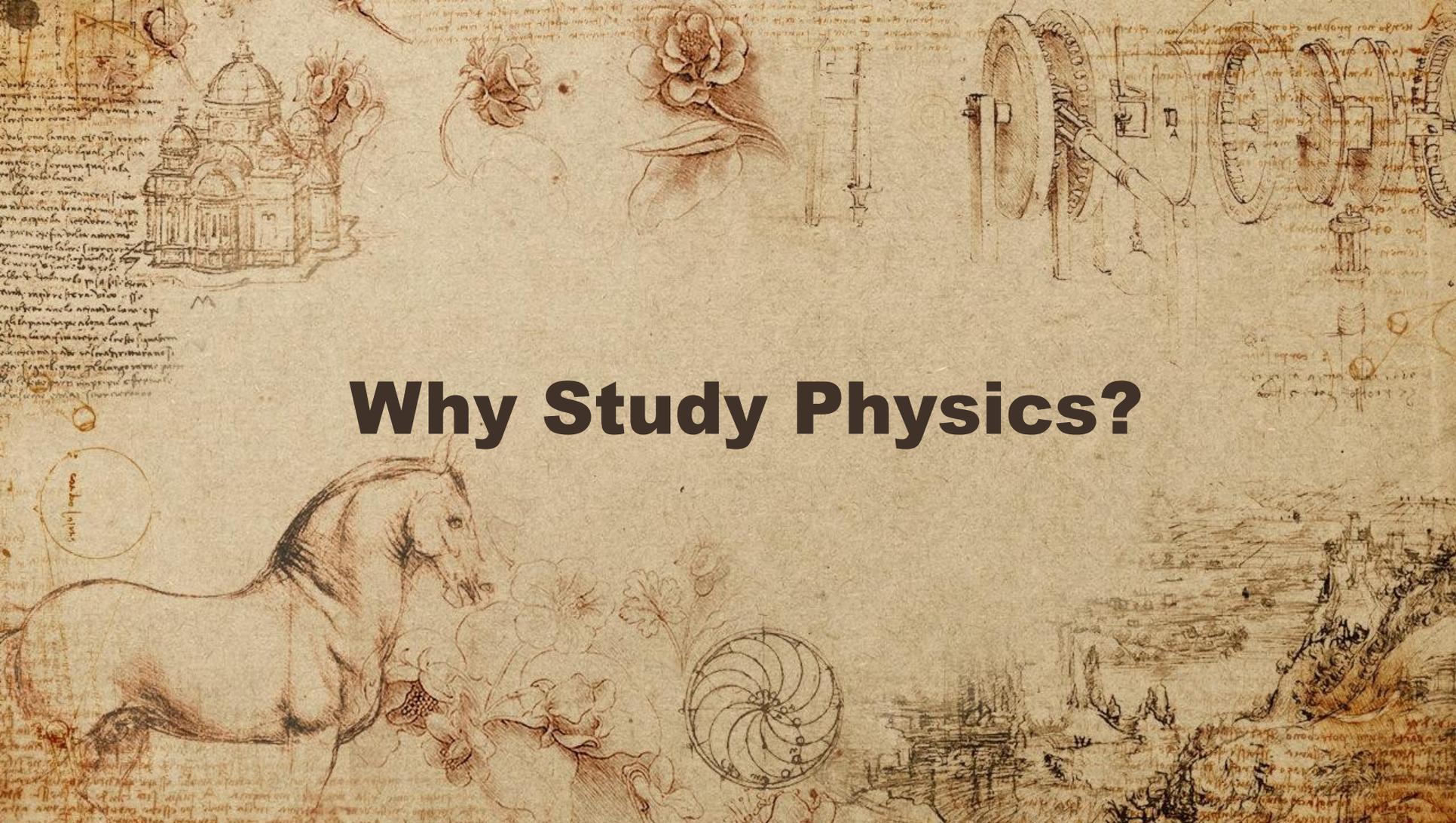




Physics First

Dr. Fei Liu
Fei.Liu@NJSCI.ORG

Why Study Physics?



