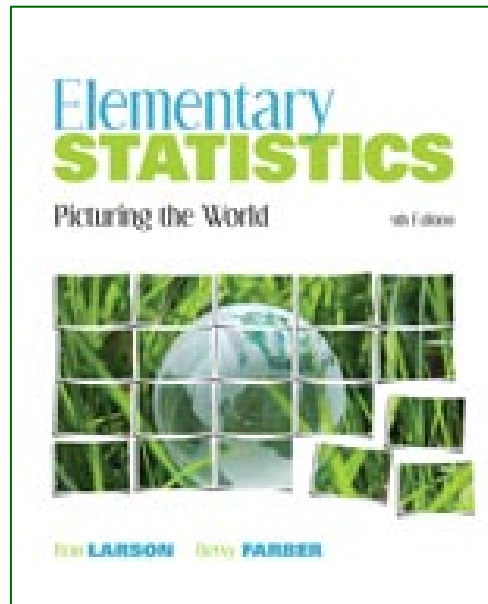


A Correlation of

# Elementary Statistics

## Picturing the World

5<sup>th</sup> Edition, ©2012



to the

# Arkansas Statistics Mathematics Curriculum Framework

**A Correlation of *Elementary Statistics: Picturing the World* ©2012  
to the  
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| <b>Arkansas Statistics<br/>Mathematics Curriculum Framework</b>   | <b>Elementary Statistics<br/>Picturing the World ©2012</b>  |
|---|---|
| <b>Descriptive Statistics</b>   |   |
| Content Standard 1. Students will create, compare, and evaluate data displays using such methods as <i>histograms</i> , cumulative distribution functions, and scatter plots. For these data, they calculate measures of central tendency (various kinds of <i>means</i> , the <i>median</i> , and the <i>mode</i> ) and their derivatives ( <i>range</i> , <i>variance</i> , and <i>standard deviation</i> ).  |   |
| DS.1. S.1<br>Create, compare, and evaluate different graphic displays of the same data, using histograms, <i>frequency polygons</i> , cumulative distribution functions, pie charts, scatter plots, stem-and-leaf plots, and box-and-whisker plots and draw these by hand or use a computer spread sheet program (Ex: Gather data to answer the question: Which area of the country has the highest school dropout rate? Display your dropout data in various forms.) | <b>SE/TE:</b> 42-43, 46-52, 53-54, 56, 58, 60-64, 71-78, 103, 107-112, 484-486, 496-497, 499                                  |
| DS.1.S.2<br>Compute and use mean, mode, <i>weighted mean</i> , <i>geometric mean</i> , <i>harmonic mean</i> , <i>range</i> , <i>quartiles</i> , variance, and standard deviation (Ex: Use spreadsheet formulas to compute measures that summarize your dropout data by state.)  | <b>SE/TE:</b> 65-70, 72-78, 79, 80-85, 88-97, 98-99, 100-103, 107-112, 113, 194-201, 210, 224, 237-238, 244, 246-248, 266-279 |
| <b>Data Collection</b>  |   |
| Content Standard 2. Students will describe the method of data collection in a census, <i>sample survey</i> , <i>experiment</i> , and <i>observational study</i> , and identify an appropriate method of solution for a given familiar or unfamiliar contextual problem. Students will plan and conduct a survey. The plan will address sampling techniques (simple random and stratified) and methods to reduce bias.   |   |
| DC.2.S.1<br>Compare and contrast <i>controlled experiments</i> and observational studies and the conclusions one can draw from each   | <b>SE/TE:</b> 16-17, 23-25  |
| DC.2.S.2<br>Compare and contrast <i>population</i> and <i>sample</i> , and <i>parameter</i> and <i>statistic</i>  | <b>SE/TE:</b> 3-8, 20, 24-25  |
| DC.2.S.3<br>Identify biased sampling methods  | <b>SE/TE:</b> 20, 22, 24-25   |
| DC.2.S.4<br>Describe simple <i>random sampling</i>  | <b>SE/TE:</b> 20-21, 24-25  |

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|---|---|
| DC.2.S.5<br>Select a data collection method appropriate for a given context   | <b>SE/TE:</b> 18-19, 23-25  |
| DC.2.S.6<br>Investigate and describe sampling techniques, such as simple random sampling, <i>stratified sampling</i> , and <i>cluster sampling</i>                      | <b>SE/TE:</b> 20-22, 24-25  |
| DC.2.S.7<br>Determine which sampling technique is best, given a particular context  | <b>SE/TE:</b> 22, 24-25   |
| DC.2.S.8<br>Plan and conduct a survey to answer a question or address an issue, identify possible sources of <i>bias</i> , and describe ways to reduce bias             | <b>SE/TE:</b> 32, 34-35   |
| <b>Data Collection</b>  |   |
| Content Standard 3. Students will construct and interpret display of data to solve problems.  |   |
| DC.3.S.1<br>Analyze categorical data  | <b>SE/TE:</b> 551-563, 564  |
| DC.3.S.2<br>Use and compare methods of data collection  | <b>SE/TE:</b> 18-19, 23-25  |
| DC.3.S.3<br>Apply statistical principles and methods in sample surveys; identify difficulties   | <b>SE/TE:</b> 20-22, 24-25  |
| DC.3.S.4<br>Apply concepts of probability to solve familiar and unfamiliar contextual problems  | <b>SE/TE:</b> 133-134, 138-143, 144, 145, 147-155, 157-165, 166-167, 169-178, 179 |
| DC.3.S.5<br>Use simulations to develop an understanding of the <i>Central Limit Theorem</i> and its importance in <i>confidence intervals</i> and tests of significance | <b>SE/TE:</b> 268-273, 275-279  |
| DC.3.S.6<br>Recognize, construct and interpret results using confidence intervals in the context of a problem   | <b>SE/TE:</b> 307-316, 317, 319-325, 326, 327-335, 336, 338-343                   |

