

Superintendent's Message



Dear Parents and Students,

This booklet contains revised and updated objectives for students' learning in the "core" areas of English, mathematics, science, and social studies. These learning objectives are closely aligned with the Virginia Standards of Learning (SOL) to enhance students' opportunities for successful performance on SOL tests.

The purpose of this booklet is to provide parents and students a practical tool to use in planning and monitoring learning. Students are encouraged to preview course objectives at the beginning of the year and to evaluate their progress periodically by monitoring the objectives. Parents can play a significant role in increasing their children's achievement by reviewing these expectations with their student(s) on a regular basis.

Research repeatedly shows that by having high expectations for students' learning, we can make a positive contribution to students' success. Please join me in communicating to all students our expectation that they can succeed academically and become prepared for a rewarding future.

Sincerely,

Stewart D. Roberson
Superintendent of Schools

Required Textbooks

Prentice Hall Literature, Timeless Voices, Timeless Themes (Grade 6 – Copper Level) by Kate Kinsella, Kevin Feldman, Colleen Shea Stump, Joyce Armstrong Carroll and Edward E. Wilson – Pearson Education, Inc., 2005

Write Source by Dave Kemper, Patrick Sebranek, and Verne Meyer, Great Source Education Group, 2005

Standardized Assessment

The Virginia Standards of Learning (SOL) Assessment in Reading is administered to all sixth grade students in May. Writing assessment is administered to all eighth grade students in March of the eighth grade year. The results of the reading tests are available each summer. In grade eight, the results of both the reading and writing tests are combined to produce one final score.

During second semester, students participate in simulated SOL testing sessions using practice tests developed by teachers in Hanover County. The purpose of these sessions is to provide students with a practice testing experience, as well as to aid teachers in analyzing the strengths and weaknesses of the Language Arts curriculum. Students have an opportunity to review the content and strengthen test-taking strategies through a self-evaluation as the test questions are reviewed and discussed in class.

Technology

In the English classroom, students use technology to:

- access, retrieve, organize, analyze, and evaluate electronic information from a variety of sources, documenting sources appropriately;
- communicate an understanding of literature, grammar, and the writing process;
- present information using a variety of multimedia;
- use advanced publishing software and graphics programs to produce page layouts;
- compose and edit a multipage document at the keyboard using word processing skills and the writing process;
- develop and use databases to organize, analyze, and evaluate information;
- use search strategies to retrieve electronic information; and
- use local and worldwide network communication systems.

Parent Tips

Parental involvement in schooling can lead to academic benefits for students. Parents are encouraged to:

- help students manage and organize daily and weekly routines, allocating time for homework and extended assignments;
- read and discuss literary assignments with students;
- review and discuss students' writing, making suggestions for revision;
- visit the library in order to learn about outstanding literature (e.g., Newbery Medal winners);
- share and define new vocabulary words;
- read and discuss newspaper/magazine articles and historical/current events;
- supervise visits to sites on the Internet that extend student appreciation of the language arts;
- have students keep a writing journal;
- expose students to pieces of both fiction and nonfiction;
- model lifelong learning skills by reading alongside students for thirty minutes each day; and
- encourage use of writing process by using the following:

Prewriting (Planning)

- ◆ Use brainstorming, listing, clustering, freewriting, and class discussion to generate topic ideas.
- ◆ Choose and limit topic.
- ◆ Develop and organize details by making an outline, creating a list, or using graphic organizers.
- ◆ Conduct research, if necessary.
- ◆ Suit topic to purpose and audience.

Drafting/Composing

- ◆ Compose sentences and paragraphs (including thesis statement) from ideas generated in the prewriting stage.
- ◆ Develop a strong main idea, good supporting details (elaboration), and a powerful conclusion.
- ◆ Ensure that the essay has a definitive beginning, middle, and end.
- ◆ Assign a meaningful title to the piece.

Revising (Rearranging)

- ◆ Read draft for coherence, unity, and content.
- ◆ Examine word choice to make certain that vocabulary is precise for maximum impact on the reader.
- ◆ Utilize peer editing workshops when appropriate.
- ◆ Produce additional drafts to ensure a polished final product.

Editing (Correcting)

- ◆ Scrutinize work for sentence completeness, subject-verb agreement, verb tense consistency, and pronoun-antecedent agreement.
- ◆ Identify and correct errors in mechanics: capitalization, punctuation, spelling, and formatting.

Proofreading

- ◆ Examine work one more time to be certain that all desired changes have been made.
- ◆ Check to see that the title of the paper still reveals the work's central idea and purpose.

Publishing/Final Draft

- ◆ Share final product with, or submit final product to, the intended audience.

Helpful websites for parents:

- Hanover's language arts website: <http://hcps2.hanover.k12.va.us/instruction/la/default.htm>
- Virginia English Standards of Learning Curriculum Framework: <http://www.pen.k12.va.us/vdoe/instruction/english/englishcf/html>
- www.readwritethink.org
- www.reading.org/links/lit_tp.html
- www.rif.org/parents/
- www.ncte.org