Want to Know How and Why? Learn Physics

- Physics is crucial to understanding the world around us, the world inside us, and the world beyond us. It is the most basic and fundamental science.
- Physics challenges our imaginations with concepts like relativity and string theory, and it leads to great discoveries, like computers and lasers, that lead to technologies which change our lives—from healing joints, to curing cancer, to developing sustainable energy solutions.

Credit and Figures American Physics Society: <http://www.aps.org>

American Institute of Physics: <http://www.aip.org>

Like Science? It Began with Physics

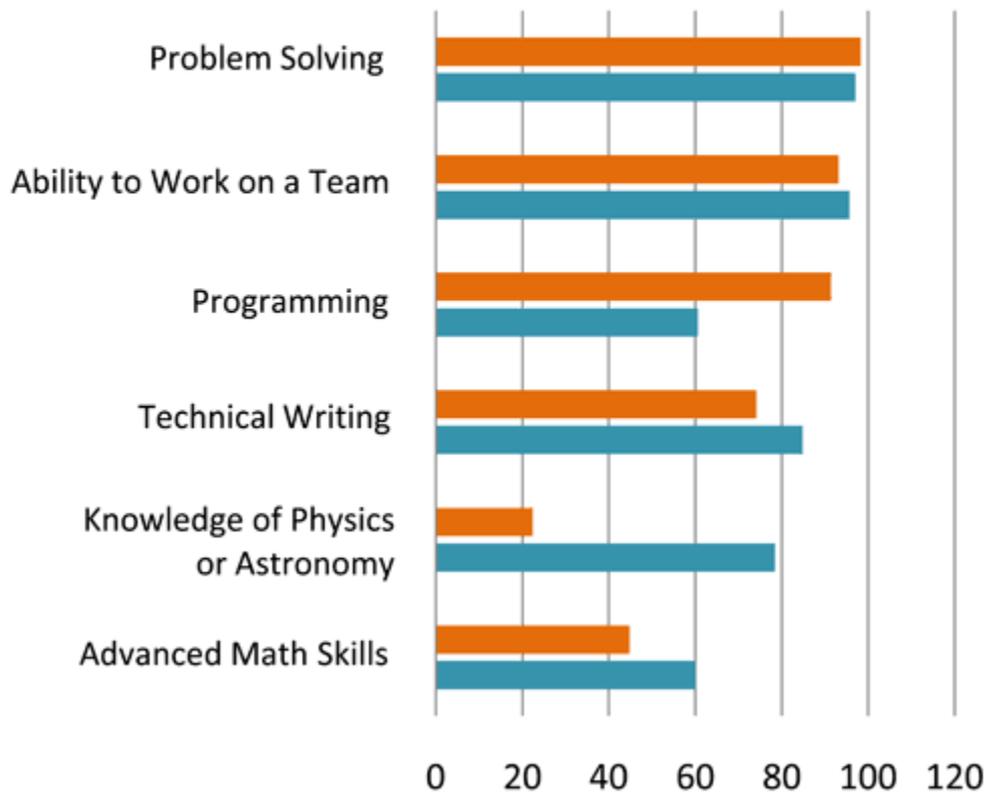
- Physics is the foundation of natural sciences. A popular quote is that Physics is the king of sciences.
- Physics encompasses the study of the universe from the largest galaxies to the smallest subatomic particles.
- Moreover, it's the basis of many other sciences, including chemistry, oceanography, seismology, astronomy, biology and medical science. All are easily accessible with a bachelor's degree in physics.

Want Skills? Physicists Learn Them

- **Emphasis:** *Physicists are problem solvers. Their analytical skills make physicists versatile and adaptable so they work in interesting places. Problem solving skills and ability developed from studying physics will benefit various subjects and disciplines.*
- You can find physicists in industrial and government labs, on college campuses, in the astronaut corps, and consulting on TV shows. In addition, many physics grads work at newspapers and magazines, in government, and even on Wall Street—places where their ability to think analytically is a great asset.

