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Excursions: Activities That Foster Mathematical Belonging

AUTHOR NAMES:

Sussman, Annie; and Murray, Megan

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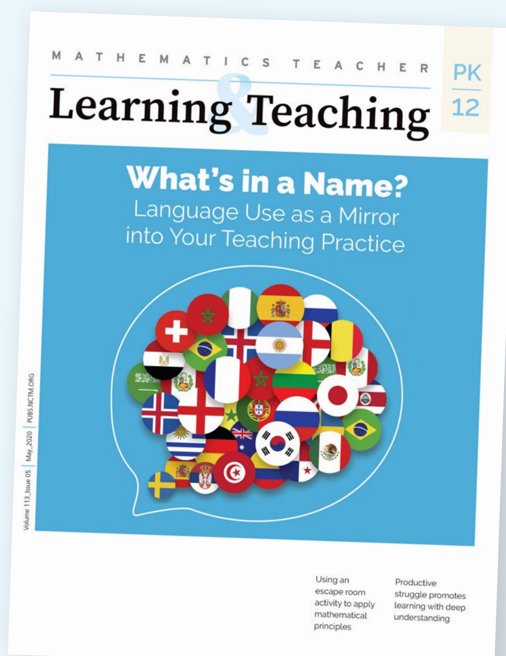
CONTACT: mtlt@nctm.org



NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

Excursions: Activities That Foster Mathematical Belonging

Ear to the Ground features voices from several corners of the mathematics education world.

Annie Sussman and Megan Murray

When students feel they belong in mathematics class, they connect to and invest in the mathematics they are engaging in. They feel their ideas are valued, and their diverse competencies and ways of learning are welcomed and appreciated. This sense of belonging positively impacts their identities and sense of agency and disrupts the disconnect many students experience between the mathematics embedded in their lives and traditionally taught mathematics (National Council of Teachers of Mathematics [NCTM], 2020).

One powerful way teachers can promote mathematical belonging is through activities that help students see themselves and others in the mathematics they are learning (NCTM, 2024). In the interest of developing resources to support K–5 students in seeing how mathematics relates to their lives, and how it is present in other contexts (e.g., social studies), the Forum for Equity in Elementary Mathematics at TERC developed Excursions. These freely available sequences of related activities are designed to enhance grade-level content and provide opportunities for every student to uncover their unique mathematical strengths, experiences, and interests. All can be downloaded from the Forum's website (link online).

Excursions focus on a range of topics, including favorite foods, quilts and quilt makers, languages, temperature, designing a school, and building a city or town (see Figure 1). Students engage in mathematics that connects to the topic being explored (e.g., representing and analyzing data or describing, composing, and decomposing shapes) as they move through four to six activities that range in length from 15 to 60 minutes. While each excursion is unique, all provide opportunities for students to

- generate and pursue questions of interest
- learn about how people from a range of cultures, ethnicities, and genders have used mathematics in a variety of fields
- reflect on and discuss personal connections to mathematical topics with the community and each other