Language Arts Objectives

- 6.1 The student will analyze oral participation in small-group activities.
- Communicate as leader and contributor.
 - Evaluate own contributions to discussions.
 - Summarize and evaluate group activities.
 - Analyze the effectiveness of participant interactions.
- 6.2 The student will listen critically and express opinions in oral presentations.
- Distinguish between fact and opinion.
 - Compare and contrast viewpoints.
 - Present a convincing argument.
 - Paraphrase what is heard.
 - Summarize what is heard.
 - Use grammatically correct language and vocabulary appropriate to audience, topic, and purpose.
- 6.3 The student will read and learn the meanings of unfamiliar words and phrases.
- Identify word origins, derivations, and inflections.
 - Identify analogies and figurative language.
 - Use context and sentence structure to determine meanings and differentiate among multiple meanings of words.
 - Use word-reference materials.
- 6.4 The student will read and demonstrate comprehension of a variety of fiction, narrative nonfiction, and poetry.
- Identify the elements of narrative structure, including setting, character, plot, conflict, and theme.
 - Use knowledge of narrative and poetic structures to aid comprehension and predict outcomes.
 - Describe the images created by language.
 - Describe how word choice and imagery contribute to the meaning of a text.
 - Describe cause-effect relationships and their impact on plot.
 - Use information stated explicitly in the text to draw conclusions and make inferences.
 - Explain how character and plot development are used in a selection to support a central conflict or story line.
 - Paraphrase and summarize the main points in the text.
- 6.5 The student will read and demonstrate comprehension of a variety of informational selections.
- Identify questions to be answered.
 - Make, confirm, or revise predictions.
 - Use context to determine meanings of unfamiliar words and technical vocabulary.
 - Draw conclusions and make inferences based on explicit and implied information.
 - Organize the main idea and details to form a summary.
 - Compare and contrast information about one topic contained in different selections.
 - Select informational sources appropriate for a given purpose.
- 6.6 The student will write narratives, descriptions, and explanations.
- Use a variety of planning strategies to generate and organize ideas.
 - Establish central idea, organization, elaboration, and unity.
 - Select vocabulary and information to enhance the central idea, tone, and voice.

- Expand and embed ideas by using modifiers, standard coordination, and subordination in complete sentences.
- Revise writing for clarity.

6.7 The student will edit writing for correct grammar, capitalization, punctuation, spelling, and sentence structure.

- Use a variety of graphic organizers, including sentence diagrams, to analyze and improve sentence formation and paragraph structure.
- Use subject-verb agreement with intervening phrases and clauses.
- Use pronoun-antecedent agreement to include indefinite pronouns.
- Maintain consistent tense inflections across paragraphs.
- Choose adverbs to describe verbs, adjectives, and other adverbs.
- Use correct spelling for frequently used words.

Emphasis on Grammar:

- use complete sentences with appropriate punctuation
- avoid comma splices and fused sentences
- avoid using coordinating conjunctions at the beginning of a sentence, e.g., *and*, *so*
- diagram simple sentences with prepositional phrases
- use singular verbs with singular subjects and plural verbs with plural subjects, e.g., *The driver of the bus full of children drives very carefully. The students in the class discuss many topics.*
- use reference sources to select the correct spelling and usage of such words as *their*, *there*, and *they're*
- use first person pronouns appropriately in compound subjects and objects, e.g., *John and I went to the store. Mother gave presents to Jim and me.*
- choose adjectives and adverbs appropriately, e.g., *He is a good student. He does really well in all his studies.*
- capitalize language classes or classes followed by a number, e.g., *French, Algebra II*
- capitalize *mom* and *dad* only when those titles replace names or are used as proper nouns, e.g., *My mom told me to go to bed, and I replied, "No, Mom, I don't want to."*
- punctuate and format dialogue
- hyphenate words between syllables when they must be split at the ends of lines
- understand the use of the apostrophe for contractions and possessives
- maintain a consistent verb tense within sentences and throughout and across paragraphs

Mathematics

Required Textbooks

Mathematics 6: Glencoe Mathematics: Applications and Concepts, Course 1; The McGraw Hill Companies, Inc., 2005.

Mathematics 7: Glencoe Mathematics: Applications and Concepts, Course 2; The McGraw Hill Companies, Inc., 2005.

Pre-Algebra: Glencoe Mathematics: Pre-Algebra; The McGraw Hill Companies, Inc., 2005.

Algebra I: Glencoe Mathematics: Algebra I; The McGraw Hill Companies, Inc., 2005.

Standardized Assessment

The Virginia Standards of Learning (SOL) Assessment for Math 6, Math 7, and Math 8 are given to all students enrolled in Math 6, Math 7, or Pre-Algebra in May. These assessments cover the math objectives for the specified course.

The Virginia Standards of Learning (SOL) Assessment for Algebra I is given to all students enrolled in this course in the late spring.

In March, all math students participate in a simulated SOL testing session using a cumulative practice test developed by teachers in Hanover County. The purpose of this session is to provide students with a practice testing experience and to identify strengths and weaknesses in content knowledge and skills prior to the SOL testing. Discussion and analysis of test questions help students evaluate their knowledge and strengthen test-taking strategies.

Technology

In the mathematics classroom, students use technology to:

- collect and display real-time data;
- present data in a variety of graphical forms;
- learn abstract mathematical concepts through constructions, visual displays, and measurement;
- construct spreadsheets to perform numerical calculations; and
- communicate understanding of mathematical concepts, skills, and processes.

The following equipment is used in the instructional program for Math 6, Math 7 and Pre-Algebra:

- Scientific calculators such as the TI-30XASEVA made by Texas Instruments

The following equipment is used in the instructional program for Algebra I:

- Graphing Calculator, such as the TI-83 Plus or TI-84 Plus made by Texas Instruments

Parent Tips

Parental involvement in schooling can lead to academic benefits for students. Parents are encouraged to:

- help students manage and organize daily and weekly routines, allocating time for homework and extended assignments;
- provide supplies including calculators, pencils, notebook paper, graph paper, scissors, a protractor, and a compass;

- review mathematics homework for accuracy and understanding by asking students to explain strategies and solutions;
- encourage students to review their notes and work sample problems in preparation for each quiz and test, periodically reviewing material from previous chapters;
- read newspaper articles and discuss news reports that incorporate mathematics or statistics; and
- talk with students about ways to use mathematics including problem solving and logical reasoning in their daily lives.

Three helpful resources are Math on Call: A Mathematics Handbook and Algebra To Go, and Geometry to Go published by Great Source Education Group.

