

# PHSX 621: Homework #2

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Grant Saggars

## 1. An Exercise in Time Travel

Good physics students of the 21st century have super-powers compared to the poorly-trained scholars trying to do physics in Newton's time. For this problem you will consider going back in time to London, England in 1680, with nothing but an appropriate set of clothes and money to live for about a month, supposing you are not instantly robbed. Using your current knowledge and skill base, and without online research (since there's no internet in 1680), write an essay to propose an invention that will make you rich and famous, or be a savior of mankind. We don't care about format. Don't do extra work typing or typesetting LaTeX unless it is your most efficient method. Don't bother inventing lasers, cell-phones, turbo-chargers, or toilet paper. Paper is expensive! You must use the means and materials available in 1680 to build your invention. The civilization has brass and iron, ropes, wooden carts, animal power, and quill pens. Points will be deducted for proposing to build steam engines or electric generators or rocket cars, or anything else we all know you can't build. Think about history without (repeat) being able to do historical research. Remember it is a primitive world of unimaginable prejudice, cruelty, and ignorance. It is an era of superstition, crazy rumors, abuse of power, abuse of women and children, abuse of law by corrupt judges, hatred for migrants and foreigners, cults of politics and personality, bullies, thugs, scoundrels liars and thieves. Disease is rampant, and irrational public officials multiply deaths from epidemics. A rich person might have more money than a regular person could earn in 640,000 lifetimes. The most evil rich people are embedded in the government, which exists to serve the King and the rich people, and tax the poor. But if your idea can sell a rich person, it might be a way to succeed. The exception to building something yourself is a sure-fire package an evil rich person will support, so someone else can build it. Don't propose teaching your ideas, including math. It does not count as an invention. Also, anything you teach will surely have elements of heresy. Anything useful will be stolen, while you may end up in a ditch, or being cut into pieces by a jealous rival. What you will have are your inherent cleverness, your super-educated brain and your current knowledge of physics. You are 340 years ahead of the world you fell into. There are many simple things to be invented, if you are creative. Choose your adventure!

## Problem 1

By the 17th century, black powder is very old technology, partially because its easy to make with naturally occurring ingredients: some nitric acid (which is naturally occurring enough to be discovered in the 1000s), sulfur, and charcoal. Dynamite is the upgrade from this, just needing toluene and a few other things. The harder thing to make is the fuse, but it is just some special rope at the end of the day. Rich people would love this stuff, since it would help them build their industrial revolution facilities (think mining, construction, dastardly sabotage of your competitors). Furthermore, this made Mr. Nobel rich enough to create the Nobel prize, so if he can do it I'm sure I could figure something out too.