how wind is measured and recorded at weather stations

## Chapter 11 - Weather Patterns and Climate

Core Standards: 5.1.8. D1, 5.2.6. C3, 5.3.4. C2, 5.4.6. F1, 5.4.6. G1

- 69. Explore how weather can differ in different parts of the country
- 70. Explain how air masses produce different kinds of weather along fronts
- 71. Describe how cold fronts and warm fronts affect the weather
- 72. Explore where tornadoes are most likely to happen
- 73. Explain how thunderstorms and tornadoes are related
- 74. Describe what hurricanes are and how they can cause damage
- 75. Explain how radar is used to track storms
- 76. Explore how temperatures and precipitation differ from place to place
- 77. Identify factors that make up and determine climate
- 78. Distinguish among the ways climates may change
- 79. Identify how climate affects health and food production

## Chapter 12 - Properties and Structure of Matter

Core Standards: 5.1.8. D3, 5.2.4. A3, 5.2.4. B1, 5.2.6. A3, 5.2.8. A4, 5.2.8. A5

- 80. Explore various properties of matter
- 81. Compare objects using various properties of matter
- 82. Classify matter based on physical properties including magnetism, ability to conduct/insulate heat, electricity, sound, and density
- 83. Recognize the importance of various properties of matter
- 84. Explore that matter can be made of more than one substance
- 85. Understand that all matter is made up of elements and compounds
- 86. Describe the structure and properties of elements
- 87. Recognize the importance of elements and compounds we find in our daily lives
- 88. Explore the melting point of ice
- 89. Explain that matter has the ability to exist in several different states (solids, liquids, gases)
- 90. Understand that matter expands or contracts as it changes state
- 91. Describe how the expansion and contraction of matter affects us

## Chapter 13 - Forms of Matter and Energy

Core Standards: 5.1.8. C2, 5.1.8. D3, 5.2.4. A1, 5.2.6. B1, 5.2.8. A5, 5.2.8. A7

- 92. Explore how to separate mixtures
- 93. Understand that mixtures maintain physical properties of their ingredients
- 94. Explain that mixtures of substances can be separated by using physical properties of

the original substances

- 95. Communicate examples of solutions, heterogeneous mixtures, and colloids
- 96. Explore signs of chemical change
- 97. Compare physical changes to chemical changes
- 98. Recognize signs of chemical change
- 99. Understand the importance of chemical changes such as rusting
- 100. Explore which household items are acids, which are bases
- 101. Explain the properties of acids and bases
- 102. Investigate acid and base indicators
- 103. Understand acidity, alkalinity, and Ph
- 104. Explore how long various kinds of batteries last
- 105. Understand that chemical reactions can produce energy
- 106. Compare and contrast energy forms
- 107. Understand various properties of heat energy

## Chapter 15 - Sound Energy

Core Standards: 5.1.8. C2, 5.1.8. D1, 5.2.4. C1

- 108. Explore what makes sound
- 109. Conclude that vibrations produce sounds
- 110. Explain how sound travels as waves through matter
- 111. Explore ways of changing sounds
- 112. Distinguish between pitch and volume
- 113. Sequence the steps in making recordings
- 114. Explore absorption and reflection of sound
- 115. Infer how various materials affect sound
- 116. Explain how the speed of sound varies and its implications
- 117. Explain the importance of fundamental frequency

## Chapter 16 - Light Energy

Core Standards: 5.1.8. C2, 5.1.8. D1, 5.2.4. C4, 5.2.6. C1, 5.2.6. C2

- 118. Explore whether light is needed to see
- 119. Explain that light is a form of energy that travels
- 120. Explain how light reflects from various surfaces
- 121. Recognize how the law of reflection affects the images in mirrors
- 122. Explore whether light can pass through all kinds of matter
- 123. Explain how light travels through different materials
- 124. Describe how light is refracted 8
- 125. Compare how light is refracted by different lenses
- 126. Explore how colors of objects appear through colored filters