Some websites offering mathematics information, activities, and practice include:

- Glencoe Online Learning Centers: www.glencoe.com/sites/virginia/students/mathematics
- Virginia Department of Education: www.pen.k12.va.us
- U. S. Department of Education: www.ed.gov
- Figure This! Math Challenges for Families: www.figurethis.org
- For a free challenge book and tips for parents call toll free 1-877-GO-SOLVE
- National Council of Teachers of Mathematics: www.nctm.org
- A site for teachers, parents, and students of all ages: www.math.com
- Fun Brain: www.funbrain.com
- NASA: www.nasa.gov
- www.mathematics.com
- Jefferson Lab: Virginia State Standards of Learning
<http://education.jlab.org/solquiz/index.html>
- The Math Lab: www.themathlab.com
- Purplemath-Your Algebra Resource (Algebra I): www.purplemath.com
- Cool Math: www.coolmath.com
- www.msinnovation.info
- <http://hcps2>

Mathematics 6 Objectives

Number and Number Sense

The student will identify representations of a given percent and describe orally and in writing the equivalence relationships among fractions, decimals, and percents.

- 6.1 The student will describe and compare two sets of data, using ratios, and will use appropriate notations, such as a/b , a to b , and $a:b$.
- 6.3 The student will
- find common multiples and factors, including least common multiple and greatest common factor;
 - identify and describe prime and composite numbers; and
 - identify and describe the characteristics of even and odd integers.
- 6.4 The student will compare and order whole numbers, fractions, and decimals, using concrete materials, drawings or pictures, and mathematical symbols.
- 6.5 The student will identify, represent, order, and compare integers.

Computation and Estimation

- 6.6 The student will
- solve problems that involve addition, subtraction, multiplication, and/or division with fractions and mixed numbers, with and without regrouping, that include like and unlike denominators of 12 or less, and express their answers in simplest form; and
 - find the quotient, given a dividend expressed as a decimal through thousandths and a divisor expressed as a decimal to thousandths with exactly one non-zero digit.
- 6.7 The student will use estimation strategies to solve multistep practical problems involving whole numbers, decimals, and fractions (rational numbers).
- 6.8 The student will solve multistep consumer-application problems involving fractions and decimals and present data and conclusions in paragraphs, tables, or graphs. Planning a budget will be included.

Measurement

- 6.9 The student will compare and convert units of measure for length, area, weight/mass, and volume within the U.S. Customary system and the metric system and estimate conversions between units in each system:
- length—part of an inch ($1/2$, $1/4$, and $1/8$), inches, feet, yards, miles, millimeters, centimeters, meters, and kilometers;
 - weight/mass—ounces, pounds, tons, grams, and kilograms;
 - liquid volume—cups, pints, quarts, gallons, milliliters, and liters; and
 - area—square units. *
- * The intent of this standard is for students to make ballpark comparisons and not to memorize conversion factors between U.S. Customary and metric units.

- 6.10 The student will estimate and then determine length, weight/mass, area, and liquid volume/capacity, using standard and nonstandard units of measure.
- 6.11 The student will determine if a problem situation involving polygons of four or fewer sides represents the application of perimeter or area and apply the appropriate formula.
- 6.12 The student will
- solve problems involving the circumference and/or area of a circle when given the diameter or radius; and
 - derive approximations for pi (π) from measurements for circumference and diameter, using concrete materials or computer models.
- 6.13 The student will
- estimate angle measures, using 45° , 90° , and 180° as referents, and use the appropriate tools to measure the given angles; and
 - measure and draw right, acute, and obtuse angles and triangles.

Geometry

- 6.14 The student will identify, classify, and describe the characteristics of plane figures, describing their similarities, differences, and defining properties.
- 6.15 The student will determine congruence of segments, angles, and polygons by direct comparison, given their attributes. Examples of noncongruent and congruent figures will be included.
- 6.16 The student will construct the perpendicular bisector of a line segment and an angle bisector.
- 6.17 The student will sketch, construct models of, and classify solid figures (rectangular prism, cone, cylinder, and pyramid).

Probability and Statistics

- 6.18 The student, given a problem situation, will collect, analyze, display, and interpret data in a variety of graphical methods, including
- line, bar, and circle graphs;
 - stem-and-leaf plots; and
 - box-and-whisker plots.
- Circle graphs will be limited to halves, fourths, and eighths.
- 6.19 The student will describe the mean, median, and mode as measures of central tendency, describe the range, and determine their meaning for a set of data.

6.20 The student will

- make a sample space for selected experiments and represent it in the form of a list, chart, picture, or tree diagram; and
- determine and interpret the probability of an event occurring from a given sample space and represent the probability as a ratio, decimal or percent, as appropriate for the given situation.

Patterns, Functions, and Algebra

6.21 The student will investigate, describe, and extend numerical and geometric patterns, including triangular numbers, patterns formed by powers of 10, and arithmetic sequences.

6.22 The student will investigate and describe concepts of positive exponents, perfect squares, square roots, and, for numbers greater than 10, scientific notation. Calculators will be used to develop exponential patterns.

6.23 The student will

- model and solve algebraic equations, using concrete materials;
- solve one-step linear equations in one variable, involving whole number coefficients and positive rational solutions; and
- use the following algebraic terms appropriately: variable, coefficient, term, and equation.

Mathematics 7 Objectives

Number and Number Sense

- 7.1 The student will compare, order, and determine equivalent relationships between fractions, decimals, and percents, including use of scientific notation for numbers greater than 10.
- 7.2 The student will simplify expressions that contain rational numbers (whole numbers, fractions, and decimals) and positive exponents, using order of operations, mental mathematics, and appropriate tools.
- 7.3 The student will identify and apply the following properties of operations with real numbers:
- the commutative and associative properties for addition and multiplication;
 - the distributive property;
 - the additive and multiplicative identity properties;
 - the additive and multiplicative inverse properties; and
 - the multiplicative property of zero.

Computation and Estimation

- 7.4 The student will
- solve practical problems using rational numbers (whole numbers, fractions, decimals) and percents; and
 - solve consumer–application problems involving tips, discounts, sales tax, and simple interest.
- 7.5 The student will formulate rules for and solve practical problems involving basic operations (addition, subtraction, multiplication, and division) with integers.
- 7.6 The student will use proportions to solve practical problems, which may include scale drawings, that contain rational numbers (whole numbers, fractions, and decimals), and percents.

