Northwestern School Corporation

2010 5th Grade Science

Course Outline

A. The Nature of Science

The students will make inferences and draw conclusions based on data collected. They will examine conclusions from past scientific investigations and determine how and why scientists were able to draw those conclusions. They will give examples of how scientists make predictions about the future based on what is known about the past.

The students will:

- Use gathered data to form conclusions about results.
- Make decisions concerning reliable resources for research information.
- Examine established scientific principles to understand the how scientists were able to draw the conclusions.
- Understand how past data relates to future predictions.

B. The Nature of Technology

The students will describe how the interaction between science and technology makes available scientific instruments and materials that are integral to modern science and/or daily life. They will give examples of situations in which new technology had unexpected positive and negative effects on the world. They will explain how the solution to one problem may create other problems.

The students will:

- Use technology to view simulations of scientific research.
- Examine the ways that technology has affected daily life in different parts of the world such as bringing the internet to remote villages, the Exon-Valdize disaster, the Gulf of Mexico disaster, etc.
- Discuss certain companies, industries, and programs that have promoted the advances of technology such as: the auto industry, Apple computers, NASA, etc.

C. Physical Science

1. Energy

Students will demonstrate how a warmer object transfers heat to a cooler one by contact or by radiation at a distance, so that the cooler object gets warmer and the warmer object gets cooler. Demonstrate that when heat is made to flow into an object by putting it in contact with a hotter object, its temperature increases.

Students will:

- Define the methods of heat transfer to be: conduction, convection, and radiation and be able to explain all with examples.
- Understand heat transfer and the correlation of the movement of molecules in that process.
- Understand the transfer of electrons in the process and formation of electricity.
- Define rays and waves as they correlate to heat, sound, and light energy.

2. Property of Matter

Students will give examples of chemical changes such that when a new material is made by combining two or more materials, it has properties that are different from the original materials. They will describe how physical properties are not dependent on size or volume of a material.

Students will:

- Understand chemical reactions and be able to list the types of reactions as: combination, replacement, and decomposition. They will be able to give examples of each.
- Be able to discuss the role that electrons and the structure of atoms play in chemical changes.
- Be able to navigate the Periodic Table including knowing where the atomic number is, what the symbols are, and how elements are arranged in the table.
- Know how density of an element impacts the buoyancy of the element in water.

3. Changes in Matter

Students will identify heat as the energy of moving particles too small to be seen. Describe how the properties and phases of materials change as the materials gain or lose heat energy.

4. Motion

Students will

- Identify kinetic and potential energy.
- Identify and understand mechanical, electrical, sound, chemical and light energy.
- Identify the point at which potential energy transfers to kinetic energy and switches back and forth.
- Explore different forms of energy.

D. Earth and Space Science

1. Earth Science

Students will

- Identify the parts of the water cycle and know how they are interdependent upon each other.
- Identify the different types of clouds and what type of weather accompanies each.
- Recognize different weather patterns and strengths of storms.
- Learn and use proper weather vocabulary.

2. Space Science

Students will

- Identify the different types of telescopes and their uses for viewingdistant objects in the sky including the moon and planets.
- Identify several different stars in the night sky including the sun as a star. Students will identify different sizes and temperatures of stars and recognize what makes up the magnification of stars.

E. Life Science

1. Plants

Students will

- Know and identify different types of reproduction of plants.
- Know the classification of plants based upon complexity of organism.
- Identify a plant cell, all its parts, and the functions of each.

2. Animals

Students will

- Know the classification of animals and the steps used to classify organism, based on similarities of characteristics.
- Identify the parts of an animal cell and the function of each.
- Understand the basic needs of life forms and what functions are necessary to constitute life.

3. Biology/Health

Students will

- Understand that cells make up tissues, tissues make up organs, organs make up body systems and body systems work together for good health.
- Understand basic facts of genetic transfer of information through genes in cells and how dominant and recessive genes affect "families".
- Understand the "survival of the fittest" and how that process has helped in the evolution of different species and the extinction of others.
- Identify how changes in an organisms environment can be helpful, and when taken outside of the natural environment with natural predators it can be harmful.
- Understand how fossils can be used to identify different pre-historic life forms by comparing them to existing life forms using similarities and differences.

F. The Mathematical World

Students will

- Make precise measurements using the metric system with appropriate units.
- Explain that predictions can be based on what is known about the past, assuming that conditions are similar.
- Form hypothesis using logic based on research, past experiences, and knowledge of testing procedures.

- Demonstrate a working knowledge of the following mathematical concepts: basic algebraic equations; simple figure and solids; and parallel, perpendicular, congruence and symmetry of shapes.
- Demonstrate the ability to find the area of irregular shapes by dividing the shape into regular shapes.
- Demonstrate that results increase in validity with the repetition of experiments and that gathering large collections of data also helps validify the conclusion drawn.
- Use different methods to gather data, realizing that some forms are more appropriate for different types of data and results.
- Use the entire data collected to explain results.

G. Common Themes

Students will

- Investigate, observe, and describe that things change in steady, repetitive or irregular ways.
- Use a table or a graph of measurements to tell which type of change is being made.
- Recognize the importance of using facts, figures, statistics, and data when making decisions, but will not overemphasize any of these.

H. Local Standards

1. Use of unit study to fit school calendar.

2. All areas of science are to be taught each year: life science, physical sciences, earth sciences, and behavioral/health sciences.

3. Fifth grade students will use the scientific method to investigate an individual question and report those findings in a written report, with a formal presentation.