- 127. Conclude that white light can be broken down into the colors of the spectrum
- 128. Explain how we see the colors of objects
- 129. Distinguish between primary colors of light and primary colors of paints
- 130. Explore how light waves are different from sound waves
- 131. Explain the nature of light waves
- 132. Describe various parts of the electromagnetic spectrum
- 133. Describe the development of and various uses for lasers

## Voorhees Township Schools Science Course of Study/Grade 6 Objectives Macmillan/McGraw-Hill Science © 2005

#### New Jersey Core Curriculum Content Standards Added

Unit	Chapter(s)	Lesson(s)	Time Frame
A - Organisms and Environments	1 - The Kingdoms of Life 2 - Ecosystems	3, 4	Sept Oct
G - Exploring New Jersey Supplemental Material			September
B - Organization of Living Things	3 – From Cells to Organisms Health Handbook Section R	1, 2, & 4	Oct Nov.
E - Interactions of Matter and Energy	9 – Properties and Changes of Matter 11 – Electricity and Magnetism	All	Dec March
C - Observing the Sky	5 - Earth-Moon System 6 - Solar System & Beyond	All	April - May
D - The Restless Earth	7 - Earth's Moving Crust 8 - How Earth Changes Over Time	All	May - June

## Chapter 1 - The Kingdoms of Life

Core Standards: 5.3.4.D.1, 5.3.6.C.2, 5.3.6.C.3, 5.3.6.A.1, 2, 5.3.8.A.1, 2

- 1. Explore how living things can be classified
- 2. Compare characteristics of living things
- 3. Explain the system of organizing living things into kingdoms
- 4. Compare and contrast the kingdoms of life
- 5. Define viruses
- 6. Explore how to classify leaves
- 7. Compare and contrast vascular and nonvascular plants
- 8. Distinguish between kinds of seed plants
- 9. Explain various ways plants reproduce
- 10. Explore differences among invertebrates
- 11. Compare and contrast the phyla of invertebrates
- 12. Explain how people interact with invertebrates
- 13. Explore ways of comparing vertebrates
- 14. Compare and contrast the classes of vertebrates
- 15. Discuss how people can help save endangered species

## Chapter 2 - *Ecosystems*

## Core Standards: 5.3.6.B.2, 5.3.6.C.2, 5.3.6.C.3, 5.3.6.E.1

- 16. Compare and contrast biomes
- 17. Understand how biomes dictate what people can plant
- 18. Identify the biome in which we live
- 19. Explore the biotic and abiotic factors of an ecosystem
- 20. Explain relationships among organisms in an ecosystem
- 21. Describe the organization of ecosystems at the community level
- 22. Compare and contrast water ecosystems

## Chapter 3 – From Cells to Organisms

Core Standards: 5.3.6.C.1, 5.3.6.B.1, 2, 5.3.6.A.2, 5.3.8.A.1, 5.3.6.D.1, 5.3.6.A.1, 5.3.6.D.1, 5.3.6.A.1

- 23. Explore identifying living from nonliving things
- 24. Identify cells as a basic unit of living things
- 25. Put in order the levels of organization of a living thing
- 26. Explore differences between cells of plants and animals
- 27. Compare and contrast animal cells and plant cells
- 28. Distinguish between cells with and without a nucleus
- 29. Distinguish elements from compounds in the body
- 30. Trace our modern understanding of cells
- 31. Explore movement of materials through barriers
- 32. Identify forms of transport in and out of cells
- 33. Compare and contrast photosynthesis and respiration
- 34. Explore a butterfly life cycle
- 35. Identify common stages of animal life cycles
- 36. Explain the cell cycle and how organisms grow
- 37. Explain various ways animals reproduce
- 38. Compare and contrast meiosis and mitosis
- 39. Define life span and life expectancy
- 40. Trace changes in the chromosome number
- 41. Learn about what causes cancer

