



Math on the Road

A family road trip offers many possibilities for side trips and sightseeing. For the Hart children – Josh, 12, Kallie, 9, and Marissa, 6 – a journey to Yellowstone National Park also includes opportunities for excursions into a landscape of mathematical learning. Math Moments abound on the American roadside.

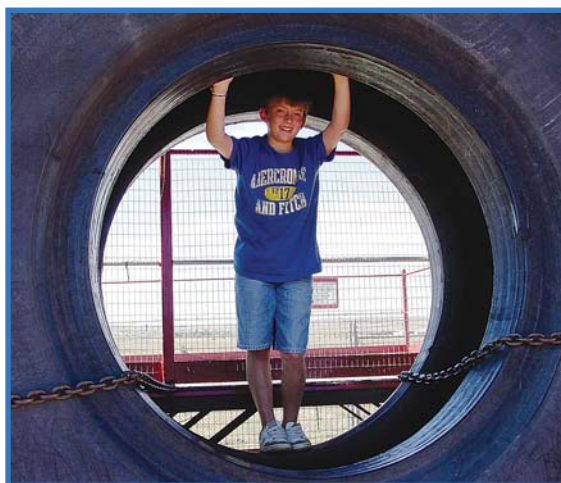
In Minnesota, the Harts stop to ponder the proportions of a famous steel and concrete figure of Paul Bunyan and his blue ox Babe, which towers over the mortals who stop to admire. How large are the outsized figures? Kids love guessing games, and this can be a quick estimation activity: Josh is almost 5 feet tall, and Big Paul looks to be as high as four of Josh ... so the lumberjack must be a little less than 20 feet. (Checking the sign after estimating reveals that the technique works: the statue is 18 feet high.) Now spread the fun (and the math) around: Kallie, at 52 inches, can be a benchmark to gauge Babe's oxenly dimensions. And how many Marissas, end to end, would it take to span the big bovine's horns? Now that's a longhorn!

A few hundred miles down the road, the Harts are in Gillette, Wyo., touring a working coal mine. Never mind the coal – what fascinates the kids are the behemoth mining trucks. A tire, available for inspection, can bring up words like “diameter,” “radius” and “circumference.”

Josh's height is just about equal to the tire's radius, so what is its diameter? How far does the truck move in a single tire revolution? To figure it out, compute the circumference (multiply the diameter by

3.14, or pi, possibly with a calculator; or mentally multiply by 3 to approximate). Compare that with the family minivan!

In the Black Hills of South Dakota, everyone gets a chance to pan for riches at Big Thunder Gold Mine. The yellow flakes may be small, but there is a lode of math to be mined. Pans come in diameters of 8, 10, 12 and 14 inches, and in the gold miner's lexicon, there are 12 Troy ounces to the pound (instead of the cus-



A giant tire gives Josh Hart, 12, a chance to consider diameter, radius and circumference.

tomary 16). A parent could wonder aloud, “So which is heavier, a Troy ounce or a U.S. ounce?”

A similar math principle comes from examining the panning sieves that miners use to screen material. The holes range in size from 1/4-inch (“4 mesh”) to 1/100-inch (“100 mesh”). Which size has smaller holes? A simple Math Moment spent considering that question will lead to a key principle of fractions: the larger the denominator, the smaller the amount. The 1/4 holes are large compared to the tiny 1/100-inch holes, which thus screen out the most.

An impressive numerical comparison comes up when the family learns that in 35 years of operation, Big Thunder mine produced a mere 10 ounces of gold from 250,000 pounds of excavated ore! (The Holy Terror Mine across the stream averaged 26 ounces of gold per ton of ore. Which mine did better?) But today, Big

Thunder is producing: the Hart kids get to take home a few gleaming yellow specs they find in their pan bottoms.

With its geysers and grizzlies (seen at a safe distance), Yellowstone is the highlight of the trip, but Old Faithful is less faithful than expected. It doesn't erupt at perfectly-timed intervals. Instead, say the rangers, the time between blasts ranges from 35 to 120 minutes with an average of 94 minutes – more math vocabulary! Still, geologists can predict the next eruption with accuracy. So, to see it again in 95 minutes, what time should we return?

In visiting America's natural and human-made wonders, children encounter fascinating facts and figures that add to their appreciation of the sights. Don't let those numbers pass unnoticed. By asking questions that lead to mathematical thinking, parents and children can enjoy Math Moments that add another dimension to the family vacation.

Math Moments™ creator David Schwartz spends much of his time finding unusual, whimsical ways to make math and science come alive for kids and teachers, both through writing and through speaking at schools and conferences. He has written nearly 50 books for kids, including *How Much Is a Million?* and the “Look Once, Look Again” series. For more information about David's math and science adventures, check out his Web site, www.davidschwartz.com.

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