

Puzzle #70: Up and at 'em!

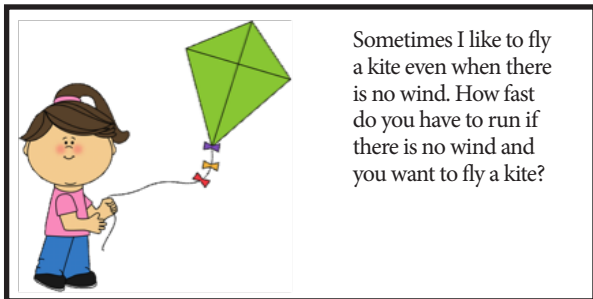
MoeZone

Real challenges for people living in the real world



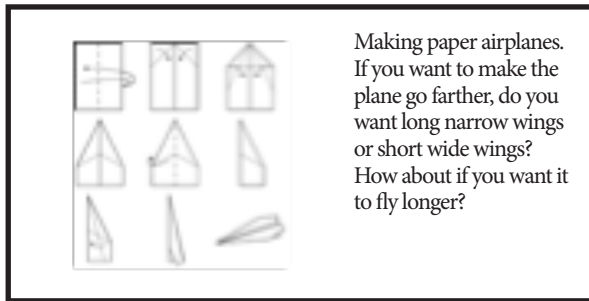
Be safe!

Can you get hurt?
Can someone else get hurt?



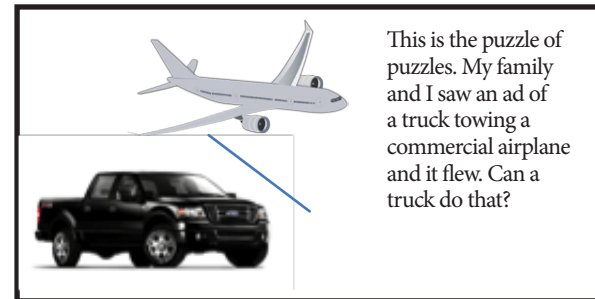
Sometimes I like to fly a kite even when there is no wind. How fast do you have to run if there is no wind and you want to fly a kite?

ELEMENTARY



Making paper airplanes. If you want to make the plane go farther, do you want long narrow wings or short wide wings? How about if you want it to fly longer?

ADVANCED



This is the puzzle of puzzles. My family and I saw an ad of a truck towing a commercial airplane and it flew. Can a truck do that?

PROFESSIONAL

Send any solutions by May 28 to Moe Benda at mbenda@d.umn.edu.
Best solutions and next puzzle will appear in HTF on June 2.

Moe's quote:
Sometimes a good answer is just not good enough.

MoeZone Puzzle #69 solutions: We cycle?

ELEMENTARY PUZZLE

Recycling helps keep plastic from going to our landfills. what plastics can we recycle?

Mary Ann (8, Virginia): My mom and I recycle all of our plastic water bottles and milk jugs.

MOE'S NOTE: Good going Mary Ann! Every bit helps. Water bottles are a #1 plastic and milk jugs are a #2 plastic. We can't recycle #3 - #7 plastics because we don't have a way to sell the stuff we recycle the plastic into (<http://www.stlouiscountymn.gov/recycle> check it out!!!). #1 plastic is polyethylene terephthalate and #2 is high density polyethylene. The prefix "poly" means many, so translated you have "many ethylenes" in your plastic. See the professional puzzle!

ADVANCED PUZZLE

What are some of the products that we make when we recycle plastics? Is the recycled plastic as good as the original?

Mark (15, Eveleth): I see over at Menards, Lowe's and L&M Supply that they have a bunch of lawn furniture made out of recycled plastics and I see a lot of stuff with "made with 50 percent recycled plastic" on them.

MOE'S NOTE: And some are even made from 100 percent (<http://time.com/money/4489474/recycled-plastic-bottles-new-products/>).

PROFESSIONAL PUZZLE

Which type of plastic is better, thermoplastics or thermosetting plastics? What's the difference?

Simply said, thermoplastics can be melted and thermosets stay solid as you heat them up. Thinking about the tires on your car—you wouldn't want them to melt when they heated up (NASCAR would have a lot of difficulty!). They warm up their tires so they have more grip, but they don't melt; they get pliable and thermoplastic like, but they stay together. What's the difference? A thermoplastic is like a bowl full of cooked spaghetti, and each strand represents a monomer, and the whole bowl represents the polymer. When you form a product, you have enough forces to hold the monomers together, but when you heat them up, they are free to move about. When a thermoset is formed it actually creates bonds between monomers and they become so stable that heating it up won't break them. This cross-linking is like what you would see on a fishing net, although it's much more random than that.

MOE'S NOTE: I worked on a type of plastic that "remembers" its shape when you heat it up. Imagine how awesome it would be to heat up a dented bumper and it would return to its original shape!