ARKANSAS ACADEMIC STANDARDS

Arkansas Mathematics Standards

Quantitative Literacy
Content Standards
2016
Compiled using the Arkansas Mathematics Standards

Course Title: Quantitative Literacy
Course/Unit Credit: 1
Course Number: 439120
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12
Prerequisite: Algebra 1

Course Description: This course builds on Algebra I to explore mathematical topics and relationships. Emphasis will be placed on applying modeling as the process of choosing and using appropriate mathematics and statistics to analyze, to better understand, and to improve mathematical understanding in real world situations. Students will represent and process their reasoning and conclusions numerically, graphically, symbolically, and verbally. Quantitative Literacy will help students develop conceptual understanding by supporting them in making connections between concepts and applying previously learned material to new contexts. Students will be expected to use technology, including graphing calculators, computers, or data gathering tools throughout the course. Quantitative Literacy does not require Arkansas Department of Education approval.

Notes:
1. Teacher notes offer clarification of the standards.
2. All items in a bulleted list must be taught.

Quantitative Literacy

Strand	Content Standard
Modeling	
	1. Students will use appropriate mathematical models to solve problems.
Numerical Reasoning	
	2. Students will use number sense and proportional reasoning in real world settings to make and communicate decisions in order to draw conclusions based on quantitative analysis.
Statistics and Probability	
	3. Students will apply statistical and probabilistic reasoning to draw conclusions, to make decisions, and to evaluate outcomes of decisions.
Personal Financial Literacy	
	4. Students will apply mathematics to make informed personal financial decisions.
Business Financial Literacy	
	5. Students will understand the principles and mathematics in business as it applies to economics.

Strand: Modeling
　　Content Standard: 1. Students will use appropriate mathematical models to solve problems.

M.1.QL.1	Demonstrate understanding of the meaning of a solution and identify when insufficient information is given to solve a problem
M.1.QL.2	Analyze mathematical models, describe limitations, and suggest improvements
M.1.QL.3	Use mathematical models created with spreadsheets or other tools to • estimate solutions for contextual questions • identify patterns • identify how changing parameters affect results
M.1.QL.4	Use mathematical models to make decisions about purchases (e.g., buying a vehicle, home improvement, fashion trends)
M.1.QL.5	Create and use mathematical models for bivariate data sets to • answer questions • draw conclusions • make decisions

Strand: Numerical Reasoning
    Content Standard: 2. Students will use number sense and proportional reasoning in real world settings to make and communicate decisions in order to draw conclusions based on quantitative analysis.

NR.2.QL.1	Solve real world problems and interpret results involving calculations with percentages, decimals, and fractions • conversions • percent change (absolute vs relative) • percent of quantities
NR.2.QL.2	Use estimation in real world situations • know when • know how • know why
NR.2.QL.3	• Identify appropriate numeric benchmarks (e.g., use 10% as an estimation for 12%) for estimating calculations • Identify appropriate contextual benchmarks (e.g., population for Arkansas, the United States, and the world) to compare to other numbers (e.g., reasonableness of statistical claims, giving context to numbers)
NR.2.QL.4	Compare magnitudes of numbers in context in different forms (e.g., millions, billions, trillions, national debt, Richter scale, scientific notation)
NR.2.QL.5	Use dimensional analysis to solve problems involving multiple units of measurement (e.g., converting between currencies, determine miles per gallon, appropriate dosages of medicine)
NR.2.QL.6	Solve real world problems requiring interpretation and comparison of various representations of rates and ratios
NR.2.QL.7	Distinguish between proportional and non-proportional real world situations

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Strand: Statistics and Probability
  Content Standard: 3. Students will apply statistical and probabilistic reasoning to draw conclusions, to make decisions, and to evaluate outcomes of decisions.

SP.3.QL.1	Create and use charts, tables, and graphs of real world data (with and without technology)
SP.3.QL.2	• Analyze charts, tables and graphs of real world data • Interpret charts, tables and graphs of real world data • Compare charts, tables and graphs of real world data
SP.3.QL.3	Analyze statistical information from studies, surveys, and polls to make informed judgements as to the validity of claims or conclusions (e.g., bias, limitations, sampling, causation vs correlation, misuse of statistics)
SP.3.QL.4	Make decisions about data summarized numerically using measures of center • compare measures of center of two or more data sets • interpret the differences in context • justify the use of a chosen measure Teacher Note: A discussion of variability and outliers would be appropriate.
SP.3.QL.5	Use probabilities to make and justify decisions about risks in everyday life (e.g., types of investments, taking medication, selecting car insurance, playing the lottery)
SP.3.QL.6	Evaluate the validity of claims based on experimental and theoretical probabilities
SP.3.QL.7	Apply rules of counting and probability to compute probabilities of compound real world events • addition rule • multiplication rule • Fundamental Counting Principle • permutation and combinations • visual representations (e.g., Venn diagrams, tree diagrams, lists, two-way tables)

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Strand: Personal Financial Literacy
Content Standard: 4. Students will apply mathematics to make informed personal financial decisions.

PF.4.QL.1	Represent and analyze mathematical models for various types of income (e.g., commission, salary, hourly wage)
PF.4.QL.2	Represent and analyze various types of income deductions (e.g., federal and state income taxes, Social Security, Medicare taxes, pre-taxed deductions)
PF.4.QL.3	Analyze expenses to create a household budget utilizing food, shelter, transportation, utilities, insurance, savings, and other expenses
PF.4.QL.4	Analyze various investment instruments for • purposes • advantages • disadvantages • risks (e.g., savings, checking accounts, certificates of deposit, stocks, social security, individual retirement accounts, bonds, annuities)
PF.4.QL.5	Analyze the characteristics of various types of loans (e.g., credit cards, personal loans, student loans, auto financing, mortgages)
PF.4.QL.6	Apply appropriate models to determine the impact of the relationship among loan rates, the term of a loan, the principle amount of a loan, and payments (e.g., amortization table, spreadsheet, compound interest, annual interest rates, continuous rates)

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Strand: Business Financial Literacy
Content Standard: 5. Students will understand the principles and mathematics in business as it applies to economics.

BF.5.QL.1	Use real world data to determine how a product or service can be profitable in a community
BF.5.QL.2	Determine fixed and variable expenses of running a business (e.g., startup costs, inventory, construction permits, salaries, equipment, taxes, advertisement)
BF.5.QL.3	Calculate indices and solve problems using common indices • consumer price index • cost of living index • determine what constitutes an index Teacher note: Discussion may include why BMI is not an index.
BF.5.QL.4	Analyze how stock market averages and indices are calculated (e.g., Dow Jones, NASDAQ, S&P 500)
BF.5.QL.5	Calculate how inflation changes the value of the dollar over time Teacher note: Discussion may include percentage change with assumed fixed rate or historical variable rates.