

# DATA LITERACY/FLUENCY

## What is data literacy/fluency and how is it related to Data Knowledge & Analysis?

Data literacy/fluency is the ability to understand, analyze and draw insights from data and communicate about it clearly. Technicians use data to solve problems and improve operations. In troubleshooting a piece of equipment, for example, a technician gathers and analyzes data to diagnose the problem, and based on that data, identifies and applies a solution, and then uses data to verify the problem has been resolved.

## Vocabulary

- **Data management** – the practice of collecting, keeping, and using data securely, efficiently, and cost-effectively
- **Spreadsheet** – a tool which stores data in a grid of rows and columns
- **Data backup and recovery** – the process of backing up data in the case of loss and setting up systems that allow data to be recovered due to data loss
- **Statistics** – mathematics used to predict outcomes by examining numerical data relationships
- **Analytical tools** – tools, such as Excel, R, and SAS, that enhance and automate data analysis
- **Data modeling** – the process for creating diagrams to represent data stored in a database
- **Data visualization** – software that represents information in the form of a chart, diagram, or picture

## How will technicians use data literacy/fluency?

Many towns or cities are served by municipal water treatment companies and have Water and Wastewater Treatment Technicians on staff who use data to ensure drinking water is safe and clean. Trinh is a Water Treatment Technician at her town's municipal water and wastewater treatment facility. One of her responsibilities is testing water samples for acid and pH levels, bacteria, and a variety of contaminants. Trinh uses equipment such as a Dual Input Analyzer, Nitrate Analyzer and Free Chlorine Sensor to collect the data she needs. Trinh is part of her organization's Consumer Confidence Report team that prepares an annual report to distribute to the public as required by the Environmental Protection Agency (EPA). Trinh gathers the required data and explains it to the communications team who then writes the report to distribute to all their water customers.



# DATA LITERACY/FLUENCY

## Skills Needed for a High-Paying Career

- Locating and acquiring data relevant to a particular problem
- Organizing data in tables and spreadsheets
- Applying basic mathematics to clean up raw data
- Creating visualizations to communicate results

## Education

Your local community college provides the advanced technology classes you will need. Data literacy and fluency skills are most often taught within Data Analytics or Data Science programs offering associate degrees and one-year certificates. You'll also find applicable skills in technical specializations, such as cybersecurity, biomedical, energy, and environmental technologies. Community college course schedules are designed to accommodate the needs of working students and often include online and hybrid delivery formats.

[Find your nearest community college here.](#)

## Future Trends

Data, once a tightly held commodity that was costly and difficult to share, is now often very low cost or free. The generation of large amounts of data (Big Data) has increased substantially. This means a future where:

- Data is available autonomously using the Internet of Things (IoT)
- Artificial intelligence, machine and deep learning can predict future outcomes
- Sensors on objects send real-time data feeds

## Learn More

- [What are Data and Data Literacy? \(video\)](#)
- [Data Literacy for All \(free eLearning program\)](#)
- [The Language of Data \(free course\)](#)



Preparing Technicians for the  
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# DATA LITERACY/FLUENCY

## What Is Data Literacy/Fluency?

Data literacy/fluency is the ability to understand, analyze and draw insights from data and communicate about it clearly. It is becoming increasingly more important as data becomes the new currency for business. Data literacy/fluency means being able to:

- **Read data:** understanding what data is and the aspects of the world it represents
- **Work with data:** including creating, acquiring, cleaning, and managing it
- **Analyze data:** filtering, sorting, aggregating, comparing, and performing other analytic operations on it
- **Persuade with data:** using data to support a larger narrative that is intended to communicate some message or story to a certain audience. ([source](#))

## Data Literacy/Fluency Competencies

- Locating and acquiring data relevant to a particular problem
- Organizing data in tables and spreadsheets
- Applying basic mathematics to clean up raw data
- Creating visualizations to communicate results

## Cross-disciplinary Skills

- Using basic statistics
- Selecting and utilizing appropriate analytics tools
- Using data visualization software
- Communicating complex information

## Bioinformatics Scenario

Ray is a Bioinformatics Technician at a cancer research center. He maintains the laboratory's electronic records and provides preliminary data analysis to assist the research scientists with their investigations of potential treatments. This week his center was asked to contribute data to a study on promising new research. Ray needs to determine which data is relevant to the research, extract it from the database, use sophisticated software to analyze it and then visualize it to present to his supervisor. Ray looks forward to reading the study once it comes out so he can see firsthand how his cancer research center's contributions are impacting the search for a cure.

## Agriculture Scenario

Ann is a Food Science Technician who works for a large citrus grower. As part of her responsibilities, Ann collects and tests soil and water samples. While performing this function was essential, it was time consuming and only yielded basic data about the soil and trees. Ann recently assisted her company with adopting soil sensors. These are devices that are inserted in the ground at various locations in the grove where they provide highly specific data, such as moisture levels, fertilizer effectiveness, and plant reaction to variable conditions, including temperature and light. The sensor measurements deliver real-time data to a computer station Ann has set up in her office. She is then able to provide this data quickly to the grove manager, allowing the company to act when a field condition, such as low water levels, produces a stress reaction, can be mitigated.

# DATA LITERACY/FLUENCY

## Activity

This activity is designed to help students think about how data is used to solve problems and make decisions. Students will consider the way climate data influences the work of two industries: agriculture and energy and utilities.

## Warm-Up

Review the definition of data literacy/fluency. Ask students:

- How is data collected and used in your career field?
- What STEM technician careers use data about the climate as part of their everyday work?
- What type of data do they need?
- How do they use this data?

## Activity Steps

1. Go to <https://www.climate.gov/maps-data/climate-data-primer>.
2. Read the overview “Why does climate data matter?”
3. Go to the National Center for Environmental Information, <https://www.ncei.noaa.gov/about/our-impact>, and select either Agriculture or Energy and Utilities. Read the document and be prepared to share with the class what you learned about climate data and the impact of climate on that industry.
4. Share in small groups or with the class what you learned.
5. If there’s time, explore the case studies within Value of Data and Tools and Resources sections at the bottom of [Our Impact](#).

## Tools Available

- [How to Use Google Sheets](#) (video)
- [Videos and handouts for Excel Data Analysis Basics taught by Mike Girvin at Highline College](#)
- [Data Literacy for All](#) (free eLearning program)

## Read More

- [What is Data Literacy?](#)
- [Data Literacy Project](#)
- [Developing a Data-Literate Workforce](#)



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