Measurement

- 7.7 The student, given appropriate dimensions, will
- estimate and find the area of polygons by subdividing them into rectangles and right triangles; and
 - apply perimeter and area formulas in practical situations.
- 7.8 The student will investigate and solve problems involving the volume and surface area of rectangular prisms and cylinders, using concrete materials and practical situations to develop formulas.

Geometry

- 7.9 The student will compare and contrast the following quadrilaterals: parallelogram, rectangle, square, rhombus, and trapezoid. Deductive reasoning and inference will be used to classify quadrilaterals.
- 7.10 The student will identify and draw the following polygons: pentagon, hexagon, heptagon, octagon, nonagon, and decagon.
- 7.11 The student will determine if geometric figures – quadrilaterals or triangles – are similar and write proportions to express the relationships between corresponding parts of similar figures.
- 7.12 The student will identify and graph ordered pairs in the four quadrants of a coordinate plane.
- 7.13 The student, given a polygon in the coordinate plane, will represent transformations – rotation and translation – by graphing the coordinates of the vertices of the transformed polygon and sketching the resulting figure.

Probability and Statistics

- 7.14 The student will investigate and describe the difference between the probability of an event found through simulation versus the theoretical probability of that same event.
- 7.15 The student will identify and describe the number of possible arrangements of several objects, using a tree diagram or the Fundamental (Basic) Counting Principle.
- 7.16 The student will create and solve problems involving the measures of central tendency (mean, median, mode) and the range of a set of data.
- 7.17 The student, given a problem situation, will collect, analyze, display, and interpret data, using a variety of graphical methods, including
- frequency distributions;
 - line plots;
 - histograms;
 - stem-and-leaf plots;
 - box-and-whisker plots; and
 - scattergrams.
- 7.18 The student will make inferences, conjectures, and predictions based on analysis of a set of data.

Patterns, Functions, and Algebra

- 7.19 The student will represent, analyze, and generalize a variety of patterns, including arithmetic sequences and geometric sequences, with tables, graphs, rules, and words in order to investigate and describe functional relationships.
- 7.20 The student will write verbal expressions as algebraic expressions and sentences as equations.
- 7.21 The student will use the following algebraic terms appropriately: equation, inequality, and expression.

7.22 The student will

- solve one-step linear equations and inequalities in one variable with strategies involving inverse operations and integers, using concrete materials, pictorial representations, and paper and pencil; and
- solve practical problems requiring the solution of a one-step linear equation.

Pre-Algebra Objectives

Number and Number Sense

- 8.1 The student will
- simplify numerical expressions involving positive exponents, using rational numbers, order of operations, and properties of operations with real numbers;
 - recognize, represent, compare, and order numbers expressed in scientific notation; and
 - compare and order decimals, fractions, percents, and numbers written in scientific notation.
- 8.2 The student will describe orally and in writing the relationship between the subsets of the real number system.

Computation and Estimation

- 8.3 The student will solve practical problems involving rational numbers, percents, ratios, and proportions. Problems will be of varying complexities and will involve real-life data, such as finding a discount and discount prices and balancing a checkbook.
- 8.4 The student will apply the order of operations to evaluate algebraic expressions for given replacement values of the variables. Problems will be limited to positive exponents.
- 8.5 The student, given a whole number from 0 to 100, will identify it as a perfect square or find the two consecutive whole numbers between which the square root lies.

Measurement

- 8.6 The student will verify by measuring and describe the relationships among vertical angles, supplementary angles, and complementary angles and will measure and draw angles of less than 360° .
- 8.7 The student will investigate and solve practical problems involving volume and surface area of rectangular solids (prisms), cylinders, cones, and pyramids.

Geometry

- 8.8 The student will apply transformations (rotate or turn, reflect or flip, translate or slide, and dilate or scale) to geometric figures represented on graph paper. The student will identify applications of transformations, such as tiling, fabric design, art, and scaling.
- 8.9 The student will construct a three-dimensional model, given the top, side, and/or bottom views.
- 8.10 The student will
- verify the Pythagorean Theorem, using diagrams, concrete materials, and measurement; and
 - apply the Pythagorean Theorem to find the missing length of a side of a right triangle when given the lengths of the other two sides.

Probability and Statistics

- 8.11 The student will analyze problem situations, including games of chance, board games, or grading

scales, and make predictions, using knowledge of probability.

- 8.12 The student will make comparisons, predictions, and inferences, using information displayed in frequency distributions; box-and-whisker plots; scattergrams; line, bar, circle, and picture graphs; and histograms.
- 8.13 The student will use a matrix to organize and describe data.

Patterns, Functions, and Algebra

- 8.14 The student will
- describe and represent relations and functions, using tables, graphs, and rules; and
 - relate and compare tables, graphs, and rules as different forms of representation for relationships.
- 8.15 The student will solve two-step equations and inequalities in one variable, using concrete materials, pictorial representations, and paper and pencil.
- 8.16 The student will graph a linear equation in two variables, in the coordinate plane, using a table of ordered pairs.
- 8.17 The student will create and solve problems, using proportions, formulas, and functions.
- 8.18 The student will use the following algebraic terms appropriately: domain, range, independent variable, and dependent variable.

