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DIGITAL INTERACTIVE EDUCATOR GUIDE



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CONTENTS

BACKGROUND AND MODULE SUMMARY	4
USING THE SELF-PACED MODULES	5
OVERVIEW	6
KEY LEARNING OBJECTIVES	6
SETTING THE STAGE	6
SECTION-BY-SECTION EDUCATOR TIPS	7
EXTENSION	9
CONTENT STANDARDS	9
KEY TERMS	10



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BACKGROUND

Information systems, the Internet, cloud computing, mobile devices and online retail have all contributed to the production of massive volumes of data. Data-driven careers in businesses, governments, and organizations have designed unique ways of gaining value from this data. Many companies use data to predict customer behavior and make smart, real-time decisions about advertising and their product supplies to improve financial results. Educators and school administrators use it to customize and improve students' educational experiences and to make discoveries about learning.

Data can also improve areas as varied as transportation systems to athletics. Transportation planners use it to reduce congestion and traffic accidents, promoting safety and efficiency, while drivers can use data from on-board computers for vehicle maintenance. In sports, "smart" devices allow athletes and trainers to gain insights into and improve their performance. Coaches and managers use statistics to make decisions about which players to put on the team and when to put them into the game to improve their chances of winning.

The constant production and ingestion of data has given rise to many interesting careers. Data engineers develop infrastructure to support the storage and use of large data sets. Data scientists and analysts analyze and interpret large data sets. Machine learning researchers and practitioners use it to develop artificial intelligence and predictions. Even more traditional careers are also increasingly influenced. For example, meteorologists use increasingly complex data sets to make more accurate predictions about weather, while entertainment industry professionals fine-tune their offerings based on detailed consumer insights.

Data is limitless and presents itself everywhere in the world around us. Something as simple as looking out the window to check the weather is a form of ingesting data. People are constantly receiving or producing data during their day—every time they use an electronic device, set an alarm clock, prepare their clothing choices, utilize transportation, or go to school or work.

This module aims to facilitate students' discovery of the role data plays in their day and facilitate their understanding of the wide range of careers that are increasingly influenced by this powerful tool.



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MODULE SUMMARY

Data in My Day provides a foundation for students to explore the world of data. The unit begins with a definition of data and a brief explanation that we consume and produce large amounts of it in our everyday activities. Following a brief self-assessment, pre-test, and confidence rating, students complete three sections that illustrate the role data plays in getting ready for school, traveling to school, an average school day, and afterschool activities. At the end of the module, students complete another confidence rating and a 3-item post-test.

USING THE SELF-PACED Modules

This module is appropriate for use in grades 6–12 and is aligned to Common Core State Standards in English Language Arts and the NSTA Science and Engineering Practices.

This module and imbedded assessment are designed for students to work through independently on a computer or tablet with internet access (i.e., computer lab, one-to-one learning environment, etc.). Suggestions for one-to-all or one-to-many learning environments are included.

The following section provides strategies for incorporating the self-paced modules into instruction and tips for facilitating discussion before, during, and after each section.





DATA IN MY DAY OVERVIEW

How does data impact your life? Students travel through a typical day to discover where and how data and data science are part of everyday activities. They explore many ways it can be used and various data-driven careers.



KEY LEARNING OBJECTIVES

Students will be able to

- understand how data impacts their everyday lives.
- identify and recognize the value of data sources.
- consider careers that focus on data and data science.

SETTING THE STAGE

Engage students before the module with one or more of these questions:

- What is data and why is it important?
- Can you identify 2 or 3 types of data that you use in the average day? What about 2 or 3 types of data you create?
- Can you name some jobs and careers that use data?



SECTION-BY-SECTION EDUCATOR TIPS

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- PREPARE
 - Set Up: The module begins by defining data as "a collection of facts and statistics that has been gathered together to reference, analyze, or draw conclusions about a topic." Ask students to fill in the blanks in the following sentences: "Data is ______. It impacts my life by _____."
 - Self-Assessment: Students are asked questions that gauge how they feel about providing data, how they use it, and how important they think it is in their school experience. How much have students thought about these questions before? In what part of their lives do they think data plays the biggest role (i.e., school, athletics, shopping, playing computer games)?
 - Show What You Know: The pre-test consists of three questions. Students have one opportunity to answer each question correctly. Feedback is provided for both correct and incorrect answers. If using the module in a whole-class setting, consider having students vote on answers or call on different students for each question. The correct answer is visible once an answer is submitted.

• LEARN

- Starting Your Day: Students learn that data is used to keep track of international time and to track the weather. Therefore, just by setting an alarm clock, looking out the window, or using a news or radio report to evaluate the weather, they are using data. Ask students if they can think of any other ways that they use insights as they get ready for an average school day. Reinforce the idea that it comes from many sources and that it doesn't have to be digital.
- Getting to School: Students explore four ways that data impacts transportation: route planning, traffic management, vehicle maintenance, and traffic safety. Have students describe how they get to school and identify ways in which they use data in the process.

