m DEPARTMENT OF EDUCATION

Designing Student Inquiry Activities using selected Statewide Data Sources

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This article can be read from top to bottom but it does not have to be read that way. To help find your best entry point for this research-based student activity and available data some links to different parts of the article follow:

A multidisciplinary data project for students based on research and supports equitable practices and student voices.

Middle and High School Academic Standards Supporting Student Data Analysis Project in ELA, math, science and social studies.
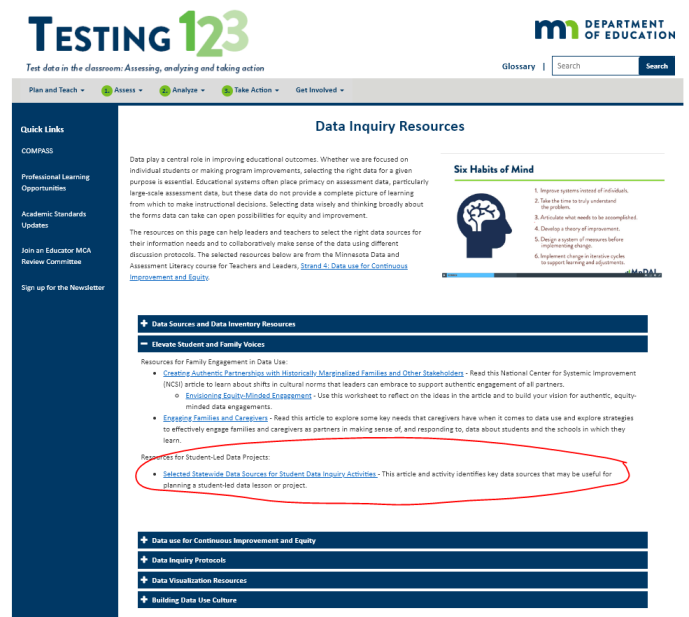
Selected Data Sources and their relationship to students, families, teachers, and school and district leaders and administrators.

Resources and references from the article.

This article is also found on Testing 1, 2, 3 > 3. Take Action > Data Inquiry Resources > +Elevate Student and Family Voices > Selected Statewide Data Sources for Student Data Inquiry Activities.

Statewide data can be useful for guiding staff professional learning days, as highlighted in other resources on Testing 1, 2, 3. Additionally, it can be a resource for students to get involved in understanding and identifying systemic barriers and school improvement needs in their own school to make recommendations for improving their learning environment. This resource provides some background and ideas for a student data inquiry project, along with some recommended data sources to use.

Educational Assessment, Accountability & Equity: a multidisciplinary data project for students

In the summer of 2022, the National Urban League (NUL) and UnidosUS (UUS) held a series of roundtable discussions about the future of assessment and school accountability systems from a civil rights perspective. As a result of these discussions, an interim report was released summarizing four Emerging Areas of Agreement:

- **Pillar I:** Our education system(s) should consistently implement broadened definitions of success

- **Pillar II:** Our education indicators and assessments, no matter the setting, should be grounded in continuous improvement and accountability.

- **Pillar III:** Our systems of support should be strengthened to enhance shared accountability that centers equity and promotes transparency and continuous, targeted improvement.

- **Pillar IV:** Historically marginalized communities, families, and youth should have a greater voice and ownership in assessment and accountability.

Their ideas around data use, availability, and visualization might prove interesting to explore at the district or school-level in light of available public datasets that can be explored by students and educators.

The report proposes discussion questions for each pillar. One proposed question under Pillar IV is "How do we ensure that youth voice is uplifted in these discussions without tokenizing or fetishizing young people?" To help think about this question, Bo Gibson's 2021 article "Bringing Relevance to the Math Classroom by using Real-World Data" provides an interesting idea when coupled with the suggestions around data from NUL and UUS around student voice. They both point towards having students use real-life data, even their own data, to improve student learning of content information.

