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Title: One, Two, Many (or a dozen reasons why mathematics isn't as easy as 1,2,3)

Abstract:

Are there really primitive tribes whose system of counting goes: "One, Two, Many", indicating that from three on it's more or less a blur? Maybe we modern humans are such a tribe. Despite the sophistication we see in ourselves compared with our less advanced ancestors from times long past, it's surprising how little progress we've made in addressing some basic problems in 3D or beyond, or when solving seemingly simple equations in 3 or more variables. For despite our astonishing mastery of some ABCs, such as Air (flight, weather prediction), Biology (medical breakthroughs, DNA) and Communications (phone, video, email), we often struggle to get past 1, 2, 3 in other domains. Or sometimes even to get to 3. We'll survey a dozen fun topics in shapes and numbers and patterns whose basics and generalization can be explored with little mathematical background, and which speedily lead to "what if" questions ranging from easy to tricky to "we just don't know." Coins, cakes, fruit, bagels, cubes, squares and primes will all make an appearance. The late Martin Gardner, whose legacy will be highlighted at MAA MathFest this August, knew all too well that such playful queries can both excite students about mathematics and lead to real research at the frontiers of the subject. There will be satisfying Aha! moments, there will be room for innovative ideas, and million dollar prizes will be discussed.