Preparing All Students for Math 1 With Comprehensive Mathematics Reform

House Select Committee on Education Reform
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Deputy State Superintendent

Current Context for Math

The culture/climate around Math

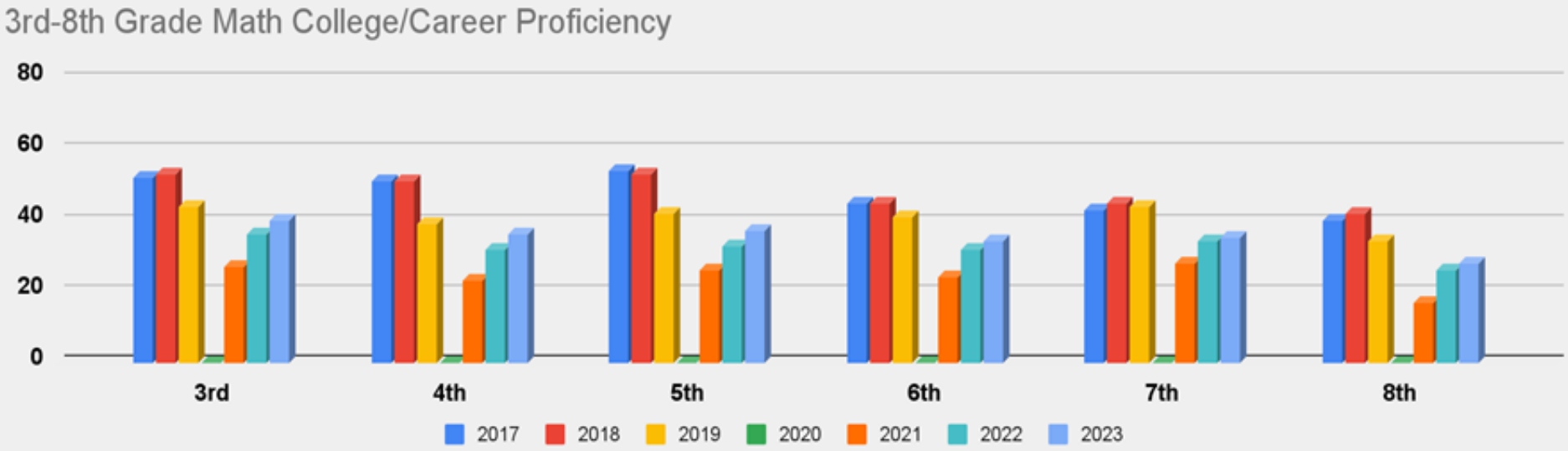
- “I’m not a math person”
- “It’s okay, math is hard”
- “When am I going to use this?” - Math as a study of Math
- Current approach to Math can be traced back to 1894 with Calculus as the end goal.

The culture/climate around Math

- It is past time to change the narrative to:

"Math is for everyone"
and
"All kids are math kids"

