



# **FUNCTIONS, ALGEBRA, AND DATA ANALYSIS CURRICULUM GUIDE**

**Loudoun County Public Schools  
2010-2011**

**Complete scope, sequence, pacing and resources are available on the CD and will be available on the LCPS Intranet.**

## INTRODUCTION TO LOUDOUN COUNTY'S MATHEMATICS CURRICULUM GUIDE

This CURRICULUM GUIDE is a merger of the Virginia Standards of Learning (SOL) and the Mathematics Achievement Standards for Loudoun County Public Schools. The CURRICULUM GUIDE includes excerpts from documents published by the Virginia Department of Education. Other statements, such as suggestions on the incorporation of technology and essential questions, represent the professional consensus of Loudoun's teachers concerning the implementation of these standards. In many instances the local expectations for achievement exceed state requirements. The GUIDE is the lead document for planning, assessment and curriculum work. It is a summarized reference to the entire program that remains relatively unchanged over several student generations. Other documents, called RESOURCES, are updated more frequently. These are published separately but teachers can combine them with the GUIDE for ease in lesson planning.

### Mathematics Internet Safety Procedures

1. Teachers should review all Internet sites and links prior to using it in the classroom.  
During this review, teachers need to ensure the appropriateness of the content on the site, checking for broken links, and paying attention to any inappropriate pop-ups or solicitation of information.
2. Teachers should circulate throughout the classroom while students are on the internet checking to make sure the students are on the appropriate site and are not minimizing other inappropriate sites.  
Teachers should periodically check and update any web addresses that they have on their LCPS web pages.
3. Teachers should assure that the use of websites correlate with the objectives of lesson and provide students with the appropriate challenge.
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## Functions, Algebra, and Data Analysis Nine Weeks Overview

<b>1<sup>st</sup> Quarter</b>	<b>2<sup>nd</sup> Quarter</b>	<b>3<sup>rd</sup> Quarter</b>	<b>4<sup>th</sup> Quarter</b>
AFDA.7 AFDA.8 AFDA.1 AFDA.2 AFDA 4  38 days	AFDA.1 AFDA.2 AFDA.3 AFDA.4 AFDA.5 47 days	AFDA.1 AFDA.2 AFDA.3 AFDA.4  47 days	AFDA.6  44 days

Number of Blocks	Topic and Essential Questions	Standard(s) of Learning	Additional Instructional Resources
<p><b>Quarter 1:</b></p>	<p><b>Unit 1: Problem Solving with Graphical and Statistical Models</b></p> <ul style="list-style-type: none"> <li>➤ Sampling Methods (including identifying biased methods)</li> <li>➤ Planning and Conducting and Experiment or Survey</li> <li>➤ Compare and Contrast Experiments and Observational Studies</li> <li>➤ Interpret measures of central tendency</li> <li>➤ Standard Deviation</li> <li>➤ Explain the influence of outliers on a data set</li> <li>➤ Identify Properties of a Normal Distribution</li> <li>➤ Determine the probability of a given event using the normal distribution</li> </ul>	<p><a href="#"><u>AFDA.7</u></a>  <a href="#"><u>AFDA.8</u></a></p>	<p>AFDA Book Ch. 7            Rectangle Activity            How Big Will They Get            NASA 1            NASA 2            Census Sampling Process            Multiplication Principle Investigations</p>

