Mathematics in Vermont

The newsletter for Vermont's Mathematics Educators and supporters

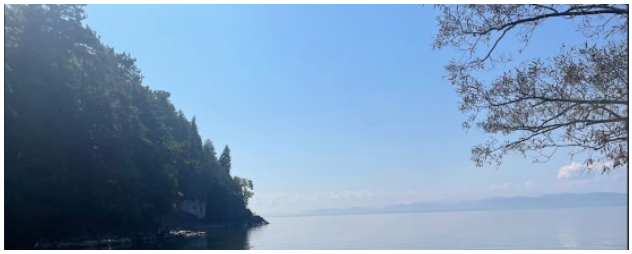
VERMONT AGENCY OF EDUCATION

October 2024

In this issue:

The ways you can access this newsletter:

- Request subscription by emailing Rachael Ledwidge, your name will be added to a listserv;
- The AOE *Weekly Field Memo* when issues are published; and
- AOE Website: The Mathematics Content



Introductions

If you're reading this newsletter, my guess is we've "met" before. However, in case I've missed you, my name is Rachael Ledwidge and I am your new Math Content Specialist here at the AOE. I am a teacher, learner, and mom living in beautiful Vermont. As a former math content elementary teacher, my experience is primarily in grades K-6, but I am passionate about all things math related. I am so excited to get to know you all from across our state and begin to learn from you, what is working and what we can help with when it comes to Proficiency-Based learning, specifically related to math.

Data Literacy – A Very Brief Overview

As educators, we are constantly using qualitative and quantitative data to inform our decisions. Our industry is not unique in this way. In 2021, an estimated 79 zettabytes of data was produced and stored globally, and projections suggest global data amounts could reach **175 zettabytes** by 2025 (World Economic Forum, 2021). (For reference, 1 zettabyte equal 1 billion terabytes. My backup external hard drive is 1 terabyte). Data literacy is an essential skill in today's world, empowering individuals to critically analyze and interpret the vast amounts of information they encounter daily, regardless of their chosen profession. Data Camp describes four key competencies that contribute to data literacy:

- Read Data: The ability to interpret data in various forms, such as graphs, charts, or reports. *For example, being able to read a company's annual financial report and understand its performance*.
- Work with Data: The collection and production of data, which can mean setting up an experiment to collect data or creating a survey to gather insights.
- Communicate with Data: The ability to use data to tell a story or make a case.
- Reason with Data: Navigating ambiguity with data and leveraging data

As industries increasingly rely on data-driven decision-making, equipping students with data literacy prepares them for a competitive job market, where employers seek candidates who can make meaning from large sets of data. The Data Literacy Project emphasizes that "data literacy is critical for the future workforce," underscoring its importance in various fields. This skill enhances critical thinking and problem-solving abilities, allowing for greater collaboration and connection among cross-functional teams. As noted in the PISA 2022 Mathematics Framework, the ability to "interpret and reason with data" is vital for students to thrive in a modern economy. However, it isn't just potential employment opportunities that make data literacy a crucial skill for today's students.

Not understanding big data presents substantial risks for K-12 students. As outlined in her paper Critical data literacy: Creating a more just world with data, Josephine Louie emphasizes the urgent need for data literacy in education. The report warns that "students must be equipped to understand data in order to participate effectively in a data-rich society." Without this knowledge, students are likely to become "vulnerable to manipulation" and misinterpretation of information, hindering their ability to engage with pressing social and scientific issues critically. Additionally, it addresses data privacy and "includes ethical consideration of whether and how to collect and use data, to avoid harming the dignity and privacy of others," (Baumer, 2022; NASEM, 2018 as cited in Louie, 2022). The report highlights that a lack of data literacy may result in inequities, as those who cannot navigate data effectively may "face barriers in education and career opportunities." Ultimately, failing to cultivate data understanding leaves students ill-prepared for the realities of a world "driven by data".

Data and Statistical Reasoning: Resources for the Classroom

Data literacy can be embedded across topics and content areas. Topics of study range from collecting and organizing data with simple graphs or tables in the earliest elementary grades to finding basic statistics like median, mean, and range in later elementary grades. In an early elementary level class, students might be working on counting and cardinality in Kindergarten, and complete this activity on counting items around the classroom and displaying their data in a table. Then, they might analyze their collected data and discuss how it might be useful to school staff. (For instance, school custodians might want to know how many chairs are in a classroom, compared to how many students to make sure everyone has a chair).

In middle school, students analyze distributions and introduce concepts in probability. Since it is an election year, students in middle school might use historical voting trend data to identify trends by race, year, and region. They might then use their interpretations of the data to predict the current year's election.

By high school, students might be interpreting more complex data sets in a variety of areas and courses, as well as potentially using more sophisticated statistical analysis to interpret differences in shape, center, and spread of the different data sets. Using the open-source CODAP software, high school students might display, analyze, and interpret real-world data that they collect or use one of the sample data sets of interest in the CODAP resources. High school students might also tackle current societal issues by examining real-world data collected by the U.S. Census Bureau, as in this investigation of Differences in Earnings Across Sex and Educational Attainment: Comparing Box Plots, and address HSS.ID.A, summarizing and interpreting the data.

Author: Rachael Ledwidge
Mathematics Content Specialist
Proficiency-Based Learning Team
Vermont Agency of Education
1 National Life Drive, Davis 5, Montpelier, VT 05620-2501
rachael.ledwidge@vermont.gov

Here are some resources that can help you get started with lesson planning ideas for data and statistics. Most are categorized by grade band level.

- TedEd, Data Analysis and Probability
- Statistics Education Web (STEW), American Statistical Association
- US Census Bureau Statistics in Schools
- Youcubed Data and Statistics
- Critical data literacy: Creating a more just world with data, (The appendix of this report has a table of interventions and resources to support critical data literacy)

Since we hope to prepare students for the inevitable need for cross-functional teams, we must educate them in data literacy in an interdisciplinary environment. I am so intrigued by data literacy education and would love to hear from those of you who might already be passionate about its integration in your courses and lessons.

Events, Announcements, and Resources

Upcoming AOE-Sponsored Event with All Learners Network:

All Learners Network Virtual Conference: Inclusion and Differentiation in the Math Classroom Grades PK-12 (Nov. 19, December 3 - Elementary focus, December 16 - Secondary focus) Register for All Learners Network Virtual Conference.

Fractions for All Learners 6 Hour VIRTUAL Workshop (Mon, Nov. 4, 2024, 8:30 AM – 3:30 PM EST) Register for Fractions for All Learners 6 hour VIRTUAL Workshop. Please note: this workshop is full but please contact Ashley Marlow at ashleymarlow@alllearnersnetwork.com to find out more and join the wait list.

VCTM Spring Conference Announcement
The Vermont Council of Teachers of Mathematics (VCTM) has announced its 2025 VCTM conference on March 21st, at St. Michael's College in Colchester (8:30 a.m.-3:30 p.m.). The theme this year is Powerful Mathematics. They have a call out for proposals, if you are interested in presenting, please visit Vermont Council of Teachers of Mathematics website to find out more and submit a proposal.

Directions for Submissions

If you would like to submit an article, announcement, event, or resource for a future newsletter, please email information to rachael.ledwidge@vermont.gov. This newsletter will be published four times throughout the school year. Time-sensitive materials will be prioritized, be sure to check if the dates of publication will delay the sharing of information.

Subscribe or unsubscribe to the Mathematics in Vermont e-bulletin. You can also write to rachael.ledwidge@vermont.gov or call (802) 828-0054.

Connect with AOE on Twitter, Facebook, or the Web.