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The Mathematics of a Warming Arctic

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As a result of a shift in global climate patterns, the Arctic region has experienced significant warming over the course of the past several decades. This trend is predicted to continue, which will have dramatic environmental, economic, and geopolitical ramifications in the years ahead. In this unit, students will use mathematics to investigate facets of Arctic warming. Designed for geometry students at the high-school level (but also with applications for students of algebra and of social studies), this unit is intended not only to increase students' proficiency with geometric concepts, but also to help students understand how mathematics – normally studied as an isolated and highly abstract field of study – can shed light on one of the most important issues humanity as a whole must address in the coming years.

The unit is divided into three lessons. In the first, students will use algebra to analyze the rate at which the area and volume of Arctic ice has been decreasing in recent decades. In the second lesson, students will examine how loss of Arctic sea ice could impact global shipping routes and geopolitical tensions. In the third, students will analyze the mathematics behind the transport through pipes of raw crude oil.

(Recommended for Geometry, grades 9-12)