Number of Blocks	Topic and Essential Questions	Standard(s) of Learning	Additional Instructional Resources
	<p><b>Unit 2: Function Categorization</b></p> <ul style="list-style-type: none"> <li>➤ Interval Notation</li> <li>➤ Values of increasing or decreasing functions</li> <li>➤ Find the maximum/minimum value of a function</li> <li>➤ Find the rate of change of a function</li> <li>➤ Identify when the function is positive or negative</li> <li>➤ Identify the function’s correlation</li> <li>➤ Find where the function equals to zero and explain that meaning</li> <li>➤ Identify the Domain and Range of a function, and its limitation</li> <li>➤ Cover properties of the various “families” – linear, quadratic, absolute value, exponential, etc.</li> <li>➤ Compare and contrast various graphs</li> <li>➤ Combinations of transformations                             <ul style="list-style-type: none"> <li>○ Vertical</li> <li>○ Horizontal</li> <li>○ Vertical stretch (amplitude)</li> </ul> </li> <li>➤ Equations and Inequalities</li> <li>➤ Distance</li> <li>➤ Constant Increasing and Decreasing Examples – Flight Plans, etc.</li> <li>➤ Domain and Range</li> </ul>	<p><a href="#">AFDA.1</a>  <a href="#">AFDA.2</a>  <a href="#">AFDA.4</a></p>	<p>AFDA Book Ch.1 (1.6, 1.7, 1.13, 1.14)                      Exploration-Identify Types of Functions                      Exploration-Transformations                      Exploration-Function Shapes                      Exploration: Increasing and Decreasing Stories from Graphs                      Linear Notes                      WS: Interval Notation Practice                      WS: Basic Ideas and Interval Notation HW                      WS: Function Shapes and Intervals 1                      WS: Function Shapes and Intervals 2                      WS: Summary of Function Shapes                      WS: Domain Practice from Graphs 1                      WS: Domain Practice from Graphs 2                      WS: Domain and Range                      WS: Zeros</p>
	<b>Assessment, Enrichment, and Remediation</b>		

Number of Blocks	Topic and Essential Questions	Standard(s) of Learning	Additional Instructional Resources
<p><b>Quarter 2:</b></p>	<p><b>Unit 3: Linear Functions and Systems of Equations and Inequalities</b></p> <ul style="list-style-type: none"> <li>➤ Identify and calculate the rate of change of a function</li> <li>➤ Inequalities               <ul style="list-style-type: none"> <li>○ Linear Programming</li> <li>○ Minimize/Maximize</li> <li>○ Corner Points and Feasibility Regions</li> </ul> </li> <li>➤ Initial Values</li> <li>➤ Identify the zeros of a function (roots, solutions, x – intercepts)</li> <li>➤ Solve linear equations and inequalities</li> <li>➤ Intersections – Systems</li> <li>➤ When is a deal best?</li> <li>➤ Piece wise functions – Linear</li> <li>➤ Linear Regression (Scatter Plot, Linear Predictions, Line of Best Fit, Residuals, and Correlation)</li> </ul>	<p><a href="#">AFDA.1</a>  <a href="#">AFDA.2</a>  <a href="#">AFDA.3</a>  <a href="#">AFDA.4</a>  <a href="#">AFDA.5</a></p>	<p>Applications: Slope            Bungee Barbie Lesson            Collecting Data (da Vinci Measurements)            Correlation Activity            Data sets for Scatter Plots and LSRL            Exploration: Symbolic Representation            Exploration: Zeros            Activity: Line of Best Fit: How Tall are the Victims?            Project: Systems Word Problems            Open Ended Question: Linear Programming            Assessment: Systems of Equations Notes: Intro to Systems            Notes: Linear Programming            Notes: Piece-wise Functions            Notes: Slope- Graph and Formula            Notes: Solving Equations using Table of Values            Notes: Linear            Notes: Statistics and Linear Data            WS: Writing Equation of Lines            WS: Matching Activity: Correlation            WS: Modeling Linear Functions</p>
	<p><b>Assessment, Enrichment, and Remediation</b></p>		

Number of Blocks	Topic and Essential Questions	Standard(s) of Learning	Additional Instructional Resources
<b>Quarter 3:</b>	<p><b>Unit 4: Quadratic Functions</b></p> <ul style="list-style-type: none"> <li>➤ Ball Experiments</li> <li>➤ Gravity Functions</li> <li>➤ Forms               <ul style="list-style-type: none"> <li>○ Vertex Form</li> <li>○ Intercept Form</li> <li>○ Standard Form</li> </ul> </li> <li>➤ Regression Curves – Equations</li> <li>➤ Multiple representation of solving quadratic functions</li> <li>➤ Inverse Operations</li> <li>➤ Factoring</li> </ul>	<p><a href="#"><u>AFDA.1</u></a>  <a href="#"><u>AFDA.2</u></a>  <a href="#"><u>AFDA.3</u></a>  <a href="#"><u>AFDA.4</u></a></p>	<p>AFDA Book Ch. 4            Activity: Weightless Wonder-NASA            Activity: Barbie Bungee Jump Lesson 2            Activity: Matching Quadratic Functions            Notes: Factoring Trinomials 1            Notes: Factoring Trinomials 2            Notes: Quadratic Regression            WS: Quadratics 1            WS: Quadratics 2</p>