## Chapter 5 - Earth-Moon System

Core Standards: 5.4.A.2, 3, 5.2.4.C.4, 5.2.6.C.1

- 42. Explore the different methods of learning about a planet
- 43. Explain what astronomers study and their scientific methods
- 44. Describe light and telescopes
- 45. Describe the requirements and goals of space travel
- 46. Explore how shadows on Earth change with the Sun's position
- 47. Describe Earth's rotation and its consequences
- 48. Describe Earth's revolution and the cause of the seasons
- 49. Explain how the Sun in Earth's energy source
- 50. Explore and explain the phases of the Moon
- 51. Describe and explain the eclipses
- 52. Describe what tides are
- 53. Describe surface features of the Moon

## Chapter 6 - Solar System & Beyond

Core Standards: 5.4.A.2, 4

- 54. Explore how to distinguish a planet from a star
- 55. Compare and contrast the inner planets
- 56. Explain what an asteroid is
- 57. Explore the relative distances of the planets from the Sun
- 58. Compare and contrast the outer planets
- 59. Explain what comets and meteoroids are
- 60. Describe the moons of Jupiter
- 61. Explore the difference between real and apparent star distance
- 62. Describe properties of stars
- 63. Describe the stages of a star's life cycle
- 64. Describe the properties of the Sun
- 65. Explore how galaxies are classified
- 66. Describe the Milky Way and the other galaxies
- 67. Describe the evolution of the universe and its contents
- 68. Describe ongoing research such as of quasars

## Chapter 7 - Earth's Moving Crust

## Core Standards: 5.4.B.3, 4

- 69. Explore finding patterns in coastlines of continents
- 70. Evaluate continental drift and sea-floor spreading
- 71. Compare plate tectonics with other theories of crustal motion

- 72. Explain how plate tectonics unifies theories of crustal motion
- 73. Explore patterns to the location of earthquakes
- 74. Describe what earthquakes are
- 75. Explain what seismic waves can tell about earthquakes
- 76. Describe how to prepare for and predict earthquakes
- 77. Explore patterns in the location of volcanoes
- 78. Relate volcanoes and plate tectonics
- 79. Compare and contrast three kinds of volcanoes
- 80. Describe volcanic features

## Chapter 8 - How Earth Changes over Time

Core Standards: 5.4.B.1

- 81. Explore what produces mountains
- 82. Identify the forces that make and shape landforms
- 83. Compare and contrast kinds of weathering
- 84. Explain how soil is produced and transported
- 85. Explore why sediment moves downhill
- 86. Explain how erosion and deposition work with gravity and wind
- 87. Describe how running water changes the land
- 88. Describe how glaciers change the land
- 89. Explore how to tell types of rocks apart
- 90. Identify ways of recognizing minerals and rocks
- 91. Identify examples of rocks that form from sediment and from other rocks
- 92. Trace pathways of change in the rock cycle
- 93. Explore ways to determine relative age
- 94. Describe what a rock's position and fossil content can reveal
- 95. Describe how half-life is used to tell absolute age
- 96. Compare and contrast the four geologic eras

## Chapter 9 - Properties and Changes of Matter

Core Standards: 5.2.6.B.1, 5.2.8.B.2

- 97. Explore how different substances float on top of each other
- 98. Identify measurements and physical properties of matter
- 99. Explain why some objects in water float while others sink
- 100. Explore how to learn about something that cannot be seen
- 101. Explain how changing an atom's composition products different elements
- 102. Compare and contrast particles and waves
- 103. Explore what chemical changes are
- 104. Explain how compounds form

105. Compare and contrast chemical changes

106. Understand that chemical changes can release energy

## Chapter 11 - *Electricity and Magnetism* Core Standards: 5.2.6.E.2, 3, 4

- 107. Explore the interaction of charged objects
- 108. Describe the causes and effects of static electricity
- 109. Distinguish between materials through which discharges will and will not travel
- 110. Explore the effects of different electrical pathways on the brightness of a bulb
- 111. Describe the parts needed to make a circuit
- 112. Compare series and parallel circuits, and open and closed circuits
- 113. Explore how to vary the strength of an electromagnet
- 114. Describe the magnetic effects of current in a wire
- 115. Identify ways electromagnets can transform energy
- 116. Explore how to produce a current
- 117. Distinguish between sources of electric current
- 118. Describe household uses of electricity

Standards 5.1, 5.2, 5.3, and 5.4 are also found in the appendix, "*Student Resources*", and are embedded throughout the text. It's especially important to include Technological Design and identifying the basic components of a technological system: input, process, output, feedback.

