Puzzle #87: Just breathe…

MoeZone

Real challenges for people living in the real world

Be safe!

Can you get hurt?
Can someone else get hurt?

What is the oldest tree you have seen? Where is it and how did it get to be so old?

ELEMENTARY

We need to breath in oxygen and breath out carbon dioxide, while trees "need" the opposite. How many trees do you think each of us need to be in balance?

ADVANCED

Having a campfire/ bonfire produces greenhouse gases. How much do you generate with a campfire/bonfire compared to driving a car?

PROFESSIONAL

Send any solutions by Feb. 4, 2018, to Moe Benda at mbenda@d.umn.edu.
Best solutions and next puzzle will appear in HTF on Feb. 9, 2018.

Moe's quote:
The future is soon to be history!

MoeZone Puzzle #86 solutions: A shot in the dark?

ELEMENTARY PUZZLE

If you threw a baseball as high into the air as you could, how fast would it be going when you catch it? The same speed? Faster? Slower? Why do you think?

Jon (9, Fayal): I think it will be slower, because I'm throwing it up, but it's only falling down.
Moe's note: Yes! And the air is keeping it from falling faster and faster—in other words, slowing it down.

ADVANCED PUZZLE

Over New Year's, my friend shot a gun straight up into the air. How high will it go? Do you think this is dangerous?

According to my research, a bullet leaving a gun is travelling at around 3,500 feet per second, and will reach the top of its flight in around 1.5 seconds at nearly one mile. The higher it goes, the slower it becomes until at the top, it is going 0 feet per second, but that's still one mile up and a lot can be in that mile space (helicopter, drones, birds, private planes).
Moe's note: It is dangerous to shoot at what you can't see, like up in the air! In fact, It is illegal in some states to shoot a gun up in the air due to the potential of property damage, but more importantly of possible injury. We live in northern Minnesota, where the population is quite small compared to the open spaces we enjoy, so the odds of actually hitting someone are small. But do you want to take that chance?

PROFESSIONAL PUZZLE

If you did shoot a gun straight up into the air, how fast will the bullet be traveling when it hits the ground? Why don't all the same rules apply as in the elementary puzzle?

Depending on the size of the bullet, it will be going between 300 and 700 feet per second—and that's still moving quite fast.
Moe's note: The same rules of the elementary puzzle do apply, with the addition of one more—terminal velocity. This happens when the bullet is being pulled back to the ground by gravity—that force—is equal to the resistive force of air hitting the bullet—the drag force. Stick your hand out of the window of your car (once it warms up!) and you'll feel the wind trying to slow you down. When the drag force holding you back equals the gravity force pulling you down, you won't go faster or slower, you'll be at terminal velocity. Terminal velocity is calculated based upon how much the object weighs, how big it is relative to the air, and how dense the air is. Do you think you can sketch out a formula for it?