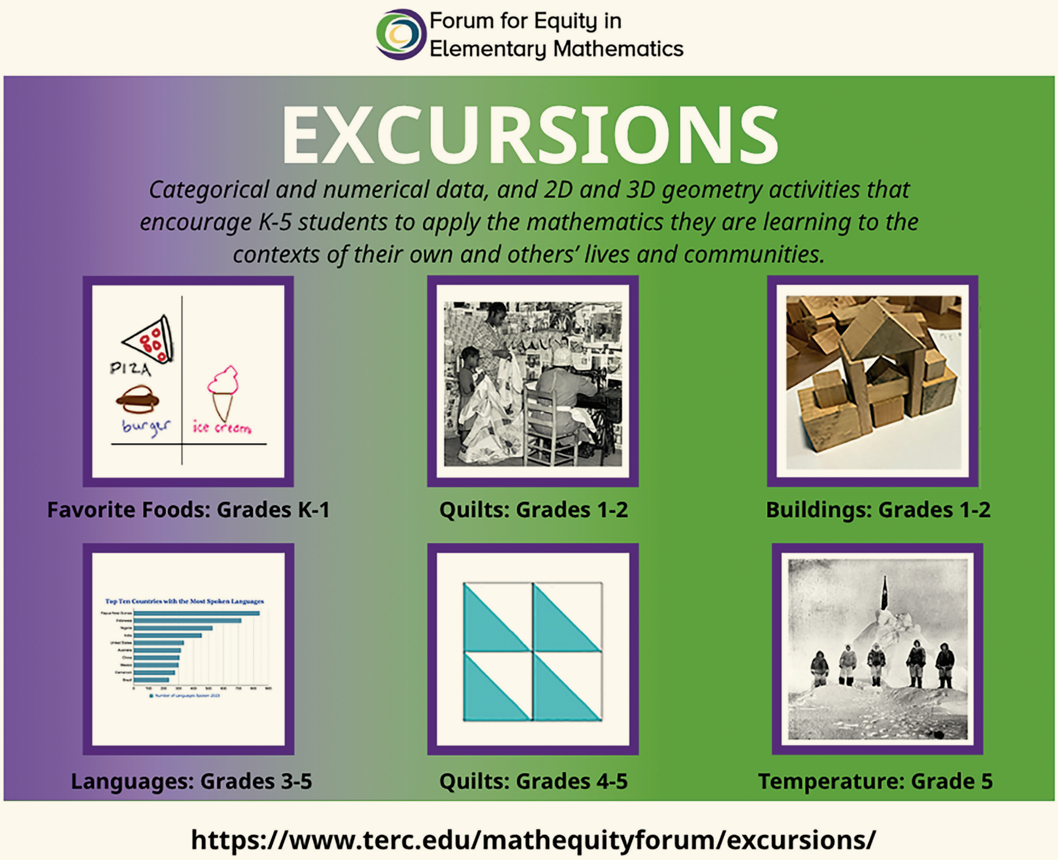
EXPLORING AN EXCURSION

In *Where in the World Is It Hot? Where in the World Is It Cold?,* a fifth-grade data excursion about temperature (see Figure 2), students consider Mystery Graphs that show temperature over time in places with extremes of cold and heat (Russell, 2024). This leads them to wonder about things like the hottest and coldest temperatures ever recorded, the locations of such extreme findings, and whether and how they have changed over time. Students also learn about Matthew Henson, the African American explorer who participated in Robert Peary's 1908–09 expedition in search of the North Pole. They consider some of the temperatures he recorded in his journal during that expedition. Finally, students pick a place in the world that has some meaning for them or their family. They find and graph average monthly temperatures for that place, write a brief story about their connection to it, and share and discuss this work with each other and with the larger community.

THE IMPACT OF EXCURSIONS

We hoped that Excursions would increase participation and engagement and broaden students' sense of what mathematics is and who can do it. Many of the field test teachers commented on these topics.

Figure 1 A Sample of Excursions



Annie Sussman, she/her, annie_sussman@terc.edu, is a member of the Forum for Equity in Elementary Mathematics staff at TERC, a STEM education nonprofit. A former classroom teacher, Annie takes a special interest in teacher leadership and in thinking about how student and teacher reflection can inform the creation of equitable learning communities.

Megan Murray, she/her, megan_murray@terc.edu, is a member of the Forum for Equity in Elementary Mathematics staff, which is committed to creating and sustaining equitable learning communities in elementary mathematics classrooms. She also worked on all three editions of the Investigations in Number, Data, and Space curriculum.