All content areas meet standards: 5.1.8.A.1, 2, 3, 5.1.8.B.1, 2, 3, 4, 5.1.8.C.1, 2, 3 (Includes scientific inquiry and processing skills)

## Voorhees Township Schools Science Course of Study/Grade 7 Objectives Glencoe Science 7 © 2005

Unit	Chapter(s)	Lesson(s)	Time Frame
2 - Earth's Atmosphere	4 - Atmosphere 5 - Weather 7 - Earth in Space		Sept. – Nov.
3 - The Basics of Life	8 – Life Structure and Classification 9 – Chemistry of Life 10 – Cell Reproduction 12 – Adaptations of Time		April - June
5 - Interdependence Over Time	18 - Interactions of Living Things 19 - Conserving Resources		Dec Jan.
6 - Matter and Energy	23 - Newton's Laws of Motion 24 - Energy and Energy Resources		Feb April

## Chapter 4 - Atmosphere

Core Standards: 5.1.8.A.1, 5.2.8.A.1, 5.28.A.3, 5.2.8.B.1, 5.2.8.B.2, 5.2.8.C.1, 5.2.8.C.2, 5.2.8.C.3, 5.4.8.E.1, 5.4.8.F.1, 5.4.8.F.2, 5.4.8.F.3, 5.4.8.G.1

## Section 1 - Earth's Atmosphere

- 1. Identify the gases in Earth's atmosphere
- 2. Describe the structures of Earth's atmosphere
- 3. Explain what causes air pressure

#### Section 2 - Energy Transfer in the Atmosphere

- 4. Describe what happens to the energy Earth receives from the Sun
- 5. Compare and contrast radiation, conduction, and convection
- 6. Explain the water cycle

#### Section 3 - Air Movement

- 7. Explain why different latitudes on Earth receive different amounts of solar energy
- 8. Describe the Coriolis effect
- 9. Locate doldrums, trade winds, prevailing westerlies, polar easterlies, and jet streams

### Chapter 5 - Weather

Core Standards: 5.1.8.A.2, 5.1.8.B.1, 5.1.8.B.2, 5.1.8.C.2, 5.2.8.A.3, 5.1.8.C.1, 5.2.8.C.2, 5.4.8.E.1, 5.4.8.F.1, 5.4.8.F.2, 5.4.8.F.3, 5.4.8.G.1, 5.4.8.G.2

#### Section 1 - What is Weather?

- 10. Explain how solar heating and water vapor in the atmosphere affect weather
- 11. Discuss how clouds form and how they are classified
- 12. Describe how rain, hail, sleet, and snow develop

#### Section 2 - Weather Patterns

- 13. Describe how weather is associated with fronts and high- and low-pressure areas
- 14. Explain how tornadoes develop from thunderstorms
- 15. Discuss the dangers of severe weather

#### Section 3 - Weather Forecasts

- 16. Explain how data are collected for weather maps and forecasts
- 17. Identify the symbols used in a weather station model

#### Chapter 7 - Our Solar System

Core Standards: 5.1.8.D.2, 5.2.8.A.1, 5.28.A.3, 5.2.8.B.1, 5.2.8.B.2, 5.2.8.C.1, 5.2.8.C.2, 5.2.8.C.3, 5.4.8.E.1, 5.4.8.F.1, 5.4.8.F.2, 5.4.8.F.3, 5.4.8.G.1

#### Section 1 - Earth's Motion and Seasons

- 18. Identify Earth's shape and other physical properties
- 19. Compare and contrast Earth's rotation and revolution
- 20. Explain the causes of Earth's seasons

#### Section 2 - Earth's Moon

- 21. Identify the Moon's surface features and interior
- 22. Explain the Moon's phases
- 23. Explain the causes of solar and lunar eclipses
- 24. Identify the origin of the Moon