Skills used by Physics Bachelors in Engineering or Computer Science Fields, class of 2007

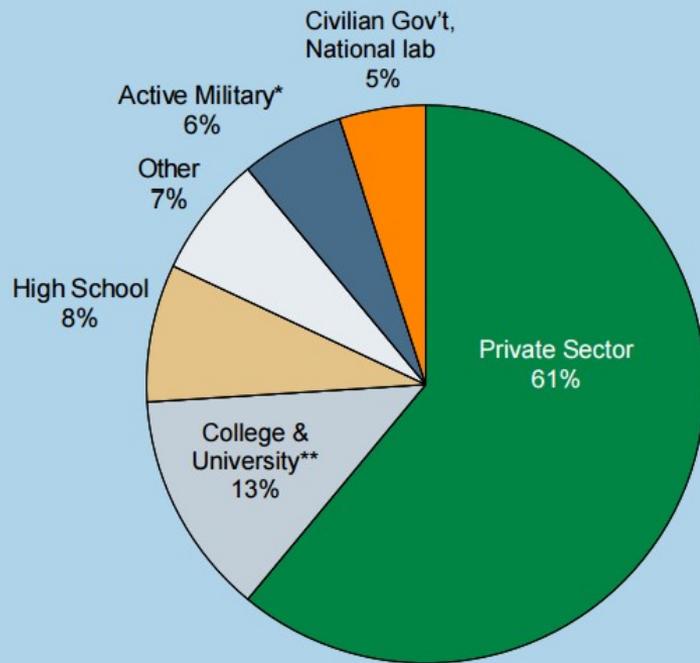
Computer Science Engineering



Want a Job? People Hire Physicists

- Physics brings a broad perspective to any problem. Because they learn how to consider any problem they are not bound by context. This inventive thinking makes physicists desirable in any field. A bachelor's degree in physics is a great foundation for careers in:
 - Journalism
 - Law
 - Finance
 - Medicine
 - Engineering
 - Computer Science
 - Astronomy

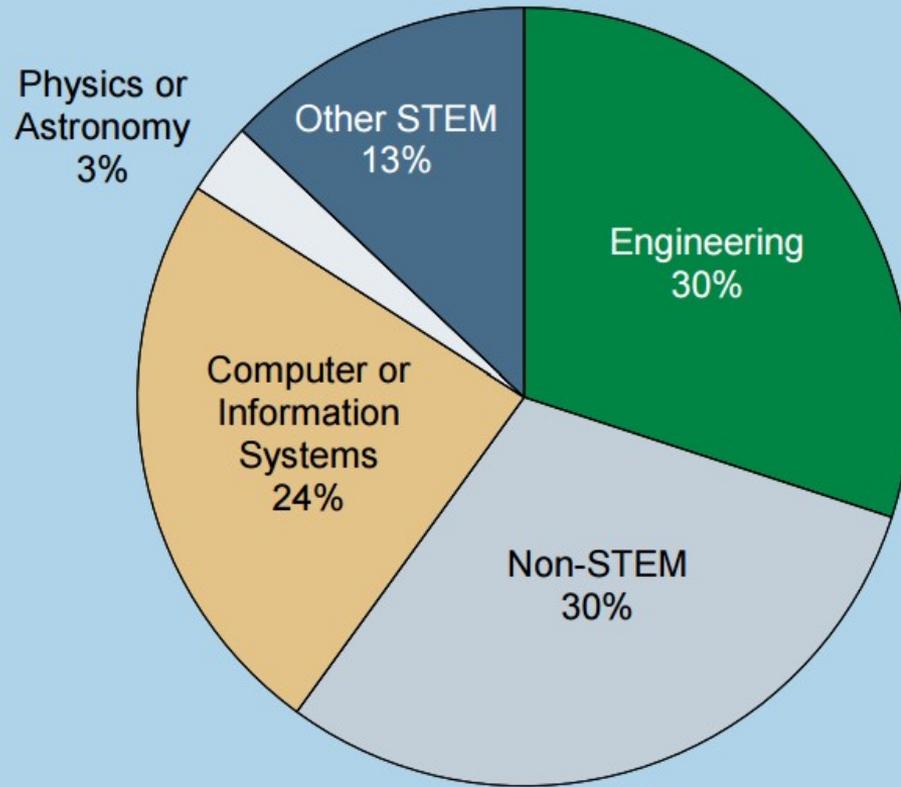
Initial Employment Sectors of Physics Bachelor's, Classes of 2011 & 2012 Combined.



