**Algebra 3-4**

**Unit 11: Probability and Statistics**

**Conceptual Lens:**

Designer(s): OPS Secondary Math Department Grade Level: Algebra 3-4, 2013

Probability and Statistics

Chapter Overview

Chapter 11 expands on students’ understanding s and skills related to probability and statistics. In this chapter, students will develop the answers to the Essential Questions posed on the following page and the key skills bulleted next to them.

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| **Unit 11: Probability and Statistics** | | |
| **Essential Questions** | **Standard** | **Objectives**  **F=Factual C=Conceptual D=Debatable** |
| 11.1 What is the difference between a permutation and combination? | MA 12.4.3 | * Students will find permutations and combinations of data sets using formulas. (C) |
| 11.2 What is the difference between experimental and theoretical probability? | MA 12.4.3 | * Students will use simulation to model experimental probability. (C) * Students will find the theoretical probability of events using a formula. (C) |
| 11.3 How are measures of central tendency different from standard deviation? | MA 12.4.1 | * Students will find and analyze the measures of central tendency of given data sets. (C) * Students will find the standard deviation of given data sets. (C) |

**Unit 11: Probability and Statistics**

**Critical Content and Skills:**

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| *Knowledge Statements*  Students will know…   1. **Vocabulary**: combination, conditional probability, experimental probability, measure of central tendency, mutually exclusive events, normal distribution, permutation, simulation, theoretical probability 2. Permutation – order matters. 3. P(A or B) = P(A) + P(B) – P(A and B) 4. Standard Deviation:     \*\*Note: The square of the standard deviation is the variance | *Key Skill Statements*  Students will know how to…   1. Count the number of possible outcomes of an event. 2. Calculate the probability of an event – experimental, theoretical, complements, mutually exclusive/not mutually exclusive, independent/dependent. 3. Determine if two events are mutually exclusive. 4. Calculate the mean, median, mode, standard deviation, variance, and range. 5. Identify outliers. 6. Create a box and whisker plot. 7. Identify skewed, uniform, and normal distributions. 8. Identify bias and bad sampling methods. 9. Determine the difference between observation and experiment. 10. Work with binomial probability and binomial theorem. |

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| **Algebra 3-4**  **Unit 11: Probability** | | | |
| **Advanced**  **Score 4.0** | In addition to the Proficient (3.0) performance, makes ***indepth*** inferences and extended applications of what was learned, including connections to other experiences. | | * Apply tree diagrams and formulas. * Find binomial probabilities and use binomial distributions. |
|  | **Proficient +**  **Score 3.5** | In addition to the complex ideas and processes (Proficient 3.0) performance, ***partial success*** at in-depth inferences and extended applications of what was learned, including connections to other experiences. | |
| **Proficient**  **Score 3.0** | ***No major*** errors or omissions regarding any of the information and simple (Basic, 2.0) or complex processes (Proficient, 3.0) that was explicitly taught. | | * Count permutations. * Find probability using theoretical, experimental, and simulations. * Find conditional probabilities. * Apply standard deviation and variance. * Draw box-and-whisker plots. * Use normal distribution. * Use formulas and tree diagrams. * Recognize bias in samples and surveys. |
|  | **Basic +**  **Score 2.5** | ***No major*** errors or omissions regarding any of the information and/or simpler details and processes (Basic, 2.0) and ***partial*** knowledge of the more complex ideas and processes (Proficient, 3.0) | |
| **Basic**  **Score 2.0** | ***No major*** errors or omissions regarding the simpler details and processes (Basic, 2.0), but ***major*** errors or omissions regarding the more complex ideas and processes (Proficient, 3.0). | | * Count permutations. * Calculate measures of central tendency. * Use a normal distribution. * Draw and interpret box-and-whisker plots. |
| **Below Basic**  **Score 1.0** | A ***partial*** understanding of ***some*** of the simpler details and processes (Basic, 2.0), but ***major*** errors or omissions regarding the more complex ideas and processes. | | |
| **Failing**  **Score 0** | ***No*** evidence or ***insufficient*** evidence of student learning. | | |

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| **Learning Experiences** | **Text Pages/Resources** |
| **Vocabulary**   * Word wall * Foldable – See Glencoe @2010 Foldables by Dinah Zike for more information * Matching the word to the definition, graph, or example * Anticipation guide (pre and post) |  |
| * **Lessons Resources at the end of each section.** * **Online resources at pearsonsuccessnet.com** | Pearson Algebra 2: 11.1-11.10 |
| **General:**  **Test-Taking Strategy**  Be sure to check the reasonableness of your answer. If students are asked for the balance of a bank account where you were dealing with amounts in the hundreds, it is not reasonable to give an answer in the millions. To make sure the answer to a problem is reasonable, you can estimate before you calculate. If the answer is close to your estimate, your answer is probably correct. |  |

**Teacher Notes/Additional Resources**

**General Algebra & Math sites:**

* AlgebraLAB: Making Math & Science Connections [www.algebralab.org](http://www.algebralab.org)
* Classzone from Holt McDougall’s free site includes really cool animations. You and your students will simply need to figure out which chapter in their book relates to what we’re studying. <http://www.classzone.com/cz/books/algebra_1_2011_na/book_home.htm?state=NE>
* Kuta software <http://www.kutasoftware.com> Excellent free worksheets (with answers) <http://www.kutasoftware.com/free.html>
* NCTM’s Figure This! Web site has several challenge problems that are designed for families to do together. <http://figurethis.org/download.htm> These challenges (there are 80 of them!) could be used for daily warm-ups in class (several involve estimation), weekly Problem-of-the-Week, and even a challenge problem along with their homework, if relevant.
* Math is Fun! Includes an illustrated math dictionary and helpful tutorials for students. [www.mathisfun.com](http://www.mathisfun.com)
* Daily Math Review <http://www.aea11.k12.ia.us/E2T2/dmr.html>
* Great online timer: <http://www.online-stopwatch.com>
* Porta Portal’s consolidated resource list <http://guest.portaportal.com/mrburke>
* Algebra2Go <http://www.saddleback.edu/faculty/lperez/algebra2go/index.html>
* About.com Education site has great warm ups <http://712educators.about.com/cs/warmups/l/blwarmmath.htm>
* Southern Regional Education Boards Instructional Resources <http://www.evalutech.sreb.org/InstResources/index.asp>

**Books:**

* Various resources provided by publishers for the book selection process

**Videos:**

* BrainPop [www.brainpop.com](http://www.brainpop.com)
* Teacher Tube [www.teachertube.com](http://www.teachertube.com)