#### Section 3 - Our Solar System

- 25. List the important characteristics of inner planets
- 26. Identify how other inner planets compare and contrast with Earth
- 27. List the important characteristics of outer planets

#### Chapter 8 - Life's Structure and Classification

Core Standards: 5.1.8.B1, 5.1.8.B.2, 5.1.8.D.2, 5.1.8.D.3, 5.3.8.A.1, 5.3.8.A.2, 5.3.8.B.1, 5.4.8.B.1, 5.4.8.B.2

#### Section 1 - Living Things

- 28. Distinguish between living and nonliving things
- 29. Identify what living things need to survive

#### Section 2 - How are living things classified

- 30. Describe how early scientists classified living things
- 31. Explain the system of binomial nomenclature
- 32. Demonstrate how to use a dichotomous key

#### Section 3 - Cell Structure

- 33. Describe the development of the cell theory
- 34. Identify names and functions of each part of a cell
- 35. Explain how important a nucleus is in a cell
- 36. Compare tissues, organs, and organ systems

#### Section 4 - Viruses

- 37. Explain how a virus makes copies of itself
- 38. Identify the benefits of vaccines
- 39. Investigate some uses of viruses

#### Chapter 9 - Cell Processes

Core Standards: 5.1.8.A.2, 5.1.8.B.2, 5.3.8.A.1, 5.3.8.A.2, 5.3.8.B.1, 5.3.8.B.2, 5.3.8.D.3, 5.4.8.B.1, 5.4.8.B.2

Section 1 - Chemistry of Life

40. List the differences among atoms, elements, molecules, and compounds

- 41. Explain the relationship between chemistry and life science
- 42. Discuss how organic compounds are different from inorganic compounds

#### Section 2 - Moving Cellular Materials

- 43. Describe the function of a selectively permeable membrane
- 44. Explain how the processes of diffusion and osmosis move molecules in living cells
- 45. Explain how passive transport and active transport differ

## Section 3 - Energy for Life

- 46. List the differences between producers and consumers
- 47. Explain how the processes of photosynthesis and respiration store and release energy
- 48. Describe how cells get energy from glucose through fermentation
- 49. Describe the structure and function of each kind of RNA

## Chapter 18 - Interactions of Living Things

Core Standards: 5.3.8.A.1, 5.3.8.A.2, 5.3.8.B.1, 5.3.8.B.2, 5.3.8.C.1, 5.3.8.D.1, 5.3.8.E.1, 5.3.8.E.2, 5.4.8.B.2

## Section 1 - The Environment

- 50. Identify biotic and abiotic factors in an ecosystem
- 51. Describe the different levels of biological organizations
- 52. Explain how ecology and the environment are related

## Section 2 - Interactions Among Living Organisms

- 53. Identify the characteristics that describe populations
- 54. Examine the different types of relationships that occur among populations in a community
- 55. Determine the habitat and niche of a species in a community

## Section 3 - Matter and Energy

- 56. Explain the difference between a food chain and a food web
- 57. Describe how energy flows through ecosystems
- 58. Examine how materials such as water, carbon, and nitrogen are used repeatedly

## Chapter 19 - Conserving Resources

Core Standards: 5.1.8.A.2, 5.1.8.A.3, 5.1.8.B.3, 5.1.8.C2, 5.2.8.A7, 5.2.8.B.1, 5.2.8.D.2, 5.4.8.C.2, 5.4.8.G.1, 5.4.8.G.2

#### Section 1 - Resources

- 59. Compare renewable and nonrenewable resources
- 60. List uses of fossil fuels
- 61. Identify alternatives to fossil fuel use

#### Section 2 - Pollution

- 62. Describe types of air pollution
- 63. Identify causes of water pollution
- 64. Explain methods that can be used to prevent erosion

#### Section 3 - The Three Rs of Conservation

- 65. Recognize ways you can reduce your use of natural resources
- 66. Explain how you can reuse resources to promote conservation
- 67. Describe how many materials can be recycled