Algebra I Objectives

- A.1 The student will solve multistep linear equations and inequalities in one variable, solve literal equations (formulas) for a given variable, and apply these skills to solve practical problems. Graphing calculators will be used to confirm algebraic solutions.
- A.2 The student will represent verbal quantitative situations algebraically and evaluate these expressions for given replacement values of the variables. Students will choose an appropriate computational technique, such as mental mathematics, calculator, or paper and pencil.
- A.3 The student will justify steps used in simplifying expressions and solving equations and inequalities. Justifications will include the use of concrete objects; pictorial representations; and the properties of real numbers, equality, and inequality.
- A.4 The student will use matrices to organize and manipulate data, including matrix addition, subtraction, and scalar multiplication. Data will arise from business, industrial, and consumer situations.
- A.5 The student will create and use tabular, symbolic, graphical, verbal, and physical representations to analyze a given set of data for the existence of a pattern, determine the domain and range of relations, and identify the relations that are functions.
- A.6 The student will select, justify, and apply an appropriate technique to graph linear functions and linear inequalities in two variables. Techniques will include slope-intercept, x- and y-intercepts, graphing by transformation, and the use of the graphing calculator.
- A.7 The student will determine the slope of a line when given an equation of the line, the graph of the line, or two points on the line. Slope will be described as rate of change and will be positive, negative, zero, or undefined. The graphing calculator will be used to investigate the effect of changes in the slope on the graph of the line.
- A.8 The student will write an equation of a line when given the graph of the line, two points on the line, or the slope and a point on the line.
- A.9 The student will solve systems of two linear equations in two variables both algebraically and graphically and apply these techniques to solve practical problems. Graphing calculators will be used both as a primary tool for solution and to confirm an algebraic solution.
- A.10 The student will apply the laws of exponents to perform operations on expressions with integral exponents, using scientific notation when appropriate.
- A.11 The student will add, subtract, and multiply polynomials and divide polynomials with monomial divisors, using concrete objects, pictorial and area representations, and algebraic manipulations.
- A.12 The student will factor completely first- and second-degree binomials and trinomials in one or two variables. The graphing calculator will be used as a tool for factoring and for confirming algebraic factorizations.
- A.13 The student will express the square root of a whole number in simplest radical form and approximate square roots to the nearest tenth.

- A.14 The student will solve quadratic equations in one variable both algebraically and graphically. Graphing calculators will be used both as a primary tool in solving problems and to verify algebraic solutions.
- A.15 The student will, given a rule, find the values of a function for elements in its domain and locate the zeros of the function both algebraically and with a graphing calculator. The value of $f(x)$ will be related to the ordinate on the graph.
- A.16 The student will, given a set of data points, write an equation for a line of best fit and use the equation to make predictions.
- A.17 The student will compare and contrast multiple one-variable data sets, using statistical techniques that include measures of central tendency, range, and box-and-whisker graphs.
- A.18 The student will analyze a relation to determine whether a direct variation exists and represent it algebraically and graphically, if possible.

Life Science Grade 6

Required Textbooks

Holt Science and Technology, Life Science – Holt, Rinehart & Winston,

Standardized Assessment

The Virginia Standards of Learning (SOL) Assessment is given to all eighth grade students in the late spring. The eighth grade science assessment covers Virginia's 6th grade general science standards, life science standards, and physical science standards.

During second semester, the students participate in a simulated SOL testing session using a cumulative practice test developed by teachers in Hanover County. The purpose of this session is to provide students with a practice testing experience, as well as to identify strengths and weaknesses in content knowledge and skills. Discussion and analysis of test questions help students evaluate their knowledge and strengthen test-taking strategies.

Technology

In the science classroom, students use technology to:

- collect and display real-time data;
- use technical databases;
- present data in a variety of graphical forms;
- acquire understanding of abstract scientific concepts through simulations, visual displays, and oral presentations;
- perform simulations of experiments;
- research scientific information from current sources; and
- communicate understanding of science concepts, skills, and processes.

Parent Tips

Parental involvement in schooling can lead to academic benefits for students. Parents are encouraged to:

- visit the Hanover Instructional Website to see science resources that are available online. Go to **<http://hcps2/instruction/science/default.htm>**;
- help students manage and organize daily and weekly routines, allocating time for homework and extended assignments;
- review science labs and class assignments with students;
- visit local museums, nature centers, and other places of scientific interest with students;
- visit the local library and check out new science-related books and periodicals; and
- supervise visits to sites on the Internet that extend student understanding of the life, physical, and Earth sciences. Suggested sites include:

www.nasa.gov (NASA homepage)

www.weather.com (The Weather Channel homepage)

www.exploratorium.edu (Science experiments and facts)

www.chem4kids.com (Introductory chemistry site)

www.epa.gov/kids/ (Environmental Protection Agency student site)

www.msinnovation.info/index.html (Mathematics and Science Center)

www.nws.noaa.gov (National Weather Service)

www.smv.org (Science Museum of Virginia)

www.cbf.org (Chesapeake Bay Foundation)

www.fws.gov (U.S. Fish and Wildlife Service)
www.cellsalive.com(Cell information and images)
www.usgs.gov/education/ (USGS education service page)
www.education.jlab.org/solquiz/ (SOL practice tests)
www.pen.k12.va.us/VDOE/Assessment/releasedtests.html
(Released Virginia SOL test items from 2000-2003)

