

**Richmond Public Schools**  
Curriculum Framework  
*Algebra, Functions, and Data Analysis*

Strand: Data Analysis	
<p><b>AFDA.8 The student will design and conduct an experiment/survey. Key concepts include</b></p> <ul style="list-style-type: none"> <li>a) sample size;</li> <li>b) sampling technique;</li> <li>c) controlling sources of bias and experimental error;</li> <li>d) data collection; and</li> <li>e) data analysis and reporting.</li> </ul>	
Suggested Pacing	
9 Class Periods	
Spiraling Standards	
<p>All.10-The student will represent and solve problems, including practical problems, involving inverse variation, joint variation, and a combination of direct and inverse variations.</p> <p>All.11-The student will</p> <ul style="list-style-type: none"> <li>a) identify and describe properties of a normal distribution;</li> <li>b) interpret and compare z-scores for normally distributed data; and apply properties of normal distributions to determine probabilities associated with areas under the standard normal curve</li> </ul>	<p>PS.8-The student will describe the methods of data collection in a census, sample survey, experiment, and observational study and identify an appropriate method of solution for a given problem setting.</p> <p>PS.9-The student will plan and conduct a survey. The plan will address sampling techniques and methods to reduce bias.</p> <p>PS.10-The student will plan and conduct a well-designed experiment. The plan will address control, randomization, replication, blinding, and measurement of experimental error.</p>
Essential Questions	Common Misconceptions
<ul style="list-style-type: none"> <li>• How are experiments/surveys designed?</li> <li>• What are sampling techniques and how do they reduce bias?</li> <li>• What are the various methods of data collection?</li> <li>• How does data collection affect conclusions for a problem?</li> </ul>	<p>Students may not understand bias and errors that may influence outcomes of experiments and surveys.</p> <p>Students may misinterpret data</p>

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<ul style="list-style-type: none"> <li>• What are the differences between controlled experiments and observational studies?</li> <li>• What do the results of experiments and surveys mean and what are the implications to real-life situations?</li> <li>• What analyses and interpretations of data can be obtained through experiments and surveys?</li> </ul>	
<b>Understanding the Standard</b>	<b>Essential Knowledge and Skills</b>
<ul style="list-style-type: none"> <li>• The value of a sample statistic may vary from sample to sample, even if the simple random samples are taken repeatedly from the population of interest.</li> <li>• Poor data collection can lead to misleading and meaningless conclusions.</li> <li>• Considerations such as sample size, randomness, and bias affect experimental design.</li> <li>• The purpose of sampling is to provide sufficient information so that population characteristics may be inferred.</li> <li>• Inherent bias diminishes as sample size increases.</li> <li>• Experiments must be carefully designed in order to detect a cause-and-effect relationship between variables.</li> <li>• Principles of experimental design include comparison with a control group, randomization, and blindness.</li> <li>• The precision, accuracy and reliability of data collection can be analyzed and described.</li> </ul>	<p><b>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</b></p> <ul style="list-style-type: none"> <li>• Investigate and describe sampling techniques, such as simple random sampling, stratified sampling, and cluster sampling. (a, b)</li> <li>• Determine which sampling technique is best, given a particular context. (b)</li> <li>• Identify biased sampling methods. (c)</li> <li>• Given a plan for a survey, identify possible sources of bias, and describe ways to reduce bias. (c)</li> <li>• Plan and conduct an experiment or survey. The experimental design should address control, randomization, and minimization of experimental error. (a, b, c, d)</li> <li>• Compare and contrast controlled experiments and observational studies and the conclusions one may draw from each. (e)</li> <li>• Write a report describing the experiment/survey and the resulting data and analysis. (e)</li> </ul>

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<b>Vocabulary</b>	
experiment, survey, sample size, sample statistic, random sample, population, data, conclusion, randomness, bias, experimental design, sampling,, characteristics, variables, comparison, contrast, control group, blindness, reliability, stratified sampling, cluster sampling, experimental error, observation	<p><b>Textbook</b></p> <p><a href="#">Eureka Math Algebra 2 Module 4 Topic C</a> Algebra 1, ©2012, Price, et al, McGraw-Hill School Education Group, page(s) 740-762 Algebra 2, ©2012, Price, et al, McGraw-Hill School Education Group page(s) 745-758</p> <p><b>Notes</b> <a href="#">Sampling Methods (Khan Academy)</a> <a href="#">Bias (Statistic How To)</a> <a href="#">Data Collection Methods (Stat Trek)</a></p> <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>● <b>Print</b></li> <li>● <b>Technology-based</b></li> </ul> <p><a href="#">Data Collection (Smart Exchange)</a></p> <p><b>Station Activities</b></p> <p>Have students in groups conduct scientific or business statistical experiments and reporting</p>
<b>Assessment</b>	
Classroom Teacher Developed Assessments	
<b>Cross-Curricular Connections</b>	<b>Tiered Differentiations</b>
<p><b>Science</b>-Students can explore the aspects of experimentation and data collection</p> <p><b>CTE</b>-student can collect statistical data in relation to business and marketing. students can conduct research experiments</p> <p><b>English</b>-students can report on statistical findings</p>	<p><b>Tier 1</b>- Students can be required to produce a statistical analysis summary</p> <p><b>Tier 2</b>-Student can decide the types of sampling methods that would be best to conduct specific experiments and discuss errors and bias that may occur</p> <p><b>Tier 3</b>-Students can identify populations and sample techniques.</p>

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