

**Core Learning Goal 3: Data Analysis and Probability**

The student will demonstrate the ability to apply probability and statistical methods for representing and interpreting and communicating results, using technology when needed.

The following Unit Outline is offered as a first attempt to identify good sources of activities and background information for teachers who are preparing students to pass HSA 1 on Algebra and Data Analysis. The sources emphasize the use of real data, and active student participation.

<b>I. Measures of Central Tendency and Variability</b>	
The student uses measures of central tendency and variability to solve problems and make informed decisions. (3.1.2)	
Central tendencies	<i>Exploring Data</i> A8, A9 <i>Contemporary Mathematics in Context, Course 1, Part A, Unit 1, Lesson 2 Shapes and Centers</i>
Mean	
Median	
Mode	
Variability	<i>Exploring Data</i> A10, A11, A12, A13, A17 <i>Contemporary Mathematics in Context, Course 1, Part A, Unit 1, Lesson 3 Variability</i>
Range	
Interquartile range	
Quartile	
Solve problems	
Make informed decisions	
<b>II. Proper and Improper Use of Statistics</b>	
Given a set of data or statistics, the student will analyze and identify both proper and improper use of statistics. ( 3.2.3)	
Communicate the use and misuse of statistics	<i>The Visual Display of Quantitative Information, Chapter 2, Graphical Integrity</i> <i>The Visual Display of Quantitative Information, Chapter 3, Sources of Graphical Integrity and Sophistication</i>
Misuse of scaling	
Inappropriate measure of central tendency	
Misuse of 3D figures	
Data bias	
Predicating outside the domain	
<b>III. Probability and Simulations</b>	
Using data, the student determines the experimental or theoretical probability of an event. (3.1.3)	
Theoretical probability	<i>Exploring Probability</i> A14, A15, A16, A17, A18, A19, A23, A, 24, A25, A26, A30, A31, A32, A33

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Use simulations	<i>The Art and Technique of Simulation</i> A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, A13, A14, A15, A16, A17 <i>Contemporary Mathematics in Context, Course 1, Part B, Unit 7,</i> Lesson 1 Simulating Chance Situations Unit 7, Lesson 2 Estimating Expected Values and Probabilities Unit 7, Lesson 3 Simulation and the Law of Large Numbers
Use statistical inferences	<i>The Art and Technique of Simulation</i> A12, A13
Estimate probability	<i>The Art and Technique of Simulation</i> A6, A7, A8, A9, A10, A11
Given data from simulation or research, the student makes informed decisions and predictions. (3.2.1)	
Based on data from simulations or research	<i>Exploring Surveys and Information from Samples</i> A27, A28, A19 A2, A3, A4, A5, A6
Make informed decisions	
Make predications	
<b>IV. Experimental Design</b> The students will describe how they would do an investigation, select an investigation and defend their choice. Students will consider simple random sampling (SRS) techniques that may include sampling size, bias representation, and randomness.(3.1.1)	
Describe how to do an investigation	<i>Exploring Surveys and Information from Samples</i> A17, A18, A19, A20 <i>Activity-Based Statistics – “Random Rectangles”</i>
Select an investigation	
Defend their choice	
Simple Random Sample	
Sample size	
Bias representation	
Analyze data	
<b>V. Line of Best Fit</b> The students will demonstrate his or her understanding of the process by finding a line of best fit and by using it to make predictions and/or interpret data (slope anintercepts) or by using a curve of best fit to make a prediction. (3.2.2)	
Line of best fit	<i>Exploring Data</i>
Interpret data	
Make predictions	
Given curve of best fit	
Interpret data	
Make predications	
Interpolate/extrapolate	

Resources

- Coxford, Arthur, et. al., *Contemporary Mathematics in Context, A Unified Approach*, Chicago: Everyday Learning, 1997
- Gnanadesikan, Mrudulla, et. al., *The Art and Techniques of Simulation*. Palo Alto, California: Dale Seymour Publications, 1987
- Landwehr, James M, et. al., *Exploring Surveys and Information from Samples*. Palo Alto, California: Dale Seymour Publications, 1987
- Landwehr, James M. and Anne Watkins, *Exploring Data*. Palo Alto, California: Dale Seymour Publications, 1986
- Newman, Claire M, et. al, *Exploring Probability*. Palo Alto, California: Dale Seymour Publications, 1987
- Paulos, John Allen, *A Mathematician Reads the Newspaper*. New York: Basic Books, A Division of HarperCollins Publishers, Inc., 1995
- Scheaffer, Richard L. et. al, *Activity-Based Statistics*, New York: Springer, 1996
- Tufte, Edward Rolf, *Envisioning Information*, Cheshire, Connecticut: Graphics Press, 1990
- Tufte, Edward Rolf, *The Visual Display of Quantitative Information*, Cheshire, Connecticut: Graphics Press, 1983
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