Life Science Objectives

- LS.1 The student will plan and conduct investigations in which
- data are organized into tables showing repeated trials and means;
 - variables are defined;
 - metric units (SI - International System of Units) are used;
 - models are constructed to illustrate and explain phenomena;
 - sources of experimental error are identified;
 - dependent variables, independent variables, and constants are identified;
 - variables are controlled to test hypotheses and trials are repeated;
 - continuous line graphs are constructed, interpreted, and used to make predictions;
 - precise and accurate measurements are recorded;
 - a simple report of a scientific investigation is composed;
 - interpretations from the same set of data are evaluated and defended; and
 - an understanding of the nature of science is developed and reinforced.
- LS.2 The student will investigate and understand that all living things are composed of cells.
- Describe and sequence the development of the three major points of the cell theory.
 - Describe the historical development of the microscope and microscopic techniques over the last four centuries.
 - Operate, handle, and name functional parts of a microscope correctly.
 - Construct a cell model that describes the function and location of the following parts of a cell: cell wall, cell membrane, nucleus, cytoplasm, chromosome, mitochondria, chloroplast, ribosome, vacuole, and endoplasmic reticulum.
 - Compare and contrast cellular structures and functions in plant and animal cells.
 - Discuss the main components of the cell cycle (interphase, mitosis, and cytokinesis).
 - List and sequence the stages of mitosis and describe the events that occur in each stage.
 - Compare the outcomes of mitosis and meiosis as they relate to function and purpose.
- LS.3 The student will investigate and understand that all living things show patterns of cellular organization.
- Differentiate between unicellular and multicellular organisms.
 - Distinguish between cells, tissues, organs, and systems.
 - Describe the life functions and processes of cells, tissues, organs, and systems (respiration, removal of wastes, growth, reproduction, digestion, and cellular transport).
 - Explain the function of a selectively permeable membrane.
 - Investigate and demonstrate how materials move through the cell membrane through the processes of osmosis, diffusion, and active transport.
- LS.4 The student will investigate and understand that the basic needs of organisms must be met in order to carry out life processes.
- Discuss the role of the sun in the formation of energy sources on Earth.
 - Discuss the fact that a limited number of elements comprise living matter.
 - Identify the basic needs of all living things.
 - Investigate the relationship between life needs, life functions, and habitats of organisms.
 - Compare and contrast the biological needs of plants and animals.
 - Discuss factors that influence life processes (i.e. availability of nutrients, gases, water, and space).

- LS.5 The student will investigate and understand how organisms can be classified.
- Know the levels of classification from kingdom to species.
 - Discuss binomial nomenclature and why a scientific name (genus and species) describes an organism better than a common name.
 - Group organisms within a classification system using factors such as cellular structures, unicellular vs. multicellular, and how organisms acquire food.
 - Make observations involving fine discrimination between similar objects and organisms.
 - Design and use a simple dichotomous keys to group organisms.
 - Distinguish characteristics of the kingdoms of organisms (plants, animals, protists, fungi, and archaeobacteria, and eubacteria) and identify members of each group.
 - Describe the structures of viruses.
 - Describe viral reproduction.
 - Describe the ways that fungi, bacteria, protists, and viruses are important to man and the ecosystem.
 - Identify the major types of algae and protozoa.
 - Compare and contrast algae and protozoans in terms of movement, food procurement, and reproduction.
 - Identify distinguishing characteristics of major animal and plant phyla.
 - Investigate the responses of plants to stimuli and cite examples of how plants have adapted to their environments.
 - Compare the leaves, stems, roots, and method of reproduction of the major types of plants.
 - Cite examples of how animals are adapted to their environments.
 - Compare vertebrates and invertebrates.
- LS.6 The student will investigate and understand the basic physical and chemical processes of photosynthesis and its importance to plant and animal life.
- Identify the raw materials and products of photosynthesis.
 - Identify the cell organelles involved in the process of photosynthesis.
 - Describe energy transfer between sunlight and chlorophyll.
 - Describe the transformation of water and carbon dioxide into sugar and oxygen.
 - Explain that photosynthesis is the foundation of virtually all food webs.
 - Describe how photosynthesis is related to biomass.
 - Compare and contrast the processes of photosynthesis and cellular respiration.
- LS.7 The student will investigate and understand that organisms within an ecosystem are dependent on one another and on non-living components of the environment.
- Describe the major events in the carbon, water, and nitrogen cycles.
 - Describe interactions resulting in a flow of energy and matter throughout the system.
 - Describe the impact that decomposers have on the ecosystem.
 - Observe ecosystems and identify, measure, and classify the living and nonliving components.
 - Analyze the complex relationships between organisms and their environment within terrestrial, freshwater, and marine ecosystems.
 - Establish and analyze energy flow in food webs and energy pyramids.
 - Investigate and understand the unique properties and characteristics of water.
 - Discuss the importance of water for agriculture, power generation, and public health.
 - Discuss the importance of protecting and maintaining water resources.
- LS.8 The student will investigate and understand that interactions exist among members of a population.

- Investigate and contrast competition, cooperation, social hierarchy, and territoriality within populations and communities.
- Differentiate between the needs of the individual and the needs of a population.
- Analyze the influence of behavior on a population.
- Describe the characteristics of a population.
- Explain and give examples for what is meant by population density, limiting factors on a population's growth, and carrying capacity.

LS.9 The student will investigate and understand interactions among populations in a biological community.

- Describe how organisms or populations rely on each other for basic needs forming a community.
- Discuss the relationship among producers, consumers, and decomposers in food webs.
- Predict the effect of population changes on the food web of a community.
- Describe the relationship of predators and prey.
- Explain the impact of competition and cooperation.
- Describe and give examples of symbiotic relationships including parasitism, commensalism, and mutualism.
- Establish the habitats and niches of organisms.

LS.10 The student will investigate and understand how organisms adapt to biotic and abiotic factors in an ecosystem.

- Differentiate between biotic and abiotic factors in an environment.
- Differentiate between ecosystems and biomes.
- Describe the major characteristics of land, marine, and freshwater ecosystems.
- Discuss adaptations that enable organisms to survive within a specific ecosystem.
- Investigate and understand the natural processes and human interactions that affect watershed systems.
- Discuss the health of ecosystems and the abiotic factors of a watershed.
- Locate and describe the structure of Virginia's regional watershed systems.
- Identify divides, tributaries, river systems, and river and stream processes.
- Discuss wetlands and estuaries.
- Debate major conservation, health, and safety issues associated with watersheds.
- Practice water monitoring and analysis using field equipment including hand-held technology.
- Describe and give examples of conditions found in the major land biomes.