Gibson's proposed project is further supported by Pietryka & Glazier (2022), who claim this type of project improves both student achievement and their enjoyment in the learning process. Additionally, they found that 85% of students said the data projects made them feel like the teachers were more invested in their learning, and 63% of the students reported the projects increased their interest in the class overall. While Gibson stops at the math classroom, some in the engineering field focus in on teaching core concepts through multidisciplinary projects (ESSS, 2022) to improve learning. They encourage multidisciplinary classroom projects to better prepare future engineers many engineering programs even at introductory levels. As such these, these types of projects, regardless of complexity, show how different content (such as, math, science, social studies and ELA) interact to build stronger connections and understanding for our students.

Considering the amount of support for these types of projects due to their ability to build equity and content knowledge while providing real-life experience and space to elevate student voice coupled with a large amount of public data available, educators would be remiss to not do a project of this type. On top of this, schools and districts, while (sometimes) having a Research and Evaluation department, may appreciate the outcomes produced by their students about their data. As such, consider having students process, interpret, and present some research questions that can be answered with one or more of the publicly data sets as part of classroom instruction of grade-level benchmarks. According to Gibson (2021), to do a real-world data project some helpful tools might be needed, such as Desmos and Google Sheets, and well vetted data sets (see the list of data sources referenced earlier).

Before planning a project for students, educators will need to:

1. Find data

2. Clean and organize the data

3. Visualize the data

4. Draw insight from the data

Importantly, to fully embrace and follow through with efficacy, more than just math standards will be needed. The following Minnesota K–12 Academic Standards reflect some benchmarks from multiple content areas that could be reinforced alongside a data analysis student project. These selected standards identify the needed skills and concepts to fully realize the benefits of a student driven data analysis project.

Table 1: Middle and High School Academic Standards Supporting Student Data Analysis in ELA, math, science and social studies.

Content Area*	Middle School Connections	High School Connections
English Language Arts (ELA) [2020 Minnesota K-12 Academic Standards in English Language Arts](#)	**8.1.5.3** Compare and contrast the ideas/information conveyed through illustrations, graphics and other audiovisual elements in a wide variety of texts, based on accuracy, perspective, credibility and relevance. **8.2.7.1** Formulate self-generated questions that guide inquiry, generating additional questions for further research and investigation.	**11.2.7.2** Plan and conduct independent research from a wide variety of sources including academic journals and peer-reviewed sources, demonstrating understanding of subject of investigation, and share findings in writing. **11.3.3.1** Select and deliver most applicable style of presentation to communicate knowledge and ideas appropriate to task, purpose, audience and discipline, ensuring that audience can follow the line of reasoning in presentation of knowledge of ideas, following ethical and safe communication practices.
Math [2007 Minnesota K-12 Academic Standards in Mathematics](#)	**6.4.1.3** Perform experiments for situations in which the probabilities are known, and compare the resulting relative frequencies with the known probabilities; know that there may be differences. **7.4.2.1** Use reasoning with proportions to display and interpret data in circle graphs (pie charts) and histograms. Choose the appropriate data display and know how to create the display using a spreadsheet or other graphing technology. **8.4.1.1** Collect, display and interpret data using scatterplots. Use the shape of the scatterplot to informally estimate a line	**9.4.1.3** Use scatterplots to analyze patterns and describe relationships between two variables. Using technology, determine regression lines (line of best fit) and correlation coefficients; use regression lines to make predictions and correlation coefficients to assess the reliability of those predictions. **9.4.2.1** Evaluate reports based on data published in the media by identifying the source of the data, the design of the study, and the way the data are analyzed and displayed. Show how graphs and data can be distorted to support different points of view. Know how to use spreadsheet tables