Number of Blocks	Topic and Essential Questions	Standard(s) of Learning	Additional Instructional Resources
	<p><b>Unit 5: Exponential and Logarithmic Functions</b></p> <ul style="list-style-type: none"> <li>➤ Growth</li> <li>➤ Decay</li> <li>➤ Inverse Variation</li> <li>➤ End Behavior</li> <li>➤ Increasing without bound</li> <li>➤ Asymptote – of Exponential and Logarithmic</li> <li>➤ Symbolically</li> <li>➤ Formulas</li> <li>➤ Logarithmic Functions – Inverse of the Exponential Function</li> <li>➤ Domain and Range of both types of functions</li> </ul>	<p><a href="#"><u>AFDA.1</u></a>  <a href="#"><u>AFDA.2</u></a>  <a href="#"><u>AFDA.3</u></a>  <a href="#"><u>AFDA.4</u></a></p>	<p>AFDA Book Ch. 5                      Activity: Modeling with Exp. and Log Functions                      Activity: Exponential and Log Functions                      Notes: Exponential Functions                      Notes: Growth and Decay Applications                      Notes: Intro to Logs                      Notes: Inverse Functions                      Notes: Graphing Logs                      WS: Exponential and Logs (1-8)</p>
	<b>Assessment, Enrichment, and Remediation</b>		



Number of Blocks	Topic and Essential Questions	Standard(s) of Learning	Additional Instructional Resources
<p><b>Quarter 4:</b></p>	<p><b>Unit 6: Probability Models</b></p> <ul style="list-style-type: none"> <li>➤ Compare and Contrast Permutations and Combinations</li> <li>➤ Calculate the number of permutation of n objects taken r at a time.</li> <li>➤ Calculate the number of combinations of n objects taken r at a time.</li> <li>➤ Define and give contextual examples of complementary, dependent, independent, and/or mutually exclusive</li> <li>➤ Given two or more events in a problem setting, determine if the events are complementary, dependent, independent, and/or mutually exclusive.</li> <li>➤ Law of large numbers</li> <li>➤ Find Conditional Probabilities for Dependent, Independent, and Mutually exclusive events</li> <li>➤ Represent and Calculate probabilities using Venn diagrams and probability trees</li> <li>➤ Tree Diagrams</li> <li>➤ Addition and Multiplication Rules</li> </ul>	<p><a href="#"><u>AFDA.6</u></a></p>	<p>AFDA Book Ch. 6            Multiplication Principle            Activity: Probability Models            Activity: Fundamental Counting Principle            Activity: Independent or Not Independent            Activity: Let's Make a Deal            Activity: Matter of Taste            Activity: Photographs and Committees            Activity: Population Growth            Activity: Sounding an Alarm            Activity: Thinking about Skunk Name            Activity: What is a Normal Curve            Activity: Z-Scores and NFL Quarterback Salaries</p> <p>For Teachers: Article: Teaching Probability</p>

Number of Blocks	Topic and Essential Questions	Standard(s) of Learning	Additional Instructional Resources
	<p><b>Unit 7: Financial Models</b></p> <ul style="list-style-type: none"> <li>➤ Students will understand interest and the time-value of money</li> <li>➤ Simple and Compound Interest</li> <li>➤ Present and Future Value of Annuities</li> <li>➤ Mortgages</li> <li>➤ Financing (APR)</li> </ul>		<p>AFDA Book Ch. 8 Being a Smart Consumer Unit</p>
	<p><b>Assessment, Enrichment, and Remediation</b></p>		