4.DA.1 Data and Analysis

> *The student will identify the appropriate type of data needed to solve a problem or answer a question. (a) Analyze a problem to determine the appropriate type of data needed. (b) Evaluate the reliability of data sources. (c) Use numeric values to represent non-numeric ideas to include binary, American Standard Code for Information Interchange (ASCII), and RGB values. (d) Collect, store, clean, and organize data for analysis and to prepare visualizations.*

Understanding the Standard

The abilities to determine what type of data is needed to answer a question and use a computer to access, organize, and analyze this data are skills needed in many career and academic fields. Students can use a computer to collect data through measurements, sensors, or surveys, explore existing data sets compiled by others, and organize data. Computers use numeric values to store information and perform operations. For example, when we click the letter A on the keyboard in order for the letter A to be displayed on our screen, those instructions have to be converted into a binary numeric value for the computer to process that information. The students can use numeric values to represent non-numeric ideas, such as letters or colors, to better understand how computers digitize information.

Term	Definition
Clean	(As in data) identifying and fixing errors in data (such as removing duplicate entries, fixing typos, cross-checking information) to make it more reliable and accurate.
Binary	The number system used by computers to represent all messages and commands
Pixel	Small colored dots that make up an image.
RGB	A method of identifying colors from the amount of red, green, or blue light in the color is represented by a numerical value from 0-255. (short for red, green, blue)
ASCII	A standard that assigns letters, numbers, and other characters a numerical value based on a sequence of 8 binary digits. (short for American Standard Code for Information Interchange)

Prerequisite Knowledge

Students should have a foundational knowledge of collecting and organizing data and using evidence to support their thinking. They should also be able to differentiate between numeric and non-numeric data.

Integration Opportunities

English 4.W.1d When writing a persuasive text, have students pose a question and identify the data type needed to address the topic. Then have students collect and organize data to analyze then form their argument based on the results of the data.

Science 4.1a-d Engage in scientific & engineering practices to collect, organize, and analyze experimental data.

Visual Arts 4.12a Use RGB values to express meaning in a work of art focusing on color.

Physical Education 4.3b,g Have students calculate their heart rate and collect personal baseline data using a standardized health-related criterion-referenced test. Then have students clean and organize the data to analyze the results.

Summary of a Lesson

Students watch How do Computers work? video. Provide each student with a copy of the ASCII table. Show an example of a letter represented numerically on the board, and have students use the ASCII table to try to figure out what letter is being represented. Students then work in pairs sending a binary coded message to their partner. As an exit ticket have students reflect on their learning (ie, What is one thing you learned today? Was there anything that surprised you? etc).