- LS.11 The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic and change over time (daily, seasonal, and long term).
- Define and give an example of phototropism, hibernation, and dormancy.
 - Distinguish between a population, community, and ecosystem.
 - Brainstorm factors that could cause a population to increase or decrease in size.
 - Explain how climate influences environments.
 - Use the term succession correctly and give examples in nature.
 - Describe several catastrophic disturbances in nature and how they might affect populations, communities, and ecosystems.
 - Explain how new communities arise from areas that were once devoid of life.
 - Compare and contrast pioneer and climax communities.
- LS.12 The student will investigate and understand the relationships between ecosystem dynamics and human activity.
- Discuss how human food production and harvesting impacts an ecosystem.
 - Analyze the impact of changes on habitat size, quality, and structure.
 - Analyze population disturbances and factors that threaten and enhance species survival.
 - Discuss how interaction between humans and the environment can create environmental issues (water supply, air quality, energy production, and waste management).
 - Explain the role of the sun in the formation of most energy sources on Earth.
 - Differentiate between nonrenewable and renewable energy sources.
 - Discuss how nonrenewable and renewable resources can be managed.
 - Discuss using preventative measures for responsible land-use and the reduction of environmental hazards.
 - Debate the costs and benefits in conservation policies.
 - Describe and give examples of recycling and conservation and explain how they relate to natural resources.
- LS.13 The student will investigate and understand that organisms reproduce and transmit genetic information to new generations.
- Describe the structure of DNA and its function.
 - Describe the contributions of Franklin and Watson and Crick to our basic understanding of genetics.
 - Discuss the function of genes and chromosomes.
 - Explain how traits are inherited and explain Mendel's contributions to the study of genetics.
 - Use Punnett squares to predict the possible combinations of inherited factors in single trait crosses.
 - Differentiate between genotypes and phenotypes.
 - Differentiate between dominant and recessive traits.
 - Discuss factors affecting the expression of traits.
 - Differentiate between inherited and acquired characteristics.
 - Give examples of how genetic engineering has been used to manipulate the genetic code.
 - Describe and give examples of incomplete dominance, multiple alleles, sex linked trait and genetic disorders.
- LS.14 The student will investigate and understand that organisms change over time.
- Discuss how mutations are inheritable due to changes in the DNA code and can cause variation within a population.
 - Explain that mutations can be beneficial or harmful.

- Explain how changes in organisms occur over time according to the theories of acquired characteristics (Lamarck) and natural selection (Darwin).
- Explain the relationships between mutations, adaptation, natural selection, and extinction.
- Recognize and give examples of adaptations in plants and animals.
- Explain how fossils give clues to changes of life forms and geologic events in Earth's history.
- Discuss evidence for evolution in terms of genetic information, the distribution of organisms, and anatomical and developmental similarities across species.
- Analyze data showing variation over time within a population.

United States History to 1877

Required textbooks

Horizons United States History: U.S. Beginnings – Harcourt, Inc. 2002

Standardized Assessment

The Virginia History and Social Studies Standards of Learning (SOL) assessment is given to all sixth graders in May. This cumulative test covers United States History I.

During second semester, students participate in a simulated SOL testing session using a cumulative practice test developed by teachers in Hanover County. The purpose of this session is to provide students with a practice testing experience, as well as to aid teachers in analyzing the strengths and weaknesses of the U.S. History curriculum. Students have an opportunity to review the content and strengthen test taking strategies through a self-evaluation as the test questions are reviewed and discussed in class.

Technology

In the social studies classroom students use technology to:

- access, retrieve, organize, analyze, and evaluate electronic information from a variety of sources, documenting sources appropriately;
- communicate understanding of social studies concepts, skills, and processes;
- present social studies information in a variety of graphical forms;
- create multimedia presentations of social studies topics of student interest; and
- use search strategies to retrieve electronic information.

Parent Tips

Parents are encouraged to become involved in student learning to benefit academic progress.

- Help students manage and organize daily and weekly routines, allocating time for homework which may include written work and/or studying information to prepare for classroom instructional activities.
- Review with students completed assignments, classroom activities, and learning in United States history.
- Encourage the use of content vocabulary and application of knowledge by discussing key people, places, events, and conflicts relevant to the study of United States History.
- Discuss local and national news, including newspapers, news magazines, newscasts, and educational television programming.
- Question the student's understanding of causes and effects and the impact of the historical person's life and/or historical event on our country's development.
- Visit historical sites with students. (ex. Virginia Historical Society for an experience with 20th century history and the Valentine Museum for 19th century history)
- Museums and Historical Points of Interests
- <http://hcps2.hanover.k12.va.us/instruction/ss/home2.htm>

United States History to 1877 Objectives

Skills

- USI.1 The student will develop skills for historical and geographical analysis, including the ability to
- identify and interpret primary and secondary source documents to increase understanding of events and life in United States history to 1877;
 - make connections between the past and the present;
 - sequence events in United States history from pre-Columbian times to 1877;
 - interpret ideas and events from different historical perspectives;
 - evaluate and discuss issues orally and in writing;
 - analyze and interpret maps to explain relationships among landforms, water features, climatic characteristics, and historical events;
 - distinguish between parallels of latitude and meridians of longitude; and
 - interpret patriotic slogans and excerpts from notable speeches and documents.

Geography

- USI.2 The student will use maps, globes, photographs, pictures, and tables to
- locate the seven continents;
 - locate and describe the location of the geographic regions of North America: Coastal Plain, Appalachian Mountains, Canadian Shield, Interior Lowlands, Great Plains, Rocky Mountains, Basin and Range, and Coastal Range; and
 - locate and identify the water features important to the early history of the United States: Great Lakes, Mississippi River, Missouri River, Ohio River, Columbia River, Colorado River, Rio Grande, Atlantic Ocean, Pacific Ocean, and Gulf of Mexico.

Exploration to Revolution: Pre-Columbian Times to the 1770s

- USI.3 The student will demonstrate knowledge of how early cultures developed in North America by
- locating where the American Indians (First Americans) settled, with emphasis on Arctic (Inuit), Northwest (Kwakiutl), Plains (Sioux), Southwest (Pueblo), and Eastern Woodland (Iroquois); and
 - describing how the American Indians (First Americans) used their environment to obtain food, clothing, and shelter.

