ENERGY TO WORK

Units 10 & 11 Dr. John P. Cise, Professor of Physics, Austin Com. College, Ridgeview Campus, Austin Texas , jpcise@austincc.edu & New York Times, June 17,2017 by Leans A. Wen

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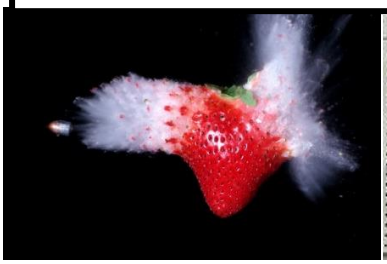
What Bullets Do to Bodies

((QUESTIONS)):(b) Convert 3.6 grams to English units of mas of slugs?, (c) Confirm a M16 bullet energy (in English system) as shown in right chart? Note: units show are in correct. ANSWERS: (b) 24.6672 X 10^{-5} slugs, (c) 1302 ft. lb (proper units)

((QUESTION)):(a) Confirm a M16 bullet of mass (in chart below mass was mislabeled as weight) 3.6 grams traveling at 990 m./s. has energy shown? Get energy in metric system of Joules. MORE HINTS: 88 ft./s. = 60 mph HINTS for (a) & (b): K = ½ m v^2 , 6.852 X 10^{-5} slugs / gram , weight/g = mass



Rifle	Caliber	Cartridge	Cartridge weight	Bullet weight	Velocity	Energy	Ef
M16	5.56×45mm	M193	184 gr (11.9 g) [106]	56 gr (3.6 g) [107]	3,250 fps (990 m/s) [107]	1,302 ft/lbs (1,764 J) [107]	

It was just after midnight when the call came in. “Fifteen-year old male, single G.S.W.” — gun shot wound — “to the abdomen,” I heard over the loudspeaker. “Stable vitals.” Earlier that night, we had treated another young man who had been shot in the abdomen. He’d been hit just outside the hospital and walked in, clutching his belly and yelling in pain. **The bullet went straight through the left side of his abdomen, puncturing his spleen, before it exited through a small wound in his upper back.** In the operating room, surgeons removed his spleen and tied off the bleeding vessels. He went to the I.C.U. in stable condition. Early in my medical training**, I learned that it is not the bullet that kills you, but the path the bullet takes. A *non-expanding (or full-metal-jacket)* bullet often enters the body in a straight line. Like a knife, it damages the organs and tissues directly in its path, and then it either exits the body or, if it is traveling at a slower velocity, is stopped by bone, tissue or skin.**

This is in contrast to expanding bullets, especially if shot from an assault rifle, which can discharge bullets much faster than a handgun. Once they enter the body, they fragment and explode, pulverizing bones, tearing blood vessels and liquefying organs. On Wednesday, ***(((four people were shot in Northern Virginia, including Representative Steve Scalise))) of Louisiana,*** who remains in critical condition from a gunshot wound to the hip. A bullet to the hip is less likely to be deadly than a shot to the head. Unfortunately, **(((the shooter in Virginia reportedly used a semiautomatic assault rifle.)))** This was the kind of damage inflicted upon victims of the Pulse nightclub shooting in Orlando and other mass shootings including Newtown, San Bernardino and Aurora. Trauma doctors and nurses who treated patients in these tragedies, and medical examiners who investigated the aftermath, all commented on **the unbelievable devastation resulting from the bullet wounds.** Indeed, **this is the intended consequence of assault rifles. When they discharge expanding bullets, the bullets don’t follow a straight line through the body; they fragment and explode, destroying as much living tissue as possible.** Two years ago, a group of doctors wrote in the Annals of Internal Medicine: “It does not matter whether we believe that guns kill people or that people kill people with guns — **the result is the same: a public health crisis.”** In the war zone of the E.R., we don’t see partisanship or politics. We see the devastation that happens when our society normalizes tools of total bodily destruction.

((QUESTION)): (d) The energy for a M16 bullet of mass 24.67 X 10^{-5} slugs traveling at 3250 ft./s. was found in question (c) to be ~ 1302 ft. lb……So, if instead of a bullet, what if we had a 3200 lb. car (typical weight of a car) moving with the same amount of kinetic energy. What speed would the car be moving at in ft./s. & mph having the same 1302 ft. lb of kinetic energy as the M16 bullet?, ANS: (d) 5.1 ft./s. or ~ 3.5 mph (walking speed)