

High School Data Literacy Program – Standards and Objectives

Course Overview

Course Title: Data Literacy and Foundations of Data Science

Grade Level: 9–12

Prerequisites: Algebra I, basic computer literacy

Duration: One semester

Purpose: This course introduces students to the principles and practices of working with data, including how to collect, analyze, manage, and communicate data effectively using tools like Python and SQL.

Standards and Learning Objectives

Standard 1: Introduction to Data Literacy

Students will:

- Define what data is and why it's important in society.
- Distinguish between qualitative and quantitative data.
- Identify types of data sources (surveys, sensors, web, databases).
- Understand the ethical use of data and issues of privacy.

Objectives:

- Explain how data informs decisions in business, government, and daily life.
 - Describe different types of data (structured vs. unstructured).
 - Discuss the importance of ethical data use and digital citizenship.
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Standard 2: Fundamentals of Python for Data Work

Students will:

- Learn the basics of Python syntax and use it to manipulate and analyze data.
- Write Python code for data input/output, calculations, and visualizations.
- Use libraries like pandas, matplotlib, and numpy.

Objectives:

- Write Python scripts to load and explore data sets.

- Create basic data visualizations (e.g., line plots, bar graphs).
 - Use loops, conditionals, and functions to process data.
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Standard 3: Understanding Databases and SQL

Students will:

- Understand the structure and purpose of relational databases.
- Use SQL to query, update, and manage data within a database.
- Learn about tables, keys, and relationships in database systems.

Objectives:

- Write SELECT, INSERT, UPDATE, DELETE, and JOIN statements in SQL.
 - Design simple database schemas using primary and foreign keys.
 - Explain how databases store, organize, and retrieve data.
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Standard 4: Data Quality and Cleaning

Students will:

- Identify issues that affect data quality such as missing data, duplicates, and outliers.
- Use Python and SQL tools to clean and prepare data for analysis.

Objectives:

- Detect and handle missing or inconsistent values in datasets.
 - Use Python (pandas) to filter, group, and format data.
 - Understand the importance of clean data in ensuring accurate analysis.
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Standard 5: Data Management and Ethics

Students will:

- Learn data management principles including data lifecycle and storage.
- Explore data security, governance, and responsible stewardship.

Objectives:

- Explain how data is stored, backed up, and secured.
- Evaluate policies for data access and privacy (e.g., FERPA, GDPR).

- Create a data management plan for a school or personal project.
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Standard 6: Applied Data Projects and Communication

Students will:

- Apply learned skills to real-world datasets and communicate findings clearly.
- Develop data stories and visualizations for a target audience.

Objectives:

- Complete a capstone project analyzing a public dataset.
 - Present findings using dashboards, slides, or reports.
 - Interpret and explain insights from data analysis to peers or stakeholders.
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Assessment Types

- Coding assignments and mini-projects
- SQL practice worksheets
- Data cleaning challenges
- Ethics case studies
- Capstone project with presentation