- USI.4 The student will demonstrate knowledge of European exploration in North America and West Africa by
- describing the motivations, obstacles, and accomplishments of the Spanish, French, Portuguese, and English explorations;
 - describing cultural interactions between Europeans and American Indians (First Americans) that led to cooperation and conflict; and
 - identifying the location and describing the characteristics of West African societies (Ghana, Mali, and Songhai) and their interactions with traders.

- USI.5 The student will demonstrate knowledge of the factors that shaped colonial America by
- describing the religious and economic events and conditions that led to the colonization of America;

- comparing and contrasting life in the New England, Mid-Atlantic, and Southern colonies, with emphasis on how people interacted with their environment;
- describing colonial life in America from the perspectives of large landowners, farmers, artisans, women, indentured servants, and slaves; and
- identifying the political and economic relationships between the colonies and England.

Revolution and the New Nation: 1770s to the Early 1800s

USI.6 The student will demonstrate knowledge of the causes and results of the American Revolution by

- identifying the issues of dissatisfaction that led to the American Revolution;
- identifying how political ideas shaped the revolutionary movement in America and led to the Declaration of Independence, with emphasis on the ideas of John Locke;
- describing key events and the roles of key individuals in the American Revolution, with emphasis on George Washington, Benjamin Franklin, Thomas Jefferson, Patrick Henry, and Thomas Paine; and
- explaining reasons why the colonies were able to defeat Britain.

USI.7 The student will demonstrate knowledge of the challenges faced by the new nation by

- identifying the weaknesses of the government established by the Articles of Confederation;
- identifying the basic principles of the new government established by the Constitution of the United States and the Bill of Rights;
- identifying the conflicts that resulted in the emergence of two political parties; and
- describing the major accomplishments of the first five presidents of the United States.

Expansion and Reform: 1801 to 1861

USI.8 The student will demonstrate knowledge of westward expansion and reform in America from 1801 to 1861 by

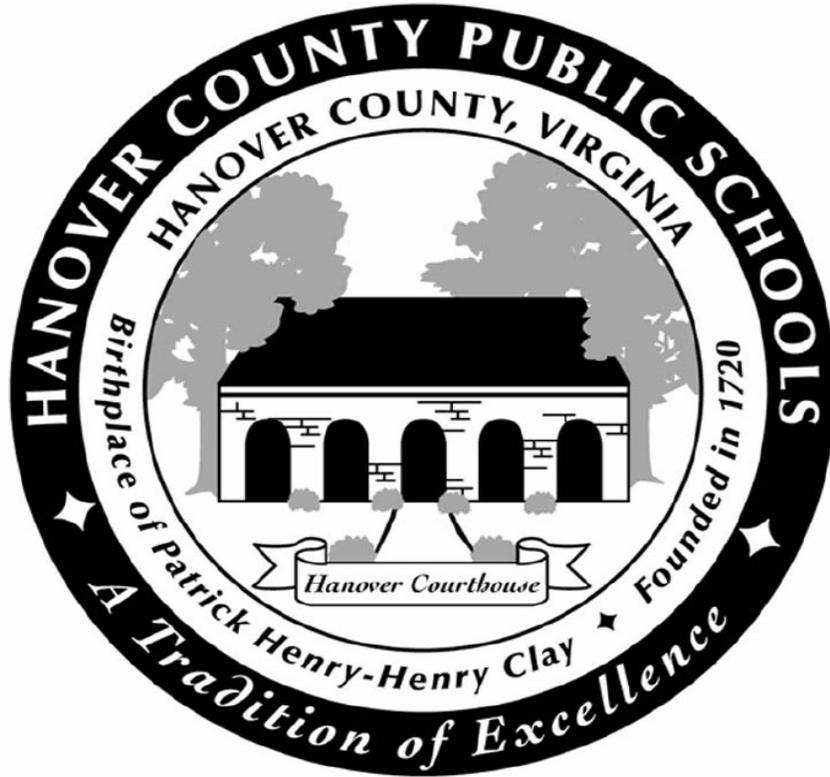
- describing territorial expansion and how it affected the political map of the United States, with emphasis on the Louisiana Purchase, the Lewis and Clark expedition, and the acquisitions of Florida, Texas, Oregon, and California;
- identifying the geographic and economic factors that influenced the westward movement of settlers;
- describing the impact of inventions, including the cotton gin, the reaper, the steamboat, and the steam locomotive, on life in America; and
- identifying the main ideas of the abolitionist and suffrage movements.

Civil War and Reconstruction: 1860s to 1877

USI.9 The student will demonstrate knowledge of the causes, major events, and effects of the Civil War by

- describing the cultural, economic, and constitutional issues that divided the nation;
- explaining how the issues of states' rights and slavery increased sectional tensions;
- identifying on a map the states that seceded from the Union and those that remained in the Union;
- describing the roles of Abraham Lincoln, Jefferson Davis, Ulysses S. Grant, Robert E. Lee, Thomas "Stonewall" Jackson, and Frederick Douglass in events leading to and during the war;
- using maps to explain critical developments in the war, including major battles; and
- describing the effects of war from the perspectives of Union and Confederate soldiers (including black soldiers), women, and slaves.

- USI.10 The student will demonstrate knowledge of the effects of Reconstruction on American life by
- identifying the provisions of the 13th, 14th, and 15th Amendments to the Constitution of the United States and their impact on the expansion of freedom in America; and
 - describing the impact of Reconstruction policies on the South.



Chickahominy Middle School

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Liberty Middle School

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Mechanicsville, VA 23116
723-2160
Mrs. Debbie Arco, Principal

13496 Liberty Middle School Road
Ashland, VA 23005
365-8060
Mr. Donald E. Latham, Principal

Oak Knoll Middle School
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Mechanicsville, VA 23116
365-4740
Mrs. Caroline Harris, Principal

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Dr. Anita Wallace, Principal