Content Area*	Middle School Connections	High School Connections
	of best fit and determine an equation for the line. Use appropriate titles, labels and units. Know how to use graphing technology to display scatterplots and corresponding lines of best fit. **8.4.1.3** Assess the reasonableness of predictions using scatterplots by interpreting them in the original context.	and graphs or graphing technology to recognize and analyze distortions in data displays. **9.4.2.2** Identify and explain misleading uses of data; recognize when arguments based on data confuse correlation and causation. **9.4.2.3** Design simple experiments and explain the impact of sampling methods, bias and the phrasing of questions asked during data collection.
Science 2019 Minnesota K-12 Academic Standards in Science	The data sets contained in these reports would not connect with science content, but these Science and Engineering Practices could support the process of collaborative data analysis in other content areas. 1. Asking questions (for science) and defining problems (for engineering) 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) and designing solutions (for engineering) 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	
Social Studies 2011 Minnesota K-12 Academic Standards in Social Studies	**6.1.1.1.2** Use graphic data to analyze information about a public issue in state or local government. For example: Graphic data—charts, graphs, maps, surveys, political cartoons.	**9.1.1.1.4** Examine a public policy issue by defining the problem, developing alternative courses of action, evaluating the consequences of each alternative, selecting a course of action and designing a plan to implement the action and resolve the problem.

Selected Statewide Data Reports and Uses

This section identifies recommended data sources to use when designing a data inquiry activity for students.

Statewide Assessment Reports

After students complete the statewide assessments each spring, families receive an Individual Student Report (ISR). This report shows the results for each assessment their child took. Student reports are typically provided to districts in late August. State law requires all parents/guardians to be given a report of student results on the MCA/MTAS assessments. However, MCA and MTAS results specifically are intended to be used at the summarized level (for example, student

group, grade, school, or district) to examine progress toward equitable learning outcomes. Final results are provided in summarized reports organized at the school, district, county, and state levels. Last spring's summarized statewide assessment results were publicly released on Aug. 24.

When reviewing statewide assessment results, it is important to remember the following:

- Results are one piece of a district's balanced assessment system. Information from each system level (classroom, district, state) works together to guide teaching and learning of the grade-level standards.

- Results represent a snapshot of student learning of the standards. They are broader in scope than information produced in the classroom, where the learning takes place.

- Results should be used at the summarized level (across student groups, grades, school buildings) to help identify underlying inequities and highlight promising practices.

- Results should always be used alongside additional evidence of learning when making decisions.

To support the recommendation in the fourth bullet above, a short list of additional educational reports was compiled below for students, families, teachers and leaders according to their intended use. These might be useful when planning professional development days and for communicating about results. Additionally, next to each data set is a selected group of Minnesota K–12 Academic standards that can be used to design lessons for students, including examples of how they might design their own action research project or data inquiry activity. Teachers might consider using these data reports and recommendations when planning lessons aligned to these standards. For more detailed information on what is included in each assessment report, how to use and access them, visit the Use Statewide Assessment Results page.

Recommended Data Sources

The following data sets may be of interest for students, families, teachers, and school or district administrators to dig into. Click on the name of the data set to learn more about how it relates to each audience group:

- Minnesota Report Card
- MCA Benchmark Report
- Minnesota Student Survey (MSS)
- Minnesota Common Course Catalogue (MCCC)
- Ancestry Ethnic Origin (AEO)
- Ed-Fi

Minnesota Report Card

An interactive tool that allows users to easily access district and school level test results, demographic information, graduation rates, proficiency trends across the last five years, and more.

Student: This is not just one report—it's a whole series of reports. There are reports that include your perceptions of school safety provided on by students on the Minnesota Student Survey as well as data around enrollment, staffing, financial, assessment and graduation. Other important data about your experiences is reported on other parts of the MDE Data Center.

Family: This is not just one report—it's a whole series of reports including student perceptions of school safety, enrollment, staffing, financial, assessment and graduation data. The Report Card is meant to be helpful for you to learn about your child's current or future school(s) and district(s).

Teacher: Educators may find this tool useful to easily compare data across schools or grade levels by viewing side by side charts and tables. The scope can be further narrowed by selecting from a variety of criteria to filter the data, such as gender or race/ethnicity.

- Assessment results from the MCA/MTAS can be found by navigating to the "How Well are Students Doing," > "Are students mastering standards?" tabs of the menu bar.

- Assessment results from the ACCESS/Alternate ACCESS can be found by navigating to the "How Well are Students Doing," > "Are English learners progressing?" tabs of the menu bar.

