South Carolina Mathematics

Statistical Modeling

Mathematical Process Standards MPS

1 Problem Solving MPS.PS

1a Make sense of problems and persevere in solving them strategically. MPS.PS.1

2 Representation & Communication MPS.RC

2a Explain ideas using precise and contextually appropriate mathematical language, tools, and models. MPS.RC.1

3 Connections MPS.C

3a Demonstrate a deep and flexible conceptual understanding of mathematical ideas, operations, and relationships while making real-world connections. MPS.C.1

4 Analyze & Justify MPS.AJ

4a Use critical thinking skills to reason both abstractly and quantitatively MPS.AJ.1

5 Structure & Patterns MPS.SP

5a Identify and apply regularity in repeated reasoning to make generalizations. MPS.SP.1

Data, Probability, and Statistical Reasoning SM.DPSR

1 Communicate using descriptive and inferential statistics by collecting, critiquing, analyzing, and interpreting real-world data. SM.DPSR.1

1a Calculate and interpret z-scores as a measure of relative standing to standardize units. SM.DPSR.1.1

1b Approximate percentages using the Empirical Rule and z-scores for normally distributed data. SM.DPSR.1.2

1c Using simulations taken from a given population, model sample-to-sample variability in sampling distributions of a statistic. SM.DPSR.1.3

1d Construct and compare confidence intervals of different models to make conclusions about reliability given a margin of error. SM.DPSR.1.4

1e Summarize and evaluate reports based on data for appropriateness of study design, analysis methods, and statistical measures used. SM.DPSR.1.5

2 Formulate investigative statistical questions that can be answered using data. SM.DPSR.2

a Formulate investigative statistical questions about a population using samples taken from the population. SM.DPSR.2.1

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2b Formulate comparative and associative investigative statistical questions for surveys and observational studies to compare two or more groups or to investigate the association of two or more variables. SM.DPSR.2.2

2c Formulate comparative and associative investigative statistical questions for experiments to compare two or more groups or to investigate the association of two or more variables. SM.DPSR.2.3

2d Formulate inferential investigative statistical questions regarding association and prediction. SM.DPSR.2.4

2e Formulate investigative statistical questions for two variables. SM.DPSR.2.5

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3 Design and implement a plan to collect data to address the investigative statistical question. SM.DPSR.3

3a Apply an appropriate data-collection plan when collecting data for the investigative statistical question of interest. SM.DPSR.3.1

3b Distinguish between sample surveys, observational studies, and experiments. SM.DPSR.3.2

3c Design sample surveys, experiments, and observational studies using statistical methods. SM.DPSR.3.3

3d Differentiate between random selection and random assignment and identify their impact on generalizing. SM.DPSR.3.4

3e Examine potential sources and effects of bias and confounding variables. SM.DPSR.3.5

3f Describe and comply with the ethical use of data. SM.DPSR.3.6

3g Identify when data can be generalized to a target population. SM.DPSR.3.7

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4 Use appropriate graphical and numerical methods to analyze data. SM.DPSR.4

4a Describe quantitative and categorical data. SM.DPSR.4.1

4b Summarize and describe relationships between two variables. SM.DPSR.4.2

4c Describe the relationship between two quantitative variables by interpreting correlation (r) and a least-square regression line (using technology). SM.DPSR.4.3

4d Assess the fit of a linear model by plotting and analyzing residuals, including the squares of the residuals, to improve its fit. SM.DPSR.4.4

4e Calculate and interpret the p-value for a population proportion and/or population mean. SM.DPSR.4.5

4f Use simulated sampling distributions to describe the sample to-sample variability of sample statistics. SM.DPSR.4.6

4g Use simulations to investigate associations between two categorical variables and to compare groups. SM.DPSR.4.7

'nterpret the results of the analysis by making connections to the investigative tatistical question. SM.DPSR.5

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5a Use statistical evidence from analyses to answer investigative statistical questions. SM.DPSR.5.1

5b Determine the possible impact of extreme data points, missing values, or incorrect values on the results. SM.DPSR.5.2

5c Use and interpret the p-value to determine whether the estimate for a population parameter is reasonable. SM.DPSR.5.3

5d Interpret a given margin of error corresponding to an estimate of a population parameter. SM.DPSR.5.4

5e Explain the impact of multiple variables on one another. SM.DPSR.5.5