K-5 Resources for

Data Literacy and Data Science

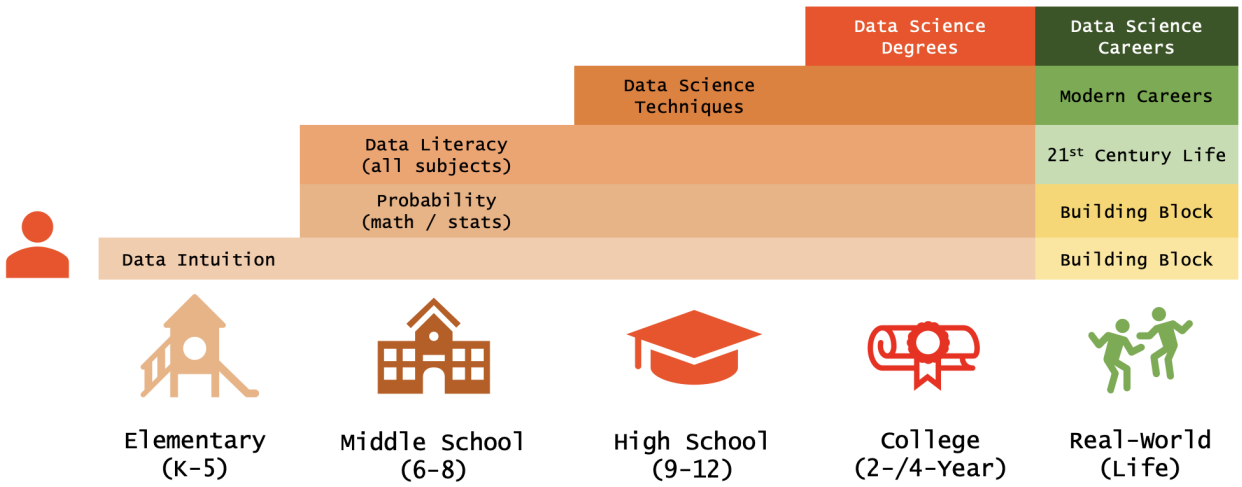
A Resource Guide for Education Leaders

Note: If you have a resource that you'd like to add please contact info@datascience4everyone.org.

Definition of Data Literacy

Data literacy refers to the ability to read, understand, interpret, and communicate data or claims derived from data. In the context of K-12 education, data literacy involves teaching students how to iteratively question data and representations of data critically, including understanding their origins, limitations and potential biases. It also involves teaching students how to effectively communicate data effectively through visualizations and other means.

A Progression of Learning K-20



K-5 Learning Progressions

Note: Below is a sampling of learning progressions for K-5. Please visit https://datasciencelearning.org/ for the comprehensive listing of K-12 Data Literacy and Data Science Learning Progressions, organized by strand and grade band.

Grade Band	Elementary Data Literacy Learning Progressions
K-2	**K-2.A.1.2a** Recognize the importance of asking questions about how data were collected.
	K-2.A.1.3a Observe that data can have many different answers or results.
3-5	**3-5.A.1.2a** Ask questions about how data are collected or considered.
	3-5.A.1.2b Understand that data is generated by people who make decisions about what and how to measure.

Curriculum and Lesson Resources

Code.org: Code.org provides a curriculum catalog to help you find the perfect fit for your learning environment that includes courses, tutorials, and more designed for all ages and experience levels. The link provided leads to a filtered list of data and digital learning resources for K-5.

- K-5 Curriculum Catalog

Crash Course Data Literacy Study Hall: Crash Course Data Literacy is a 15-video series that explores data literacy fundamentals. By the end of the course, you will be able to define foundational statistical concepts, explain methods for visualizing data, locate datasets, analyze data, and recognize ethical issues connected to data interpretation.

- Crash Course in Data Literacy Study Hall

Data4Kids: To assist educators in supporting students' data science learning, we created five "Data Stories" that educators can freely use and modify for their own uses and student experiences. Each story is a starter kit for educators at different levels–grades 3-5 (Band 1); grades 6-8 (Band 2); or grades 9-12 (Band 3).

- Project Homepage: Virtually Teaching Kids about Data Science
- Data Stories

Data Education in Schools: The **Data Education in Schools Project** is part of the Edinburgh and South East Scotland City Region Deal Data Skills Programme, funded by the Scottish and UK Government. The Data Skills Programme brings together industry, universities, colleges, schools and others to provide routes into data or digital careers. FInd out more about our Project, our aims and our vision.

- Data Education Resources
- Teach Data Literacy: A Guide for Primary Teachers

Phet Interactive Simulations: the PhET Interactive Simulations project at the University of Colorado Boulder creates free interactive math and science simulations. PhET sims are based on extensive education research and engage students through an intuitive, game-like environment where students learn through exploration and discovery.

- K-5 Simulations
    - Number-Play
    - Area Model Introduction

Slow Reveal Graph: The Slow Reveal Graph (#slowrevealgraph) is an instructional routine that promotes sensemaking about data. This highly engaging routine uses scaffolded visuals and discourse to help students make sense of data. As more and more of the graph is revealed, students refine their interpretation and construct meaning, often in surprising ways. This routine increases access for students without sacrificing rigor or engagement.

- Slow Reveal Graphs for the Elementary Classroom

Tableau Data Kids: We are here to help parents and educators discover new approaches to teaching young learners about data. Check out our engaging activities, fun visualizations, and tips for inspiring kids to explore the data that's around them every day.

- Tableau Data Kids

Tuva Labs: The **Tuva Data, Graphing, and Statistical Tools** (or the Tuva Tools) enable students to easily explore, manipulate, and analyze data. Students drag and drop attributes into the plotting area to create a variety of graphs, including dot and scatter plots, line graphs, pie graphs, bar charts, histograms, box plots, and maps. They can visualize data in different ways to look for patterns and analyze data using mathematical modeling and statistics features.

- Tuva Jr for 3-5

Youcubed: Data Science K-10 Big Ideas are descriptions of the most important content in data science through the grades to help focus attention on ways to increase data literacy. Big ideas are those that are central to the discipline of data science, and that link understandings into a coherent whole.

- K
- 1-2
- 3-5

Data Science 4 Everyone: While K-12 data education is a relatively nascent field, there are already a variety of resources for teachers who want to implement data science in the classroom today. Here, schools and teachers can gather resources for implementing data science education into their classrooms ranging from year-long courses to short activities.

Don't see what you're looking for quite yet? Our coalition partners are actively working to create more content, including lesson plans, interactive textbooks, and tools for finding ready-to-use datasets. Be sure to check back often and follow us on social media for the latest updates.

Teaching Data Science

- K-5 Data Literacy Implementation Guide
- Teaching Data Science

  Note: To see the list of K-5 resources you will need to filter by grade level.

Software, Apps and Online Tools

- Preschool Data Toolbox: Collect data, create graphs, and analyze your findings in the *Preschool Data Toolbox* app! Choose one of six investigations with preschool-appropriate research questions, or create your own investigations and turn them into a data story.
- DataFly: SAS DataFly is a free resource that offers a fun and engaging way to explore data with students in real time, whether they're together in person or meeting virtually.

Articles/Webinars

- Transforming Curriculum and Building Capacity in K–12 Data Science Education
- Data Science for Everyone Starts in Kindergarten: Strategies and Initiatives From the American Statistical Association
- Learning data science in elementary school mathematics: a comparative curriculum analysis
- Webinar recording - Data Literacy for Young Learners: Demystifying K-5 Data Science

Books

- Florence the Data Scientist and Her Magical Bookmobile