School/District Leaders/Admins: The Report Card is a great place to learn about other schools and districts, but if you really want to dig into your local data, you can use the information in Secure Reports.
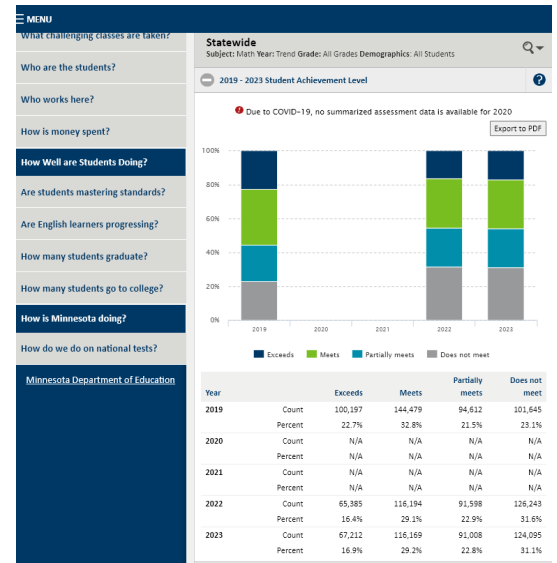
MCA Benchmark Report
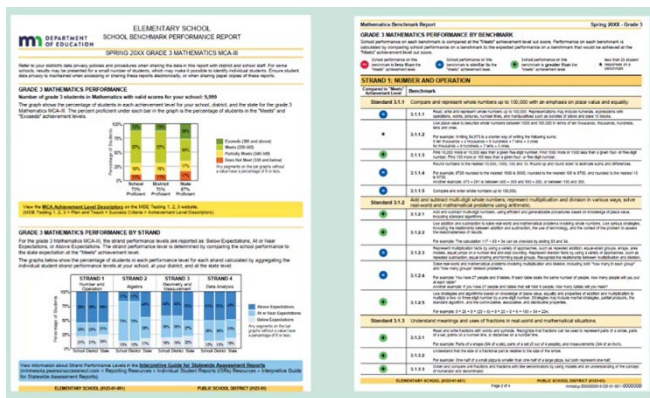
The Benchmark Reports are a tool that educators can use to gain additional details about student performance on specific benchmarks or strands/substrands within the standards from that year's MCA. Benchmark Reports are produced for the MCA only at the district and school level. Student results are aggregated by benchmark from the standards for each subject tested, to summarize student performance in relation to more specific topics within the grade-level standards. More information about these reports can be found on the Additional Reporting Resources page of PearsonAccess Next.

Note: Benchmark Reports are secure and accessible to the District Assessment Coordinator, who can provide them to district and school staff within the district.

Teacher: Educators may want to look at this report with Achievement Level Descriptors (ALD) and Benchmark ALDs to gain more insight into which strands, substrands, and benchmarks students demonstrated proficiency or progress.

🏫 **School/District Leaders/Admins:** Administrators may find it helpful to have conversations about this report and compare how students have performed on classroom assessments, measuring learning of similar benchmarks, or where and how a specific benchmark is taught in a course's scope and sequence. There is a [video] and an [interpretive guide] to quickly help leaders better understand this data set.

[Minnesota Student Survey (MSS)]

The MSS is a triennial survey that began in 1989. The survey is an anonymous statewide school-based survey conducted to gain insights into the world of students and their experiences. It opens every 3 years for any school in MN. The next MSS is in 2025 for students in grades five, eight, nine and 11.

🎒 **Student:** In the MSS interactive reports, students can look at questions by district and demographics to find out what other students are saying about factors influencing their learning environment and at home. Student perspective is valued in the creation of survey items. If there's something wrong or missing in the survey, please write to mde.studentsurvey@state.mn.us.