	Data & Transportation It's time to head to school. Whether you take public transportation, walk, or get a ride, getting there can involve a lot of data. Flip each card to learn more.			
	• Å			
	Data saves travel time.	Data manages traffic	Data keeps vehicles on the	
C	Data helps us figure out how long	reports.	road.	
	it will take to get somewhere	Mobile map apps use data to make	Data produced by the computer in	(
	through real-time info and	sure their traffic reports are	modern cars and buses makes it	
	estimated travel time on different	correct, so they can tell us which	much easier to monitor a vehicle's	
	routes. Whether you use a mobile	route has the least traffic. People	condition and track how far it has	
	map app or look online for a public	can make the data more accurate	driven and how much fuel it has	

• **Your School Day:** Students learn that data plays a large role in how schools operate. Students' report cards, transcripts, and standardized test results



provide insights about their academic performance, and the school library is full of data about student preferences and usage of materials. Emphasize that the types of insights in this section are all *created* by students, whereas the data in earlier sections was *consumed* by students. Ask students if they can think of other types of data they produce on a daily basis. Emphasize that it's important to think about data we produce and understand how it's being used, including how we give organizations permission to use it.

Output:

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Afterschool: Students examine the role of data in playing sports, shopping, and streaming digital content. Wearables and "smart" devices can be used to track performance and activity levels. Shopping data can be used to personalize advertisements and discounts as well as adjust product prices and supply. Using social media and online content creates data that can be used to create programming schedules, personalize advertisements, and make predictions about what audiences want. Challenge students to list all of the types of data they produce and consume during their out-of-school time. Ask them if they read privacy statements or consider the companies that they allow to access their data through apps and devices. How do they choose which companies to give permission to?

• REFLECT

Students are asked to rank how strongly they agree or disagree with the following statements: "I know what role data plays in my everyday life" and "I am interested in learning more about careers that use data." After students have responded in the interactive, ask for students to show by raising hands if more students agree with the statement after completing the module than before? If students still disagree at the end, ask them what they still need to know in order to agree with the statement.

• CHALLENGE

 There are three post-test questions for this module. Students are encouraged to review the information in each section, if needed, before beginning the post-test.

Show What You Learned Select the category that best describes each statement.		
Data	Not Data	
Drag elements here	Drag elements here	
Nouns, Verbs, Adjectives, and Adverbs	Looking Out the Window to Check the Weather	Ŀ

 Students will encounter a variety of question types including multiple choice, classification, matching, and true/false.



For each question, students have two opportunities to answer correctly. Full credit is given for correct answers on the first try. The total number of available points in this module's post-test is 6. If students answer incorrectly, they are given an opportunity to try again or skip and continue to the next question. No additional points are given to students who either do not retry the question or retry the question and still answer incorrectly. Partial credit is given for students who correctly answer a portion of a multi-part question or who give the correct answer on a second try.

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EXTENDING THE MODULE

Once students complete the module, consider one or more of the following follow-up activities:

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- Encourage students to spend a day taking a data inventory. From morning to night, they should try to track all of the types of data they consume and produce. Prior to the activity, brainstorm and list data sources. After the activity, have students share their inventories and discuss key types of data and their importance.
- Have students collaboratively brainstorm and then independently research datacentric careers. Students can use the Bureau of Labor Statistics' <u>Occupational Outlook</u> <u>Handbook</u> and the free crowdsourcing site <u>Career Village</u> to learn about what professionals in specific data-related careers do, what types of education they have completed, how easy it is for them to find jobs, and how much they can earn.

MIDDLE SCHOOL NATIONAL STANDARDS

The following standards from the Common Core State Standards—English Language Arts and the NSTA Science and Engineering Practices are addressed in this digital interactive:

- <u>CCSS.ELA-LITERACY.CCRA.R.7</u>: Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
- <u>CCSS.ELA-LITERACY.CCRA.R.10</u>: Read and comprehend complex literary and informational texts independently and proficiently.
- <u>CCSS.ELA-LITERACY.CCRA.W.9</u>: Draw evidence from literary or informational texts to support analysis, reflection, and research.
- <u>CCSS.ELA-LITERACY.CCRA.SL.2</u>: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
- <u>Analyzing and Interpreting Data</u>: Identify significant features and patterns in data; understand that modern technology makes the collection of large data sets much easier, providing secondary sources for analysis; consider limitations of data analysis; analyze and interpret data to determine similarities and differences in findings.



MODULE KEY TERMS

Ballot: A process of voting, in writing and typically in secret.

Data: A collection of facts and statistics that has been gathered together to reference, analyze, or draw conclusions about a topic.

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Data Engineer: A professional whose primary job responsibilities involve preparing data for analytical or operational uses.

Data Scientist: A person employed to analyze and interpret complex digital data, such as the usage statistics of a website or financial data. They can assist a business in its decision-making, but they can also work in government or academics.

GPS: A radio navigation system that allows land, sea, and airborne users to determine their exact location, velocity, and time 24 hours a day, in all weather conditions, anywhere in the world. (Short for "Global Positioning System")

Meteorologist: An expert in or student of the science dealing with the atmosphere and its phenomena, including weather and climate.

Scantron: A device used to scan prepared forms used for multiple-choice and true-or-false testing.

Sports Statistician: A professional who analyzes data pertaining to sporting events, usually for major sports such as baseball, football or basketball.

Wearables: A category of electronic devices that can be worn as accessories, embedded in clothing, implanted in the user's body, or even tattooed on the skin.