

5th Grade Science Curriculum

Course Description: Three major areas of study in 5th grade will include but not be limited to matter, cells and ecology. The order they are taught in can be determined by the teacher, however; each area must be taught in no less than a three month period to ensure adequate instructional time.

*****The New Jersey Core Curriculum Standards, Strands and Cumulative Progress Indicators for 5th Grade are listed below. Standards that directly involve the 5th Grade area of concentration are 5.5, 5.6 and 5.10. Those standards will be the main focus for all students in 5th grade. Standards 5.1, 5.2, 5.3, 5.4, 8.1 and 8.2 will be included in instructional science, math, and technology hours throughout the year.**

STANDARD 5.1 (Scientific Processes) All students will develop problem-solving, decision-making and inquiry skills, reflected by formulating usable questions and hypotheses, planning experiments, conducting systematic observations, interpreting and analyzing data, drawing conclusions, and communicating results.

Strands and Cumulative Progress Indicators

Building upon knowledge and skills gained in preceding grades, by the end of **Grade 8**, students will:

A. Habits of Mind

1. Evaluate the strengths and weaknesses of data, claims, and arguments.
2. Communicate experimental findings to others.

3. Recognize that the results of scientific investigations are seldom exactly the same and that replication is often necessary.
4. Recognize that curiosity, skepticism, open-mindedness, and honesty are attributes of scientists.

B. Inquiry and Problem Solving

1. Identify questions and make predictions that can be addressed by conducting investigations.
2. Design and conduct investigations incorporating the use of a control.
3. Collect, organize, and interpret the data that result from experiments.

C. Safety

1. Know when and how to use appropriate safety equipment with all classroom materials.
2. Understand and practice safety procedures for conducting science investigations.

Instructional Strategies:

1. Students will be taught *The Scientific Method*.
2. Teachers will demonstrate proper safety procedures and incorporate them into their classroom.
3. Students will be instructed on the proper way to conduct an experiment by collecting, organizing, and interpreting the data.

Assessment of Students:

1. Students will be assessed as they work on NJCCCS 5.5, 5.6 and 5.10.

STANDARD 5.2 (Science and Society) All students will develop an understanding of how people of various cultures have contributed to the advancement of science and technology, and how major discoveries and events have advanced science and technology.

Strands and Cumulative Progress Indicators

Building upon knowledge and skills gained in preceding grades, by the end of **Grade 8**, students will:

A. Cultural Contributions

1. Recognize that scientific theories:
 - develop over time,
 - depend on the contributions of many people, and
 - reflect the social and political climate of their time.
2. Know that scientists are men and women of many cultures who often work together to solve scientific and technological problems.
3. Describe how different people in different cultures have made and continue to make contributions to science and technology.

B. Historical Perspectives

1. Describe the impact of major events and people in the history of science and technology, in conjunction with other world events.
2. Describe the development and exponential growth of scientific knowledge and technological innovations.

Instructional Strategies:

1. Students will learn about major events and people in the history of science and technology that are relevant to NJCCCS 5.5, 5.6 and 5.10.

Assessment of Students:

1. Students will be assessed as they work on NJCCCS 5.5, 5.6 and 5.10.

STANDARD 5.3 (Mathematical Applications) All students will integrate mathematics as a tool for problem-solving in science, and as a means of expressing and/or modeling scientific theories.

Strands and Cumulative Progress Indicators

Building upon knowledge and skills gained in preceding grades, by the end of **Grade 8**, students will:

A. Numerical Operations

1. Express quantities using appropriate number formats, such as:
 - decimals.
 - percents.

- scientific notation.

B. Geometry and Measurement

1. Perform mathematical computations using labeled quantities and express answers in correctly derived units.

C. Patterns and Algebra

1. Express physical relationships in terms of mathematical equations derived from collected data.

D. Data Analysis and Probability

1. Represent and describe mathematical relationships among variables using:
 - graphs.
 - tables.
2. Analyze experimental data sets using measures of central tendency:
 - mean.
 - mode.
 - median.
3. Construct and use a graph of experimental data to draw a line of best fit and identify a linear relationship between variables.
4. Use computer spreadsheets, graphing and database applications to assist in quantitative analysis of data.

Instructional Strategies:

1. Students will learn math operations as named above during math instructional time and then apply it to relevant science operations throughout the year.

Assessment of Students:

1. Students will be assessed as they work on NJCCCS 5.5, 5.6 and 5.10.

STANDARD 5.4 (Nature and Process of Technology) All students will understand the interrelationships between science and technology and develop a conceptual understanding of the nature and process of technology.

Strands and Cumulative Progress Indicators

Building upon knowledge and skills gained in preceding grades, by the end of **Grade 6**, students will:

A. Science and Technology

1. Reinforce indicators from previous grade level.

B. Nature of Technology

1. Reinforce indicators from previous grade level.

C. Technological Design

1. Select a technological problem and describe the criteria and constraints that are addressed in solving the problem.

2. Identify the basic components of a technological system:

- input.
- process.
- output.
- feedback.

