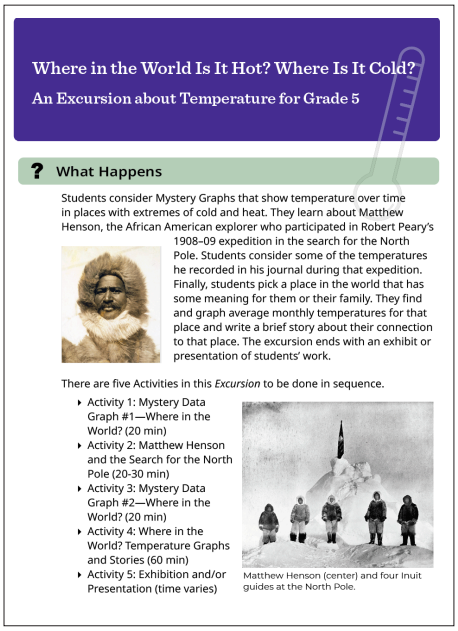
Excursions in Mathematics: Connecting Students with Their Interests, Their Communities, and the World

Students need to see themselves, their families, and those in their communities as doers of mathematics and to learn how mathematics is present in other communities, in other times and places, and in other contexts such as science and the arts (Russell, et. al., 2023). Math class should provide students with mirrors for seeing themselves in the mathematics and windows for seeing the lives of others (Gutierrez, 2007). As Gutierrez writes,

> **"students [should] find mathematics not just 'real world' as defined by textbooks or teachers, but also meaningful to their lives [p 3]."**

Excursions are sets of related activities that enhance grade-level content and provide opportunities for students to:

- Uncover their own diverse competencies, experience, ideas, and interests while engaging in the mathematics they are learning.
- Apply the mathematics they are learning to a new context. These applications might involve collecting and interpreting their own data, investigating data sets about contemporary or historical issues, or creating geometric patterns and structures.
- Generate questions of interest and pursue them using mathematics. These questions might involve some aspect of their own or others' lives, families, and communities, phenomena in the natural world, historical data, or the patterns and structures of mathematics.
- See images of people who are affecting or have affected the world using mathematics within a variety of fields, including people from a range of cultures, ethnicities, and genders.



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

An Excursion about Temperature 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 varies)

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

Finding personal connections to mathematics, investigating content in their own and others' experiences, learning about the history of different people's and communities' use of mathematics, and seeing how mathematics supports art, science, architecture, and many other fields all enhance students' mathematical identities and sense of agency. *Excursions* are not "extra" work for only some students, e.g., students who finish their work quickly, but are meant as invitations into mathematics for every student. These activities are one way to "engage in the necessary critical work to nurture a democratic society where all can use, know, and understand mathematics to comprehend and critique the world through mathematics and to experience its wonder, joy, and beauty [NCTM, 2020, p. xiv]."

References

Gutiérrez, R. (2007). Context matters: Equity, success, and the future of mathematics education. In Lamberg, T., & Wiest, L. R. (Eds.), *Proceedings of the 29th annual meeting of the North American chapter of the International Group for the Psychology of Mathematics Education* (pp 1-18). Reno: University of Nevada.

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