

Mathematics Standards of Learning for Virginia Public Schools - (Adopted April 2022)

Data Science

The following standards outline the content of a one-year course in Data Science. If a one-semester course is desired, the standards with a dagger (†) would apply. The *Data Science Standards of Learning* provide an introduction to the learning principles associated with analyzing big data.

Through the use of open source technology tools, students will identify and explore problems that involve the use of relational database concepts and data-intensive computing to find solutions and make generalizations. Students will engage in a data science problem-solving structure to interact with large data sets as a means to formulate problems, collect and clean data, visualize data, model using data, and communicate effectively about data formulated solutions.

Data in Context - Understanding data science facilitates critical examination of questions and supports informed data-driven decision making.

DS.1[†] The student will identify specific examples of real-world problems that can be effectively addressed using data science.

DS.2 The student will be able to formulate a top down plan for data collection and analysis, with quantifiable results, based on the context of a problem.

Data Bias - Data bias may result from the types of methods used for data collection, processing, representation, analysis, and use.

DS.3[†] The student will recognize the importance of data literacy and develop an awareness of how the analysis of data can be used in problem solving to effect change and create innovative solutions.

DS.4 The student will be able to identify data biases in the data collection process, and understand the implications and privacy issues surrounding data collection and processing.

Data and Communication - Data visualizations are used to communicate insights about complex data sets to support making decisions.

DS.5[†] The student will use storytelling as a strategy to effectively communicate with data.

DS.6[†] The student will justify the design, use, and effectiveness of different forms of data visualizations.

Data Modeling - Mathematical models are used to predict future, unobserved data values.

DS.7 The student will be able to assess reliability of source data in preparation for mathematical modeling.

DS.8[†] The student will be able to acquire and prepare big data sets for modeling and analysis.

DS.9[†] The student will select and analyze data models to make predictions, while assessing accuracy and sources of uncertainty.

DS.10[†] The student will be able to summarize and interpret data represented in both conventional and emerging visualizations.

DS.11 The student will select statistical models and use goodness of fit testing to extract actionable knowledge directly from data.

Data and Computing - Technology is used to effectively prepare, analyze, and communicate with data.

DS.12⁺ The student will be able to select and utilize appropriate technological tools and functions within those tools to process and prepare data for analysis.

DS.13⁺ The student will be able to select and utilize appropriate technological tools and functions within those tools to analyze and communicate data effectively.