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|---|---|
| <b>Data Analysis</b>  |   |
| Content Standard 4: Students will collect and analyze data to solve problems  |   |
| DA.4.S.1<br>Summarize distributions of <i>univariate</i> data by determining and interpreting measures of center, spread, position, boxplot, and effects of changing units on summary measures. | <b>SE/TE:</b> 65-70, 72-78, 79, 80-85, 88-97, 98-99, 100-112, 194-201, 210, 213-214, 237-238, 244, 246-248, 266-279, 280, 282   |
| DA.4.S.2<br>Analyze distribution of continuous univariate data (both normal and non-normal)   | <b>SE/TE:</b> 190-191, 236-248, 249-256, 257-264, 265-279, 280, 283-290, 291  |
| DA.4.S.3<br>Construct and interpret graphical display of data   | 42-52, 53-64, 76-77, 103, 108-109, 111-112, 192, 198-199, 201, 299, 485-487, 495-497  |
| DA.4.S.4<br>Compare <i>distributions</i> among sets of data.  | <b>SE/TE:</b> 237<br>For related content, please see:<br><b>SE/TE:</b> 190-201, 202-217, 218-225, 236-248, 249-256, 257-265, 266-280, 281-291   |
| <b>Data Analysis</b>  |   |
| Content Standard 5: Students will use statistical models to describe and analyze sets of data.  |   |
| DA.5.S.1<br>Investigate and solve relevant problems, using technology to collect, organize, display, and analyze data in tabular, graphical, and symbolic forms                                 | <b>SE/TE:</b> 46, 52, 55, 63, 77, 79, 84, 88, 96, 98, 101, 103, 108-109, 112, 251, 255, 299, 433, 459, 477, 486, 489, 499, 500, 503, 508, 511, 512, 522-523, 524-525, 527-528, 537, 549-550, 556, 561, 570, 579, 584-586, 595, 607, 624, 647<br>Technology support can be found on:<br><b>SE/TE:</b> 122-123, 352-353, 424-425, 478-479 |
| DA.5.S.2<br>Use linear and nonlinear models to formulate predictions from data  | <b>SE/TE:</b> 501-510, 511, 517-518, 521-523, 524-528   |
| DA.5.S.3<br>Recognize the limitations of mathematical models based on sample data as representations of real world situations   | <b>SE/TE:</b> 504, 506-507, 509-510, 511, 516, 518-523  |
| DA.5.S.4<br>Identify possible <i>correlations</i> between variables in a data set   | <b>SE/TE:</b> 484-499, 500  |
| DA.5.S.5<br>Develop, use, and explain application and limitations of linear models and line of best fit (linear regression) in a variety of contexts  | <b>SE/TE:</b> 501-510, 511  |

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|---|---|
| DA.5.S.6<br>Use data from samples to make inferences about a population and determine whether claims are reasonable or unreasonable               | <b>SE/TE:</b> 38-52, 53-64, 86-87, 304-316, 317, 320-325, 326, 327-330, 332-335, 339-343, 344, 351, 366, 369, 374-375, 379-385, 386, 390-396, 397, 398-402, 403, 406-412, 413, 432-440, 441, 443-450, 451-460, 461-468, 469, 490-499, 501-510, 511, 517-518, 521-523, 524-528, 540-550, 553-563, 564, 568-573, 574-585, 595, 599-608, 609-617, 618, 619-624, 626-630, 647 |
| DA.5.S.7<br>Determine and use measures of central tendency and dispersion to describe and compare sets of data                                    | <b>SE/TE:</b> 65-78, 79, 80-99, 100-112, 113, 194-201, 210, 213-214, 224, 238, 266-279, 304-316, 317, 320-325, 326, 327-330, 332-335, 339-343, 344, 351, 366, 369, 374-375, 379-385, 386, 390-396, 397, 406-412, 413, 432-440, 441, 443-450, 453-460, 569-573, 574-585, 595, 600-608, 618, 647  |
| DA.5.S.8<br>Design, conduct, interpret, and justify the results of a probability experiment, sample, or statistical simulation                    | <b>SE/TE:</b> 15, 79, 98, 144, 166, 167, 216, 217, 265, 280, 317, 326, 336, 386, 397, 403, 441, 500, 511, 512, 564, 618   |
| <b>Probability</b>  |   |
| Content Standard 6: Students will compute and distinguish between <i>permutations</i> and <i>combinations</i> and use technology for application. |   |
| P.6.S.1<br>Understand the counting principle, permutations and combinations and use them to solve problems  | <b>SE/TE:</b> 128-131, 137-143, 168-178   |
| P.6.S.2<br>Compare and contrast permutations and combinations   | <b>SE/TE:</b> 170, 174, 178   |
| P.6.S.3<br>Calculate the number of permutations of $n$ objects taken $r$ at a time  | <b>SE/TE:</b> 168-170, 172, 174-178   |
| P.6.S.4<br>Calculate the number of combinations of $n$ objects taken $r$ at a time  | <b>SE/TE:</b> 170-171, 173-178  |
| P.6.S.5<br>Calculate <i>relative frequency</i> and expected frequency   | <b>SE/TE:</b> 40-41, 44, 47-52, 541, 544, 546-550, 563  |
| P.6.S.6<br>Find <i>conditional probabilities</i> for <i>dependent</i> , <i>independent</i> , and <i>mutually exclusive</i> events                 | <b>SE/TE:</b> 145-155   |