#### Chapter 23 - Newton's Laws of Motion

Core Standards: 5.1.8.A.2, 5.1.8.B.2, 5.1.8.C.2, 5.1.8.D.3, 5.2.8.D.1, 5.2.8.E.1, 5.2.8.D.2, 5.4.8.C.2, 5.4.8.G.1, 5.4.8.G.2

#### Section 1 - Motion

- 68. Contrast distance and displacement
- 69. Define speed, velocity, and acceleration
- 70. Calculate speed, velocity, and acceleration

#### Section 2 - Newton's First Law

- 71. Define force
- 72. Describe Newton's first law of motion
- 73. Contrast balanced and unbalanced forces

#### Section 3 - Newton's Second Law

74. Predict changes in motion using Newton's second law 75. Describe the gravitational force between objects

76. Contrast different types of friction

## Section 4 - Newton's Third Law

77. Interpret motion using Newton's third law 78. Analyze motion using all three laws

## Chapter 24 - Energy and Energy Resources

Core Standards: 5.1.8.A.1, 5.1.8.A.2, 5.1.8.C.2, 5.2.8.A.7, 5.2.8.C.2, 5.2.8.D.1, 5.2.8.D.2, 5.3.8.B.1

## Section 1 - What is Energy?

- 79. Explain what energy is
- 80. Distinguish between kinetic energy and potential energy
- 81. Identify the various forms of energy

## Section 2 - Energy Transformations

- 82. Apply the law of conservation of energy to energy transformations
- 83. Identify how energy changes form
- 84. Describe how electric power plants produce energy

## Section 3 - Sources of Energy

- 85. Explain what renewable, nonrenewable, and alternative resources are
- 86. Describe the advantages and disadvantages of using various energy sources

## Voorhees Township Schools Science Course of Study/Grade 8 Objectives Glencoe Science 8 © 2005

Unit	Chapter(s)	Lesson(s)	Time Frame
1 - Biology	1 – Nature of Science 2 – Traits 3 – Interactions of Human Systems		Sept./Feb March
2 – Ecology	6 - Ecosystems (Need to Supplement w/NJ catastrophes)		May
3 - Earth Science	9 - Fossils, Earth's Past 10 - Geologic Time 12 Solar System 13 - Galaxies		April/June
5 - Physical Science	14 - Atoms (brief review) 15 - Periodic Table (brief review) 16 - Bonds 17 - Chemical Reactions 24 - Waves, Sound, Light	1 1, 2	Oct Nov Jan.

## Chapter 1 - The Nature of Science

Core Standards: 5.1.8. A1, 5.1.8. A2, 5.1.8 A3, 5.1.8. B1, 5.1.8. B2, 5.1.8. B3, 5.1.8. B4, 5.1.8. C1, 5.1.8. C2, 5.1.8. C3, 5.1.8. D1, 5.1.8. D2, 5.1.8. D3, 5.1.8. D4

Section 1 - What is Science?

- 1. Identify how science is a part of your everyday life
- 2. Describe what skills and tools are used in science

## Section 2 - Doing Science

- 3. Examine the steps used to solve a problem in a scientific way
- 4. Explain how a well-designed investigation is developed

## Section 3 - Science and Technology

- 5. Determine how science and technology influence your life
- 6. Analyze how modern technology allows scientific discoveries to be communicated

#### worldwide

#### Chapter 2 - Traits and How They Change

Core Standards: 5.3.8. D1, 5.3.8. D2, 5.3.8. D3, 5.3.8. A1, 5.3.8. A2, 5.3.8. B1, 5.3.8. B2, 5.3.8. C1

#### Section 1 - Traits and the Environment

- 7. Compare and contrast phenotype and genotype
- 8. Describe some effects the environment has on traits
- 9. Explain how traits are formed

#### Section 2 - Genetics

- 10. Differentiate between genetics and heredity
- 11. Explain the results of Mendel's pea plant experiments
- 12. Identify the results shown by a Punnett square

#### Section 3 - Environmental Impact over Time

- 13. Explain how living and nonliving environmental factors impact evolution
- 14. Describe how natural selection occurs in a species
- 15. Compare and contrast selective breeding and natural selection

