Puzzle #82: That's slick!

MoeZone

Real challenges for people living in the real world

Be safe!

Can you get hurt?
Can someone else get hurt?

Some ice is very slippery and some ice is quite sticky. Why do you think there is a difference?

ELEMENTARY

What is the slipperiest stuff you know of? What makes it so slippery?

ADVANCED

Non-stick pans are great! How are they made? Why don't things we cook stick to them?

PROFESSIONAL

Send any solutions by Nov. 12, to Moe Benda at mbenda@d.umn.edu.
Best solutions and next puzzle will appear in HTF on Nov. 17.

Moe's quote:
Free hugs this week!!

MoeZone Puzzle #81 solutions: Holy moley!

ELEMENTARY PUZZLE

I've heard there are 100 octillion stars in the universe. What's the largest number you can think of that is an actual count of something? What is it a count of?

Paul R. (12, Virginia): Facebook says that they have 1,860,000,000 users!

MOE'S NOTE: Wow!!

ADVANCED PUZZLE

If you react 1 cubic foot of hydrogen with 1 cubic foot of oxygen, how many cubic feet of water vapor will you end up with? Why does that make sense?

Carl S. (Hibbing): You would end up with 1 cubic foot of water vapor and 1/2 cubic foot left over of oxygen. This makes sense because of the equation 2 H2 + 02 yields 2 H20. In this case, you don't have enough hydrogen to keep making water vapor, so you're left with excess oxygen.

MOE'S NOTE: Although Avogadro didn't come up with the constant credited to him, his experiments led scientists to its discovery based on observations like the one Carl's referring to here! He said that equal volumes of gases react and produce predictive volumes so these volumes must contain equal numbers of particles. See https://www.scientificamerican.com/article/how-was-avogadros-number/.

PROFESSIONAL PUZZLE

How did scientists come up with Avogadro's number and why is it important?

Avogadro's number is the count of particles in a single mole of a substance. Scientists had to come up with a unit of measurement to help describe what happens when chemical molecules do ANYTHING. That sounds easy now, but we take for granted the time when we had no idea as to why things did what they did—but a number like 6.02 x 10^23 is an awfully big number! Can you even count that high? I, for one, am not quite sure what an octillion is (see elementary question), let alone be able to count to it! So, Avogadro—did someone count the number of particles in a mole? It turns out you can, with the help of math and very powerful microscope (in the early 1970s), but that number had already been around and the counting just confirmed it. Up until then, scientists used consistent macroscopic evidence and observations to calculate what it must be—with the help of some other theories and some really good statistics!

MOE'S NOTE: For fun, do an Internet search on "the largest number!"