Instructional Strategies:

1. Students will use technology when available as they work on NJCCCS 5.5, 5.6 and 5.10.

Assessment of Students:

1. Students will be assessed as they work on NJCCCS 5.5, 5.6 and 5.10.

STANDARD 5.5 (Characteristics of Life) All students will gain an understanding of the structure, characteristics, and basic needs of organisms and will investigate the diversity of life.

Strands and Cumulative Progress Indicators

Building upon knowledge and skills gained in preceding grades, by the end of **Grade 6**, students will:

A. Matter, Energy, and Organization in Living Systems

1. Explain how systems of the human body are interrelated and regulate the body's internal environment.
2. Identify and describe the structure and function of cells and cell parts.

B. Diversity and Biological Evolution

1. Describe and give examples of the major categories of organisms and of the characteristics shared by organisms.
2. Compare and contrast acquired and inherited characteristics in human and other species

C. Reproduction and Heredity

1. Describe life cycles of humans and other organisms.

Instructional Strategies:

1. Students will explore theories behind the origin of life using textbooks, videos, the Internet and other resources available to teachers.
2. Students will compare and contrast the characteristics of living things using real-life observations, textbooks, video, notebooks, the Internet, and other resources that may be available to teachers.
3. Students will study the needs of living things using real-life observations, video, Internet, textbooks and other resources available to teachers.
4. Students will probe into the diversity and chemical make-up of living things down to the basic unit of all living things: the cell. Students will use microscopes to observe an array of cells. Students will sketch a plant cell and an animal cell. Students will learn the main parts of a cell and their functions.

Assessment of Students:

1. Students will learn to keep neat organized notes. The notebook will be used as a resource for the students to gather and study from for quizzes and tests. It should be considered as an assessment at each teacher's discretion.

2. Quizzes and tests should be given to students to check for understanding of material.
3. Essays should be given to students to check for a clear understanding of material.
4. Graphic Organizers should be used as a source for assessment.
5. Experiments and evaluation of experiments will be a source for assessment.
6. Projects, both individual and group, should be incorporated into the study of cells.
7. Participation should be a source of assessment.

STANDARD 5.6 (Chemistry) All students will gain an understanding of the structure and behavior of matter.

Strands and Cumulative Progress Indicators

Building upon knowledge and skills gained in preceding grades, by the end of **Grade 6**, students will:

A. Structure and Properties of Matter

1. Recognize that about 100 different elements have been identified and most materials on Earth are made of a few of them.
2. Show that equal volumes of different substances usually have different masses.
3. Describe the properties of mixtures and solutions, including concentration and saturation.

4. Describe characteristic physical properties such as boiling point, melting point, and solubility, and recognize that the property is independent of the amount of sample.

B. Chemical Reactions

1. Recognize evidence of a chemical change.

Instructional Strategies:

1. Students will explore the general properties of matter (mass, weight, density and volume) using textbook, notebooks, Internet, video, hands-on experiments, and real-world experiences.
2. Students will explore the physical and chemical changes of matter. They will also learn about the different phases of matter. Using textbooks, notebooks, Internet, video, hands-on experiments, and real-world experiences students will learn how matter can change the way it looks completely and become an entire different substance altogether.
3. Students will take matter into their own hands by learning about different elements and making mixtures and compounds. These should be both simple and safe and done under the supervision of the teacher.
4. The atom is the smallest part of an element and a basic understanding of what that means should be explored in 5th grade. This can be done in a variety of ways using textbooks, notebooks, Internet, video, hands-on experiments, and real-world experiences. In addition balloons and graphic organizers can be used to help students understand atoms.
5. Students should have an understanding of the Periodic Table using textbooks, notebooks, Internet, and video.

Assessment of Students:

1. Students will learn to keep neat organized notes. The notebook will be used as a resource for the students to gather and study from for quizzes and tests. It should be considered as an assessment at each teacher's discretion.
2. Quizzes and tests should be given to students to check for understanding of material.
3. Essays should be given to students to check for a clear understanding of material.
4. Graphic Organizers should be used as a source for assessment.
5. Experiments and evaluation of experiments will be a source for assessment.
6. Projects, both individual and group, should be incorporated into the study of matter.
7. Participation should be a source of assessment.

STANDARD 5.10 (Environmental Studies) All students will develop an understanding of the environment as a system of interdependent components affected by human activity and natural phenomena.

Strands and Cumulative Progress Indicators

Building upon knowledge and skills gained in preceding grades, by the end of **Grade 6**, students will:

A. Natural Systems and Interactions

1. Explain how organisms interact with other components of an ecosystem.
2. Describe the natural processes that occur over time in places where direct human impact is minimal.

B. Human Interactions and Impact

1. Describe the effect of human activities on various ecosystems.
2. Evaluate the impact of personal activities on the local environment.