Recent Math Data Trends



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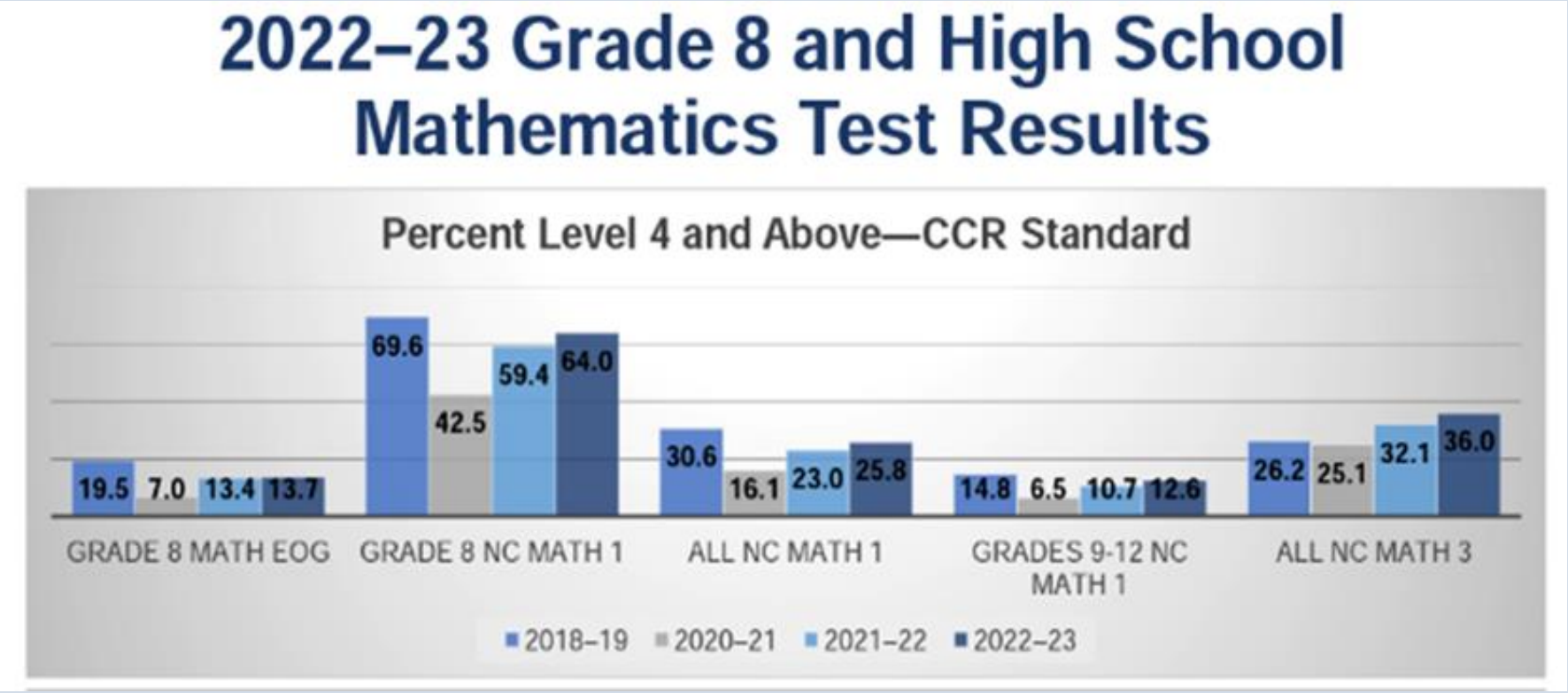
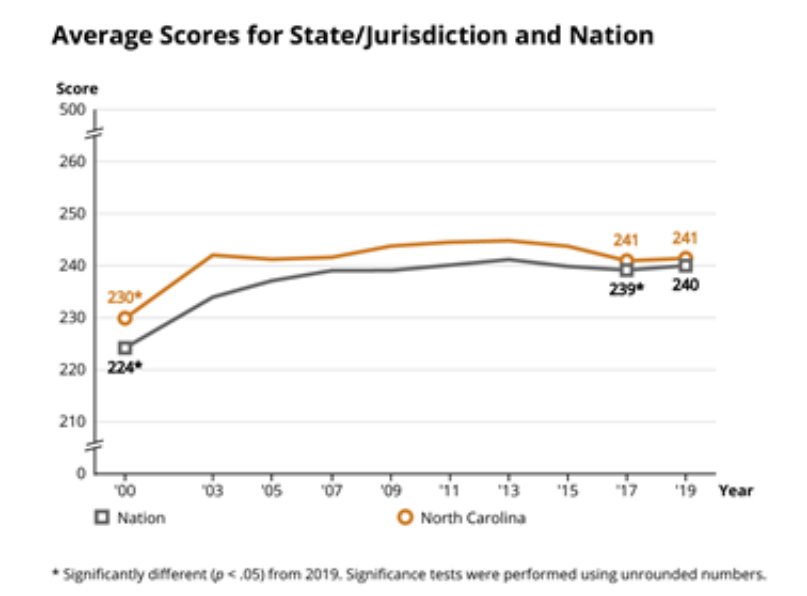