## Chapter 3 - Interactions of Human Systems

Core Standards: 5.3.8. A1, 5.3.8. A2

#### Section 1 - The Human Organism

- 16. Describe the basic structure and function of a typical human cell
- 17. Identify and describe the five levels of organization in the human body

#### Section 2 - How Your Body Works

- 18. Discuss how body systems work together to carry out important life functions
- 19. Explain how negative feedback mechanisms in the body help maintain homeostasis
- 20. Compare negative feedback mechanisms and positive feedback mechanisms in the body

#### Chapter 6 - *Ecosystems*

Core Standards: 5.3.8. A1, 5.3.8. A2, 5.3.8. B1, 5.3.8. B2, 5.3.8. C1

## Section 1 - How Ecosystems Change

- 21. Explain how ecosystems change over time
- 22. Describe how new communities begin in areas without life
- 23. Compare pioneer communities and climax communities

## Section 2 - Biomes

- 24. Explain how climate influences land environments
- 25. Identify seven biomes of Earth
- 26. Describe the adaptations of organisms found in each biome

## Section 3 - Aquatic Ecosystems

- 27. Compare flowing freshwater and standing freshwater ecosystems
- 28. Identify and describe important saltwater ecosystems
- 29. Identify problems that affect aquatic ecosystems

## Chapter 9 - Clues to Earth's Past

Core Standards: 5.3.8. E1, 5.3.8. E2, 5.4.8. B1, 5.4.8. B2, 5.4.8. C1, 5.4.8. C2

## Section 1 - Fossils

- 30. List the conditions necessary for fossils to form
- 31. Describe several processes of fossil formation
- 32. Explain how fossil correlation is used to determine rock ages
- 33. Determine how fossils can be used to explain changes in Earth's surface, life forms, and environment

## Section 2 - Relative Ages of Rocks

- 34. Describe methods used to assign relative ages to rock layers
- 35. Interpret gaps in the rock record
- 36. Give an example of how rock layers can be correlated with other rock layers

## Section 3 - Absolute Ages of Rocks

- 37. Identify how absolute age differs from relative age
- 38. Describe how the half-lives of isotopes are used to determine a rock's age

#### Chapter 10 - Geologic Time

Core Standards: 5.3.8. E1, 5.3.8. E2, 5.4.8. C1, 5.4.8. C2, 5.4.8. B1, 5.4.8. B2, 5.3.8. D1, 5.3.8. D2, 5.3.8. D3

#### Section 1 - Life and Geologic Time

- 39. Explain how geologic time can be divided into units
- 40. Relate changes of Earth's organisms to divisions on the geologic time scale
- 41. Describe how plate tectonics affects species

#### Section 2 - Early Earth History

- 42. Identify characteristic Precambrian and Paleozoic life-forms
- 43. Draw conclusions about how species adapted to changing environments in Precambrian time and the Paleozoic Era
- 44. Describe changes in Earth and its life-forms at the end of the Paleozoic Era

#### Section 3 - Middle and Recent Earth History

- 45. Compare and contrast characteristic life-forms in the Mesozoic and Cenozoic Eras
- 46. Explain how changes caused by plate tectonics affected organisms during the Mesozoic Era
- 47. Identify when humans first appeared on Earth

#### Chapter 12 - The Solar System Core Standards: 5.4.8. A1, 5.4.8. A2, 5.4.8. A3, 5.4.8. A4

Section 1 - The Solar System

48. Compare the Earth-centered and Sun-centered models of the solar system 49. Explain that gravity holds the planets in their orbits around the Sun

#### Section 2 - The Inner Planets

- 50. List the inner planets in order from the Sun
- 51. Describe each inner planet
- 52. Compare and contrast Venus and Earth

#### Section 3 - The Outer Planets

53. Describe the characteristics of Jupiter, Saturn, Uranus, and Neptune

54. Explain how Pluto differs from the other outer planets

#### Section 4 - Other Objects in the Solar System

- 55. Describe comets and how comets change when they approach the Sun
- 56. Distinguish among comets, meteoroids, and asteroids
- 57. Explain that objects from space sometimes impact Earth