Instructional Strategies:

1. Students will learn about energy resources such as, fossils fuels, the sun, wind, water, nuclear and alternative. This can be done in a variety of ways using textbooks, notebooks, the Internet, video, hands-on experiments, and real-world experiences.
2. Students will learn about Earth's nonliving resources. This can be done in a variety of ways using textbooks, notebooks, Internet, video, hands-on experiments, real-world experiences and perhaps a field trip to a mine.
3. Students will learn about pollution and how it affects land, air and water. . This can be done in a variety of ways using textbooks, notebooks, Internet, video, hands-on experiments, and real-world experiences. Students will brain storm different ways to help solve the pollution problems the Earth is facing today.
4. Conservation is a topic all students can get involved in. Using textbooks, notebooks, Internet, video, hands-on experiments, and real-world experiences students will learn what conservation means. Once they have

a true understanding of the word they can get involved in their real-world lives and help conserve on many different levels.

Assessment of Students:

1. Students will learn to keep neat organized notes. The notebook will be used as a resource for the students to gather and study from for quizzes and tests. It should be considered as an assessment at each teacher's discretion.
2. Quizzes and tests should be given to students to check for understanding of material.
3. Essays should be given to students to check for a clear understanding of material.
4. Graphic Organizers should be used as a source for assessment.
5. Experiments and evaluation of experiments will be a source for assessment.
6. Projects, both individual and group, should be incorporated into the study of ecology.
7. Participation should be a source of assessment.

8. Technological Literacy

STANDARD 8.1 (Computer and information literacy) All students will use computer applications to gather and organize information and to solve problems.

Strands and Cumulative Progress Indicators

Building upon knowledge and skills gained in preceding grades, by the end of **Grade 8**, students will:

A. Basic Computer Skills and Tools

1. Use appropriate technology vocabulary.
2. Use common features of an operating system (e.g., creating and organizing files and folders).
3. Demonstrate effective input of text and data, using touch keyboarding with proper technique.
4. Input and access data and text efficiently and accurately through proficient use of other input devices, such as the mouse.
5. Create documents with advanced text-formatting and graphics using word processing.
6. Create a file containing customized information by merging documents.
7. Construct a simple spreadsheet, enter data, and interpret the information.
8. Design and produce a basic multimedia project.

9. Plan and create a simple database, define fields, input data, and produce a report using sort and query.
10. Use network resources for storing and retrieving data.
11. Choose appropriate electronic graphic organizers to create, construct, or design a document.
12. Create, organize and manipulate shortcuts.

B. Application of Productivity Tools

Social Aspects

1. Demonstrate an understanding of how changes in technology impact the workplace and society.
2. Exhibit legal and ethical behaviors when using information and technology, and discuss consequences of misuse.
3. Explain the purpose of an Acceptable Use Policy and the consequences of inappropriate use of technology.
4. Describe and practice safe Internet usage.
5. Describe and practice "etiquette" when using the Internet and electronic mail.

Information Access and Research

6. Choose appropriate tools and information resources to support research and solve real world problems, including but not limited to:

- On-line resources and databases
 - Search engines and subject directories
7. Evaluate the accuracy, relevance, and appropriateness of print and non-print electronic information sources.

Problem Solving and Decision Making

8. Use computer applications to modify information independently and/or collaboratively to solve problems.
9. Identify basic hardware problems and demonstrate the ability to solve common problems.
10. Determine when technology tools are appropriate to solve a problem and make a decision.

Instructional Strategies:

1. Students will use technology when available as they work on NJCCCS 5.5, 5.6 and 5.10.

Assessment of Students:

1. Students will be assessed as they work on NJCCCS 5.5, 5.6 and 5.10.

STANDARD 8.2 (Technology Education) All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world as they relate to the individual, society, and the environment.

Strands and Cumulative Progress Indicators

Building upon knowledge and skills gained in preceding grades, by the end of **Grade 8**, students will:

A. Nature and Impact of Technology

1. Describe the nature of technology and the consequences of technological activity.
2. Describe how components of a technological product, system, or environment interact.
3. Describe how one technological innovation can be applied to solve another human problem that enhances human life or extends human capability.
4. Describe how technological activity has an affect on economic development, political actions, and cultural change.
5. Explain the cultural and societal effects resulting from the dramatic increases of knowledge and information available today.

B. Design Process and Impact Assessment

1. Demonstrate and explain how the design process is not linear.
2. Use hands on activities to analyze products and systems to determine how the design process was applied to create the solution.
3. Identify a technological problem and use the design process to create an appropriate solution.
4. Describe how variations in resources can affect solutions to a technological problem.
5. Select and safely use appropriate tools and materials in analyzing, designing, modeling or making a technological product, system or environment.

C. Systems in the Designed World

1. Explain technological advances in medical, agricultural, energy and power, information and communication, transportation, manufacturing, and construction technologies.
2. Explain reasons why human-designed systems, products, and environments need to be monitored, maintained, and improved to ensure safety, quality, cost efficiency, and sustainability.
3. Explain the functions and interdependence of subsystems such as waste disposal, water purification, electrical, structural, safety, climatic control, and communication.

Instructional Strategies:

1. Students will use technology when available as they work on NJCCCS 5.5, 5.6 and 5.10.

Assessment of Students:

1. Students will be assessed as they work on NJCCCS 5.5, 5.6 and 5.10.

References

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