Recent Math Data Trends

NAEP
2019 Grade 4 Mathematics

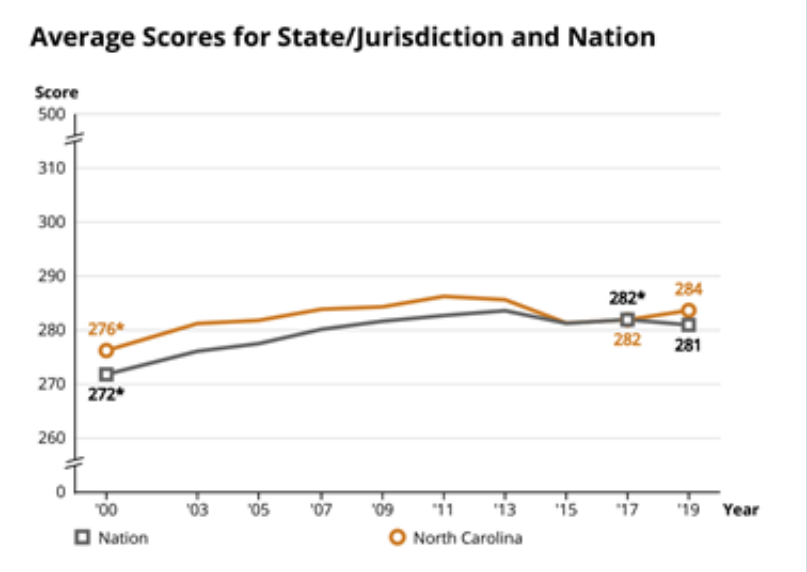


Score Gaps for Student Groups

- In 2019, Black students had an average score that was 25 points lower than that for White students. This performance gap was not significantly different from that in 2000 (23 points).
- In 2019, Hispanic students had an average score that was 16 points lower than that for White students. This performance gap was not significantly different from that in 2000 (18 points).
- In 2019, male students in North Carolina had an average score that was not significantly different from that for female students.
- In 2019, students who were eligible for the National School Lunch Program (NSLP), had an average score that was 21 points lower than that for students who were not eligible. This performance gap was not significantly different from that in 2000 (20 points).

Recent Math Data Trends

NAEP
2019 Grade 8 Mathematics



Score Gaps for Student Groups

- In 2019, Black students had an average score that was 31 points lower than that for White students. This performance gap was not significantly different from that in 2000 (35 points).
- In 2019, Hispanic students had an average score that was 22 points lower than that for White students. Data are not reported for Hispanic students in 2000, because reporting standards were not met.
- In 2019, male students in North Carolina had an average score that was lower than that for female students by 5 points. This performance gap was wider than that in 2000 (2 points).
- In 2019, students who were eligible for the National School Lunch Program (NSLP), had an average score that was 27 points lower than that for students who were not eligible. This performance gap was not significantly different from that in 2000 (28 points).

Advanced Courses in Mathematics Legislation

SL 2019-120

Goal: To broaden access and successful participation in advanced courses. Regardless of student background and demographic factors, those who demonstrate readiness are guaranteed access to advanced coursework in mathematics.

Advanced Courses in Mathematics Legislation

SL 2019-120

2023 Report Highlights (2022-2023 school year):

- 58,186 students (grades 6-12) were eligible for placement in advanced math courses.
  - Increase of 9,032 exam scores over the prior year.
- Of those eligible students
  - 94% (54,580) are currently placed in an advanced math course
  - 6% (3,606) not currently placed in an advanced math course.

Advanced Courses in Mathematics Legislation

SL 2019-120

2023 Report Highlights (2022-2023 school year):

- Eligible 8th grade students data indicate that the overall number and percentage of students placed in advanced mathematics courses is again >95%, with a 1% increase over the prior reporting period.
- Data is true across all race/ethnic groups

Advanced Courses in Mathematics Legislation

SL 2019-120

Next Steps

- Continue to review data for disparities
- Verify that there are adequate opportunities across all grade levels
- Consider expansion of auto-enrollment to English

National Recognition:
Johns Hopkins School of Education Institute for Education Policy Brief shares how NC is a national model for auto-enrollment policy.

https://jscholarship.library.jhu.edu/server/api/core/bitstreams/43bc8b47-7fd8-40d4-a75c-520f7ae53a4f/content

Ensuring All Students are Prepared for Math I

Our Strategy:

Superintendent Truitt's comprehensive math reform proposal

To ensure that each student is prepared for success in Math I

- starting with 60 minutes of daily, grade level, math instruction to build math proficiency in grades Kindergarten through 8 using effective, standards aligned instructional materials;
- that PSU board policies facilitate educator supports, math instruction, and intervention services to address student math needs;
- and that each student and his or her parent or caregiver be regularly informed of that student's math progress.

Ensuring All Students are Prepared for Math I

Strategies:

- **Instructional Materials:**
  - NC DPI shall provide a rubric detailing a list of criteria and evidence to look for which PSUs can utilize to review and select standards-aligned math instructional materials.
- **System of Support for Educators:**
  - NCDPI shall require and assist PSUs in providing a system of support for all educators who teach math in grades Kindergarten through 12 to ensure they have the pedagogical knowledge and skills to teach effective math lessons to all students.
- **Assessment and Progress Monitoring:**
  - NCDPI shall require PSUs to provide assessment systems for all educators who teach math in grades Kindergarten through 8 to implement in order to ensure teachers have information related to student growth and proficiency necessary for effective instruction and intervention.