#### Chapter 13 - Stars and Galaxies

Core Standards: 5.4.8. A4

#### Section 1 – Stars

58. Explain why some constellations are visible only during certain seasons

59. Distinguish between absolute magnitude and apparent magnitude

#### Section 2 - The Sun

- 60. Explain that the Sun is the closest star to Earth
- 61. Describe the structure of the Sun
- 62. Describe sunspots, prominences, and solar flares

## Section 3 - Evolution of Stars

- 63. Describe how stars are classified
- 64. Compare the Sun to other types of stars on the H-R diagram
- 65. Describe how stars evolve

## Section 4 - Galaxies and the Universe

- 66. Describe the Sun's position in the Milky Way Galaxy
- 67. Explain that the same natural laws that apply to our solar system also apply in other galaxies

#### Chapter 14 - Inside the Atom

Core Standards: 5.2.8. A1, 5.2.8. A2, 5.2.8. A3, 5.2.8. A5

## Section 1 - Model of the Atom

- 68. Explain how scientists discovered subatomic particles
- 69. Explain how today's model of the atom developed
- 70. Describe the structure of the nuclear atom

71. Explain that all matter is made up of atoms

## Section 2 - The Nucleus

- 72. Describe the process of radioactive decay
- 73. Explain what is meant by half-life
- 74. Describe how radioactive isotopes are used

## Chapter 15 - The Periodic Table

Core Standards: 5.2.8. A4, 5.2.8. A5, 5.2.8. A6, 5.2.8. A7

## Section 1 - Introduction to the Periodic Table

- 75. Describe the history of the periodic table
- 76. Interpret an element key
- 77. Explain how the periodic table is organized

## Section 2 - Representative elements

- 78. Recognize the properties of representative elements
- 79. Identify uses for the representative elements
- 80. Classify elements into groups based on similar properties

## Section 3 - Transition elements

- 81. Identify properties of some transition elements
- 82. Distinguish lanthanides from actinides

## Chapter 16 - Atomic Structure and Chemical Bonds Core Standards: 5.2.8. A2, 5.2.8. A6, 5.2.8. B1, 5.2.8. B2

## Section 1 - Why Do Atoms Combine?

- 83. Identify how electrons are arranged in an atom
- 84. Compare the relative amounts of energy of electrons in an atom
- 85. Compare how the arrangement of electrons in an atom is related to its place in the periodic table

## Section 2 - How Elements Bond

86. Compare and contrast ionic and covalent bonds

- 87. Distinguish between compounds and molecules
- 88. Identify the difference between polar and nonpolar covalent bonds
- 89. Interpret chemical shorthand

Chapter 17 - Chemical Reactions

Core Standards: 5.2.8. B1

## Section 1 - Chemical Formulas and Equations

- 90. Determine whether or not a chemical reaction is occurring
- 91. Determine how to read and understand a balanced chemical equation
- 92. Examine some reactions that release energy and others that absorb energy
- 93. Explain the law of conservation of mass

## Section 2 - Rates of Chemical Reactions

94. Determine how to describe and measure the speed of a chemical reaction 95. Identify how chemical reactions can be speeded up or slowed down

#### Chapter 24 - Waves, Sound, and Light

Core Standards: 5.2.8. C1, 5.2.8. C2

## Section 1 - Waves

- 96. Explain how waves transport energy
- 97. Distinguish among transverse, compressional, and electromagnetic waves
- 98. Describe the properties of waves
- 99. Describe reflection, refraction, and diffraction of waves

## Section 2 - Sound Waves

- 100. Describe how sound waves are produced
- 101. Explain how sound waves travel through matter
- 102. Describe the relationship between loudness and sound intensity
- 103. Explain how humans hear sound

## Section 3 - Light

- 104. Identify the properties of light waves
- 105. Describe the electromagnetic spectrum
- 106. Describe the types of electromagnetic waves that travel from the Sun to Earth

107. Explain human vision and color perception

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