Does kinetic energy increase mass

When we use KE=mv2/2 and say that KE is directly proportional to m we assume that the other parameter (speed) stays the same. So, between two bodies moving with the same speed the more massive one would have larger KE

An example of the latter is firing a gun. Suppose the gun''s body has a mass M while the bullet - mass m. Suppose the gun and the bullet inside it were at rest before the firing. Therefore, before filing, the linear momenta of the gun and the bullet are both zero PG=0 Pb=0 (so, the total linear momentum of a system "gun+bullet" Ptot=PG+ Pb=0).

That is instantly decided by the two of the great Conservation Laws that control every single event in the Universe: conservation of Linear Momentum and Conservation of Energy

Namely, the speeds of the gun and the bullet after firing must be such that the total linear momentum of the "gun+bullet" Ptot=PG+ Pb would NOT change (i.e. remain zero), another words, Ptot=PG+ Pb =0 ---> Pb=-PG=P . Let''s stress it: We do NOT know how large P would be : the Linear Momentum Conservation leaves that one completely open: it would allow ANY P as long as the bullet and the gun would both have that P (with opposite signs of course).

KE must be inversely proportional to mass, and because the bullet''s has normally a much smaller mass than the gun, mb<<mG its KE is much larger than that of the gun : KEb>>KEG

[BTW: what is the Energy Conservation''s role here? Answer: to decide the size of the P . Namely, suppose a certain amount Q of chemical energy stored in the cartridge is channeled toward moving of the bullet and the gun, then Q=KEb+KEG=P2/(2mb)+P2/(2MG)=P2(1/(2mb)+1/(2MG)) so, P is determined by Q at a given masses of the bullet and the gun]

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