# EVERFI Data Science:
# **Curriculum Guide**

**Recommended Grade Level:** 9th-12th graders in the U.S. and Canada

**Total Time:** *4 modules, approx. 30 minutes each*

**Subject Fit:** Economics, Mathematics, Statistics, College/Career Prep

**Standards Alignment:** Common Core Standards in Statistics and Probability, International Standards for Technology in Education (ISTE) Standards

## COURSE OVERVIEW

*EVERFI: Data Science* course is a 101 course dedicated to providing upper high school students with the skills and knowledge they need to accurately evaluate the ROI of data science education and career options. This foundations course will introduce students to what data science is and why it matters. It will cover foundational knowledge including collecting, visualizing, and understanding data. The course will also include an overview of industries that use data science, employ data scientists, and contain an exploration of the role of data science in daily life.

Students will understand the outlook of the data science field, how data is collected, cleaned, and verified, the difference between descriptive and predictive analytics, and how data should be communicated to different audiences.

## TOPIC AREAS

*Data Science*
- Students will explore ways data is used in various applications and how the emerging field of data science is growing rapidly.

*Data Lifecycle*
- Students will discover the data lifecycle including data collection, database management, data visualization, and machine learning.

*Data Collection*
- Students will consider various methods of data collection, including web scraping, sentiment analysis, surveys, interviews, and focus groups.

*Data Categorization*
- Students will understand the differences between qualitative and quantitative data, primary and secondary data collection, and descriptive and predictive data analysis.

*Data-Driven Decisions*
- Students will engage in decision-making based on conclusions they are able to make based on data.

*Data Visualization*
- Students will observe how different methods of data visualization can be used to tell a story and help others understand the data.

*Data Communication*
- Students will determine when dashboards or reports are more appropriate, based on the data that needs to be communicated and the needs of the audience.

## COURSE STRUCTURE

Each module is accompanied by offline lesson plans and discussion guides to use in the classroom.
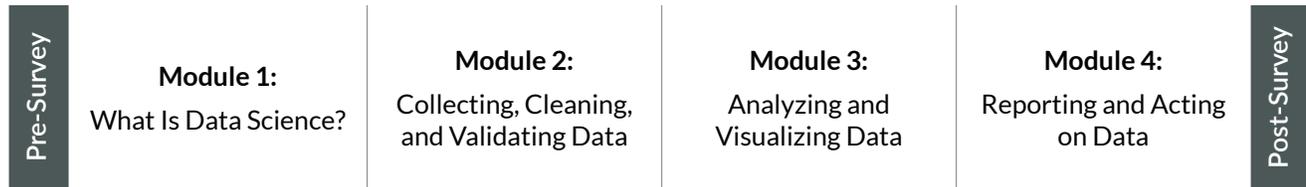
| Pre-Survey | **Module 1:** What Is Data Science? | **Module 2:** Collecting, Cleaning, and Validating Data | **Module 3:** Analyzing and Visualizing Data | **Module 4:** Reporting and Acting on Data | Post-Survey |
|---|---|---|---|---|---|

**Learning Objectives:**

*Students will be able to...*

- Recognize the applicability of data science to many real world problems.

- Explain the ways in which the practice of data science is both growing and increasingly relevant.

- Explain the kinds of problems a data scientist might need to solve, and the methods they use to address those problems.

- Describe the methods used to collect data, including quantitative and qualitative methods, and web scraping.

- Describe the methods used to clean data and populate missing values.

- Describe the methods used to validate data.

- Define data visualization, including why different displays are needed for different types of data.

- Describe descriptive analytics and the different approaches and tools.

- Describe predictive analytics and the different approaches and tools.

- Explain how to visualize data using various types of displays.

- Demonstrate through examples how data analysis results in a business decision.

- Describe the different types of data reporting outputs.

- Explain how data should be summarized for different audiences.

## DETAILED COURSE OUTLINE

### What Is Data Science?

Students will learn about machine learning, data visualization, database management, and data collection. Practical examples will allow students to gain insight into various applications of data science and data management. Students will also learn how the field of data science is growing and what types of careers are in demand.

**Learning Objectives:**

*Students will be able to...*

- Recognize the applicability of data science to many real world problems.

- Explain the ways in which the practice of data science is both growing and increasingly relevant.

- Explain the kinds of problems a data scientist might need to solve, and the methods they use to address those problems.

| Activity Topic | Activity Description |
|---|---|
| The Value of Data | Students are introduced to data science and how data is collected and analyzed. |
| Data Science Field | Students discover that data scientists are in high demand and that the field offers high-paying career options. |
| The Process | Students explore the process of data use, including collection, cleaning, analysis, visualization, and decision-making. |
| Analyzing Patterns | Students learn about the uses of descriptive and predictive analytics. |

### Collecting, Cleaning, and Validating Data

Students will discover various methods of data collection and then learn about ways that data is cleaned and validated before it is analyzed.

**Learning Objectives:**

*Students will be able to...*

- Describe the methods used to collect data, including quantitative and qualitative methods, and web scraping.

- Describe the methods used to clean data and populate missing values.

- Describe the methods used to validate data.

| Activity Topic | Activity Description |
|---|---|
| Data Uses | Students discover types of data and how they are used to drive business decisions. |

| Activity Topic | Activity Description |
|---|---|
| **Data Collection** | Students explore a variety of methods of data collection, including web scraping, sentiment analysis, surveys, interviews, and focus groups. |
| **Processing Data** | Students learn about how data must be cleaned to ensure that it is accurate and thorough before it can be analyzed. |
| **Checking Twice** | Students will understand the value of validating data to make sure that the type and format are correct. |

## Analyzing and Visualizing Data

Students will learn about the processes of analyzing and visualizing data and will explore various ways that data can be presented.

**Learning Objectives:**

*Students will be able to...*

- Define data visualization, including why different displays are needed for different types of data.
- Describe descriptive analytics and the different approaches and tools.
- Describe predictive analytics and the different approaches and tools.
- Explain how to visualize data using various types of displays.

| Activity Topic | Activity Description |
|---|---|
| **Illustrating Data** | Students explore how coding can help automate data visualization, which can then be used to tell a story. |
| **Using Descriptive Data** | Students will learn about how descriptive data can be used to understand current or past situations. |
| **Using Predictive Analytics** | Students will discover how trends in data can be helpful when it comes to predicting or modeling future events, needs, or states. |
| **Data Visualization** | Students will learn about ways data can be visualized in order to understand a large amount of data at once, including trends, comparisons, and distributions. |

## Reporting and Acting on Data

Students will understand the different uses of dashboards and reports, then determine which is better to use for a variety of audiences.

**Learning Objectives:**

*Students will be able to...*

- Demonstrate through examples how data analysis results in a business decision.
- Describe the different types of data reporting outputs.
- Explain how data should be summarized for different audiences.

| Activity Topic | Activity Description |
|---|---|
| **Eliminating Data Bias** | Students learn how assumptions can unexpectedly skew data results and the importance of considering all the numbers before drawing conclusions. |
| **Data Displays** | Students explore the differences between dashboards and reports and learn how they are used to communicate data to different audiences. |
| **Data Stories** | Students learn about how giving context to data can help to tell a story which can lead to decision-making. |
| **Reports** | Students will decide what data is relevant to different audiences and how reports can be tailored to meet a variety of needs. |