🏠 **Family:** The MSS is the primary source of comprehensive data on youth at the state, county and local level in Minnesota and is the only consistent source of statewide data on the health and well-being of youth from smaller population groups, such as racial or ethnic groups. It provides valuable information about issues vital to the health, safety and academic success of young people. The survey results have proven to be a dynamic vehicle in bringing the youth voice into decisions made by youth programs, schools, communities and state agencies Families may find this information helpful in understanding factors that may be influencing their child's learning experience or that of their peers. [Snapshots on Minnesota Youth: 2022 Minnesota Student Survey Whole Child Report] focuses on information about students in MN that recognizes how schools and others can work together to ensure each student is healthy, safe, engaged, supported and challenged.

🍎 **Teacher:** Teachers may find the information useful as it provides valuable information about issues vital to the health, safety and academic success of young people. The survey results have proven to be a dynamic vehicle in bringing the youth voice into decisions made by youth programs, schools, and communities.

🏫 **School/District Leaders/Admins:** School districts, local public health agencies and community nonprofits use local data to hold community forums and stimulate discussion about the needs of youth, to plan programs and to obtain grant funding. State agencies use the results to monitor trends, to assess the extent of disparities among population groups, to obtain federal and state funding and to assist local communities and schools.

[Minnesota Common Course Catalogue (MCCC)]

MCCC Number	MCCC Classification title
1997	English Language and Literature--Independent Study
2997	Mathematics--Independent Study
3997	Life and Physical Science--Independent Study
4997	Social Sciences and History--Independent Study
5048	Dance--Independent Study
5098	Theater--Independent Study
5148	Music--Independent Study
5198	Visual Arts--Independent Study
5297	Media Arts—Independent Study
6997	World Language and Literature--Independent Study
7997	Religious Education and Theology--Independent Study
8048	Physical Education--Independent Study
8098	Health Education--Independent Study
8153	Drivers' Education--Independent Study

The Minnesota Common Course Catalogue (MCCC) is a course classification and data collection system intended to provide uniform information about courses that are taught by Minnesota teachers and completed by Minnesota students. The direct admissions program is for soon-to-be high school graduates to be accepted into a college or university before having to submit a college application. The application process is simplified and saves the student from the uncertainties and anxieties associated with the traditional admission process. *Note: The [district IOwA](#) grants access through Education Identity and Access Management (EDIAM) to MCCC with access type user. MCCC access requires an EDIAM account for each user*

🎒 **Student:** The data is being used to help with the direct admissions process with colleges in MN.

🏠 **Family:** This is being used to help with the direct admissions process with colleges in MN. Course data will also be used as well-rounded education information for federal accountability.

🍎 **Teacher:** This data is a direct link of course content, the teacher of the content, and the student taking that content.

🏫 **School/District Leaders/Admins:** The data usage is expanding greatly. Getting good information collected for reporting is imperative so that districts, schools and students are represented correctly.

Ancestry Ethnic Origin via Ed-Fi

This report reflects student data by detailing ancestry/ethnic origins (AEO). This information is collected to better understand how MN students choose to describe their racial and ethnic identities. The report also clarifies how the state definition of American Indian compares to the federal definition. Reported information is shared in three types of state-level reports: enrollment, assessment and graduation.

🎒 **Student:** This information is provided by you or your family to your local school/district. You can choose one or more ways to identify yourself. You can also choose not to provide the information. According to this report, you can find out how many students in the state share a racial or ethnic identity with you.

🏠 **Family:** This information is provided by you or your student to your local school/district. You can choose one or more ways to identify your student. You can also choose not to provide the information. Designation Forms are available in many languages on the [Ed-Fi Documentation](#) webpage.

Counting All Students Report

Download   PDF

This report reflects student data by detailed ancestry/ethnic origins (AEO). In 2019, only five districts reported AEO data. More districts have submitted data each year since then. View the list of districts that submitted each year. For more information please, see the User Guide.

What does Ancestry Collection mean?

- **Match to Data Year:** This option only displays student data that was submitted during the year selected. For example, results for 2019 only show data for students enrolled in 2019 who had AEO data reported during 2019.
- **Expand to All Following Collection Years:** This option displays student data that was submitted during the year selected, as well as future years. For example, results for 2019 show data for students enrolled in 2019 and who had AEO data reported during 2019 or any future year.

Due to COVID-19, 2020 assessment data is not available.