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| <b>Probability</b>   |  |
| Content Standard 7: Students will identify random variables as independent or dependent and find mean and standard deviations for sums and differences of independent random variables.  |  |
| P.7.S.1<br>Compare and contrast independent and dependent random variables   | <b>SE/TE: 201</b>  |
| P.7.S.2<br>Find the standard deviation for sums and differences of independent random variables  | <b>SE/TE: 201</b>  |
| <b>Probability</b>   |  |
| Content Standard 8: Students will find probabilities, including conditional probabilities for events that are either dependent or independent, by applying the <i>law of large numbers</i> , the <i>addition rule</i> , and the <i>multiplication rule</i> . |  |
| P.8.S.1<br>Understand and use the addition rule to calculate probabilities for mutually exclusive and other events   | <b>SE/TE: 156-165</b>                                      |
| P.8.S.2<br>Understand and use the multiplication rule to calculate probabilities for independent and dependent events  | <b>SE/TE: 146-155</b>                                      |
| P.8.S.3<br>Develop the <i>binomial distribution</i> within a real world context  | <b>SE/TE: 205, 209, 211-215, 216, 217</b>                  |
| P.8.S.4<br>Calculate the mean and standard deviation for a binomial variable   | <b>SE/TE: 210, 213-214</b>                                 |
| P.8.S.5<br>Use the binomial distribution to calculate probabilities associated with experiments for which there are only two possible outcomes   | <b>SE/TE: 204-215, 216, 217</b>                            |
| <b>Probability</b>   |  |
| Content Standard 9: Students will develop, interpret, and apply the binomial probability distribution for discrete random variable, including computing the mean and standard deviation for the binomial variable.   |  |
| P.9.S.1<br>Design and conduct an experiment that simulates a binomial distribution.  | <b>SE/TE: 216</b>  |

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|--|---|
| P.9.S.2<br>Design and conduct an experiment that simulates a <i>geometric distribution</i> .   | For related content, please see:<br><b>SE/TE:</b> 218-219, 222-224                            |
| P.9.S.3<br>Simulate probability distributions, including binomial and geometric.   | <b>SE/TE:</b> 216<br>Additional related content:<br><b>SE/TE:</b> 218-219, 222-224            |
| <b>Statistical Inference</b>   |   |
| Content Standard 10: Students will use probability distributions to make statistical inferences.   |   |
| SI.10.S.1<br>Explore the characteristics and applications of the <i>normal distribution</i> and <i>standardized scores</i>                                   | <b>SE/TE:</b> 105-112, 236-248, 249-256, 257-264, 265   |
| SI.10.S.2<br>Explore a variety of statistical tests such as <i>chi-squares</i> and <i>t-tests</i> and understand the meaning of <i>hypothesis testing</i>    | <b>SE/TE:</b> 356-370, 389-396, 397, 404-412, 542-550, 553-563, 564                           |
| SI.10.S.3<br>Use relative frequency and expected values to represent and solve problems involving uncertainty  | <b>SE/TE:</b> 541-550, 563  |
| <b>Statistical Inference</b>   |   |
| Content Standard 11: Students will use <i>confidence intervals</i> and hypothesis tests, fit curves to data, and calculate <i>correlation coefficients</i> . |   |
| SI.11.S.1<br>Compute and use confidence intervals to make an estimate  | <b>SE/TE:</b> 304-316, 317, 318-325, 326, 327-335, 336, 337-343, 440, 441, 450, 460, 468, 573 |
| SI.11.S.2<br>Understand hypothesis tests of means and differences between means and use them to reach a conclusion   | <b>SE/TE:</b> 363-370, 371-384, 385, 387-396, 397, 430-440, 441, 442-450, 451-460             |
| SI.11.S.3<br>Use the principle of least squares to find the curve of best fit for a set of data  | For related content, please see:<br><b>SE/TE:</b> 502-510                                     |
| SI.11.S.4<br>Calculate and interpret the correlation coefficient of a set of data  | <b>SE/TE:</b> 489-499, 500, 626-630   |