



Happy Holidays ... and Happy Math!

While his younger brother watches, 9-year-old Tony Naber tries to reach the top of a prospective Christmas tree with a stick. Each year, a family friend offers them a spruce from his plot. But it must fit under their 8-foot-high ceiling. The brothers have already found that the stick is almost 18 inches long, and Tony is about 4.5 feet tall. His arm adds at least another foot and a half. Tony adds it all together: the top of the stick is about 7.5 feet above the ground. But the tree's apex is higher than the stick.

"It won't fit," says Jacob, 6.

Their father reassures the boys that he can cut off a few inches from the base of the tree. Dad pulls out the saw and soon the three are loading the tree onto their car.

Measuring – or in this case, estimating – the height of a Christmas tree is one of many holiday preparations that can involve math. Usually, it only takes a moment to add a mathematical dimension to the pleasures of the season.



When Elijah Frenberg-Mates, 5, and his mom, Margit, sit down to string popcorn and cranberries, they go beyond making Christmas decorations by finding and creating patterns, an early math skill. First, Margit asks her son to make a pattern for her to copy. Elijah strings his cranberries and popcorn in alternation: cranberry-popcorn-cranberry-popcorn. Margit follows suit.

"OK, now I'll do one," she says, as she challenges Elijah with the sequence *cranberry-popcorn-popcorn-popcorn-cranberry*. He looks at her string, thinks a minute, finds the pattern and copies it.

"Now can you think of a really hard one?" Margit asks.

Elijah later moves on to his collection of wooden nutcrackers, which will add their colorful personalities to the living room's holiday mood. The nutcrackers range in height from a few inches to a few feet. Elijah orders them from tallest to shortest, making corrections when his mother points out that some are bigger (in volume) but shorter. When 20 nutcrackers have been lined up, Margit asks Elijah to find the one in the middle, the sort of question he will face in the future when studying "average."



Five-year-old Elijah experiments with patterns, an early math skill, while he and his mom string popcorn and cranberries for Christmas decorations.

PHOTO BY DAVID M. SCHWARTZ



Lighting a Hanukkah menorah can provide many Math Moments. Starting with one, the number of candles to be lit increases by one each day through the eight-day holiday. But there is also a "shamash" (servant), the candle used to light all the others, so two are lit on the first day, three on the second day and so on.

The youngest children can practice basic counting while placing unlit candles into the menorah each day. Somewhat older children can figure out how many candles are needed all together. Some might want to physically group them for each day, then count to figure it out, while more

advanced mathematical thinkers can mentally determine which numbers to add, and then sum them.

One father challenged his four children to find a plan that would enable each to light the same number of candles over the holiday. (Solution: one child did the lighting on days 1 and 8; another did days 2 and 7; the third did 3 and 6; the fourth child did 4 and 5.)



There is also a math connection to the popular Hanukkah game dreidel. Children spin a four-sided top and the Hebrew letter that comes up tells the player how much to take from (or add to) the "pot" of chocolate coins ("gelt"). The letter "hay" means the player receives half the coins – a pleasurable introduction to the concept of half. Since an odd number of tokens cannot be halved, parents can point out the important difference between even and odd numbers.

With hardly any extra effort, parents can help children find Math Moments as they prepare for seasonal festivities, adding an enjoyable and educational aspect to the meaning of "Happy Holidays!"

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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