Year: 2022
Ancestry Collection: Match to Data Year
Ethnicity or Race: American Indian or Alaska Native
Report: Enrollment   [Run Report]

🍎 **Teacher:** This information is collected to better understand how Minnesota students choose to describe their racial and ethnic identities. Students/families can choose to describe their racial and ethnic identities in more detail than the federally required race and ethnicity categories. You can consider this data when looking at your classroom, curriculum materials, and school setting. Which student

identities are reflected? Which are absent? How might you affirm the multiple ways students self-identify in the areas of race and ethnicity?

🏫 **School/District Leaders/Admins:** This information is self-reported by students/families. Districts are required to submit reported information. Families can choose not to report this information. Leaders may find it beneficial to examine assessment proficiency and graduation rates within and across racial and ethnicity categories. What disparities exist for students in Minnesota? How can we plan system level improvements to meet the needs of all Minnesota students?

Digital Equity via Ed-Fi

Collecting data on Digital Equity is required for all Minnesota K–12 districts and charter schools. The data provides information locally, regionally, and statewide about the levels of student access to digital devices and the Internet in their homes to support student learning activities.
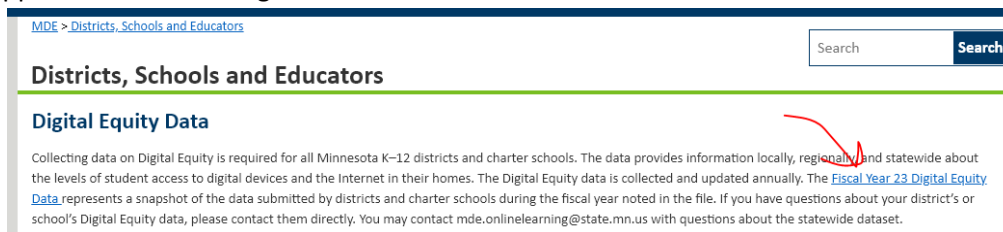
🎒 **Student: Questions to ask might be:**

- How might differences in access to devices and the internet affect your day-to-day learning activities?
- What conditions or circumstances might affect your level of access? List a few ideas and check the data set to see if you can find information.
- Is your digital access information accurate?
- Learn about internet access (video): English Hmong Karen Nepali Oromo Somali Spanish

🏠 **Family:** Families are asked to provide this information or update existing information at least once per year. Make sure that you take the time to provide accurate information. Check the data set to see if your district or charter school are reporting information. Learn about internet access (video): English Hmong Karen Nepali Oromo Somali Spanish.

🍎 **Teacher:** Teachers should consider how their students may be impacted differently by the tools and resources they have at their disposal. Students who do not have access to sufficient internet and devices may be at a disadvantage when it comes to homework completion, conducting research, or communicating with teachers or **peers.**

🏫 **School/District Leaders/Admins:** This information can provide district and school leaders with critical information about which students lack sufficient online resources to support their learning. Less than half of districts and charter schools reported Digital Equity information covering just over 15% of all enrolled students.

Resources

Engineering Simulation and Scientific Software (2022) How to approach teaching multidisciplinary projects using classroom examples https://www.esss.co/en/blog/teaching-multidisciplinary-projects/

Gibson, B. (2021) Bringing Relevance to the Math Classroom by Using Real-World Data. *Keep Indiana Learning* https://keepindianalearning.org/bringing-relevance-math-classroom-using-real-world-data/

National Urban League; Unidos US; Education Assessment, Accountability & Equity (2022) An Interim Report. https://nul.org/sites/default/files/2022-09/Emerging%20Areas%20of%20Agreement%209.22.22.pdf

Pietryka MT, Glazier RA. Learning through Collaborative Data Projects: Engaging Students and Building Rapport. *Education Sciences*. 2022; 12(12):897. https://doi.org/10.3390/educsci12120897

If there are other questions or clarifications please reach out to the Standards, Instruction, and Assessment division at mde.testing@state.mn.us or to the Data Analytics team at mde.analytics@state.mn.us.

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