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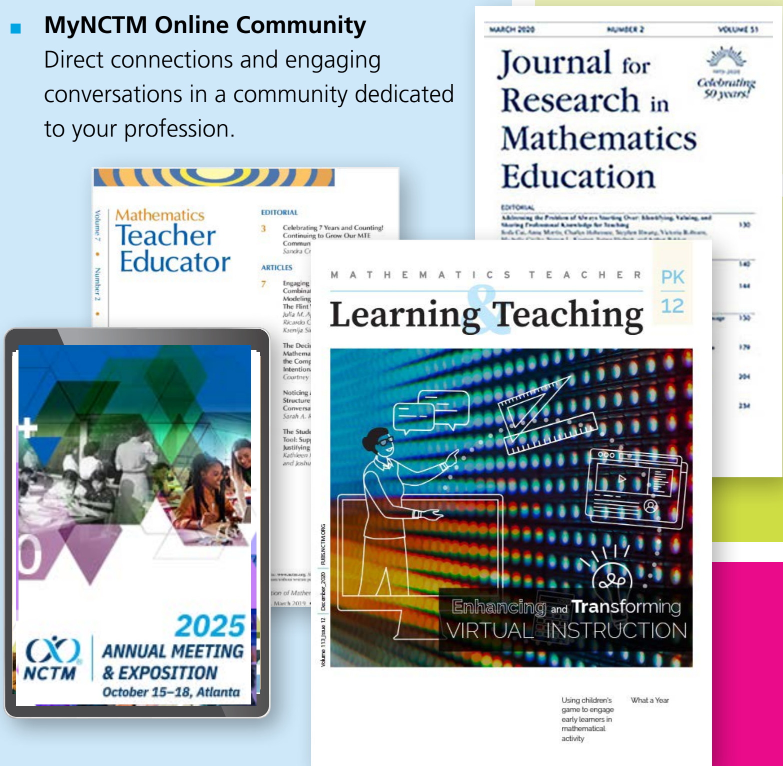

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Figure 2 A Fifth-Grade Data Excursion

Where in the World Is It Hot? Where Is It Cold?

A Data Excursion for Grade 5

? What Happens

Students consider Mystery Graphs that show temperature over time in places with extremes of cold and heat. They learn about Matthew Henson, the African American explorer who participated in Robert Peary's 1908–09 expedition in the search for the North Pole. Students consider some of the temperatures he recorded in his journal during that expedition. Finally, students pick a place in the world that has some meaning for them or their family. They find and graph average monthly temperatures for that place and write a brief story about their connection to that place. The excursion ends with an exhibit or presentation of students' work.

There are five Activities in this *Excursion* to be done in sequence:

- Activity 1: Mystery Data Graph #1—Where in the World? (20 min)
- Activity 2: Matthew Henson and the Search for the North Pole (20-30 min)
- Activity 3: Mystery Data Graph #2—Where in the World? (20 min)
- Activity 4: Where in the World? Temperature Graphs and Stories (60 min)
- Activity 5: Exhibition and/or Presentation (time will vary)

Matthew Henson (center) and four Inuit guides at the North Pole.

Excursions are sequences of related classroom activities that encourage students to apply the mathematics they are learning to the contexts of their own and others' lives and communities. Developed and published by The Forum for Equity in Elementary Mathematics, the goals and principles of excursions are described in Excursions in Mathematics: Connecting Students with Their Interests, Their Communities, and the World.

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It was a really great way to get kids that don't normally participate, to participate. A lot of these kids that had really cool places that their families were from, and really wanted to share that information—and they're not kids that always feel comfortable doing those math talks and sharing about their math—this is a great way to give them that confidence and that little boost of, like, "This is math and you're good at it and you can do this!"

I have a student who does not like to compute, but storytelling and writing and literature is something that he loves. When he got to write about the data, and write about his experience, he was engaged with the math in a way that he hasn't typically been.

CONCLUSION

Excursions invite students to see mathematics as a way of engaging with, and learning about, the world. Activities like these, which connect the mathematics that students are learning to their lived experiences and communities and to the experiences of others, can impact the classroom culture in lasting ways. They can foster a culture of belonging in mathematics, where all students can develop strong mathematics identities and a sense of agency as doers of mathematics.

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