Ensuring All Students are Prepared for Math I

Strategies:

- **Parent Notification:**
  - The parent of any K-8 student who exhibits math difficulty at any time during the school year shall be notified in writing, in language understandable to the parent, of the exact nature of the student's difficulty in math no later than 15 calendar days after the identification of the math difficulty.
- **Math Instruction and Intervention**
  - PSUs shall adopt and offer evidence-based math intervention programs to each K-8 student who exhibits math difficulties identified through assessment systems defined in the previous section. The math intervention program shall be provided in addition to the daily math instruction provided to all students in the general education classroom within 30 days of a student being identified.
- **Innovative Math Accelerator Grant Program**
  - In an effort to achieve lasting and sustainable success, this program incorporates robust and ongoing professional learning for math coaches, building-level leaders, and district-level leaders, empowering them to reinforce high-quality instruction in middle school classrooms.

Current work of the K-12 Math Team

Building capacity of district/school leaders & responding to PD Requests

- Knowledge base of standards, mathematical practices
- Deconstructing standards
- Utilizing math practices to ensure rigor and student engagement
- Increasing the level of Rigor by:
  - Procedural fluency + Conceptual + Application

Math Standards Timeline

- Current Math Standards were implemented in stages:
  - Math 1, Math 2, Math 3 - implemented 2016-2017
  - K-8 Math - implemented in 2018-2019
  - Math 4 - implemented 2020-2021

- K-12 Math standards will all go into the review phase beginning in the 2024-2025 school year
- Any recommendations for starting the revision phase will be brought to the Board in the summer of 2025

Questions around Math…

What Math does EVERY graduate **need** to know? What Math does EVERY graduate **want** to know?

- How can we increase the application of math content in our classrooms?
- How can we increase proficiency for all students in math?
- How can we increase student interest in math?
- How can we demonstrate the ways math instruction connects with the Portrait of a Graduate?

Patterns™ for Reaching and Impacting Students in Math (PRISM)

Background

Teacher Support

- Elementary school lays the foundation for students' math proficiency, and effective instruction during these formative years is vital
- Teachers in rural areas often do not have access to a robust network of peers in their grade level and subject area
- Effective professional development requires a sustained and embedded approach with coaching

What is the PRISM grant?

PRISM

Patterns™ for Reaching & Impacting Students in Math (PRISM)

- A 5 year $7.86 million Education and Innovation Research Grant (EIR) with the U.S. Dept. of Education
- A partnership with Carnegie Learning and WestEd to engage up to 300 rural 4th grade Math teachers serving as many as 7,000 students, across the state in a unique, ongoing professional learning experience
- One of 45 grants awarded from 266 that were submitted
- Goals:
  - Teachers receive individualized support in math content and instruction
  - Increases in growth and math proficiency

PRISM

The Partners -

- NCDPI - Overseeing the project, supporting recruiting and coordination between schools, teachers, Carnegie Learning and WestEd and ensuring alignment between professional development and NC standards

- Carnegie Learning - Leading the implementation of the Patterns™ professional development platform and coaching

- WestEd - Leading the research and evaluation of the project to determine its impact on teachers and students

Patterns™

- Blended learning platform combining online learning modules with both virtual and in-person coaching
- Successfully used in 19 states
- A flexible, blended professional development program designed to:
  - Deepen understanding of math concepts
  - Show vertical connections across grade levels
  - Build a network of teachers across the state
- Combines independent self paced learning time with scheduled online coaching

Patterns™

- Teacher learning and initial coaching takes place over approximately 10 weeks with topics/modules with a focus on fractions concepts such as:
  - Comparing and ordering fractions and explore equivalent fractions
  - Determining fractional representations given parts of the whole
  - Investigating multiple representations of fractions
  - Exploring fractions as division
  - Modeling operations with fractions

Timeline

Timeline - 5 years

Year 1 (January 2024 - December 2024):

- Finalize all processes, protocols, and procedures to initiate the grant work
- Identify an initial group of teachers and students to plan for the full project roll out

Years 2-4 (January 2025 - June 2028):

- Full implementation
- Complete training for two cohorts of teachers (150 in each cohort)
- Evaluation of impact on teacher knowledge and instructional practices
- Conduct longitudinal evaluation of student outcomes

Year 5 (July 2028 - December 2028)

- Disseminate results

Questions