*Data does not include degree recipients from the three military academies (US Naval Academy, US Military Academy, US Air Force Academy).

** Data include two- and four-year colleges, universities, and university affiliated research institutes.

Field of Employment for Physics Bachelor's in the Private Sector, Classes of 2011 & 2012 Combined.



STEM refers to natural science, technology, engineering, and mathematics.

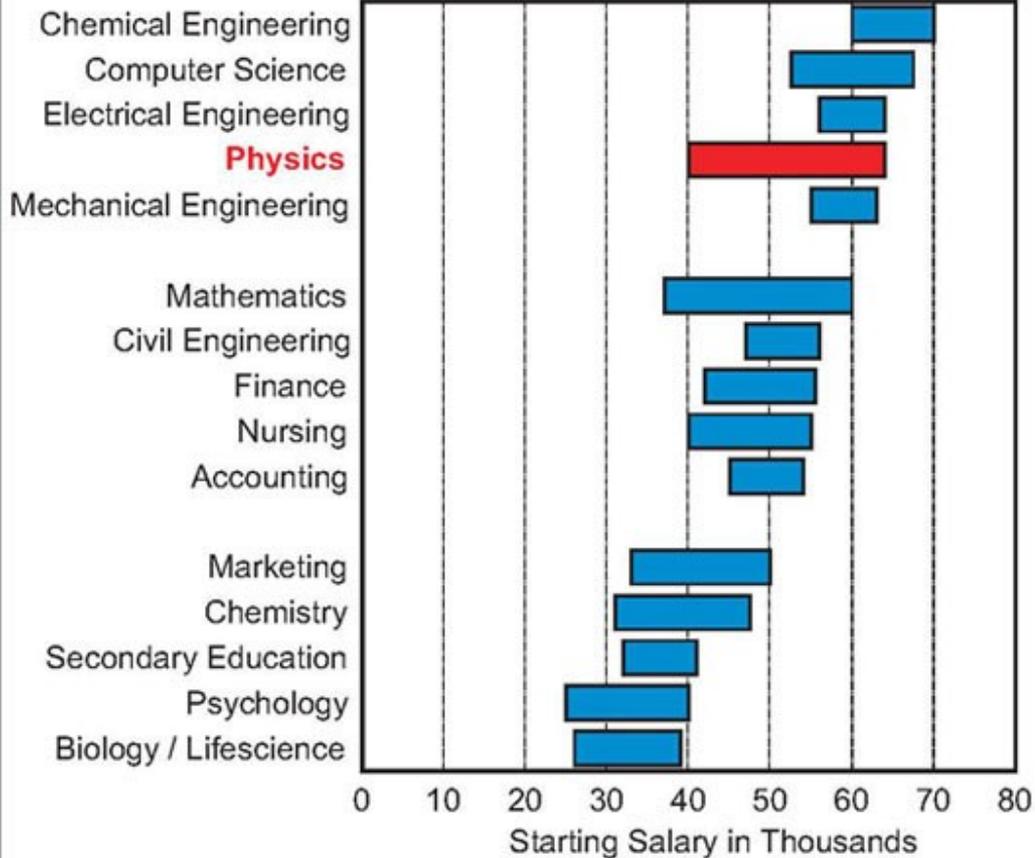
Like Money? Physics Beats Other Sciences

- Even when the job market is slow, physicists get job offers—well paying jobs. Employers know that a physicist brings additional skills with expertise and pay accordingly. That's why physics graduates can expect career salaries similar to those of computer science and engineering majors.

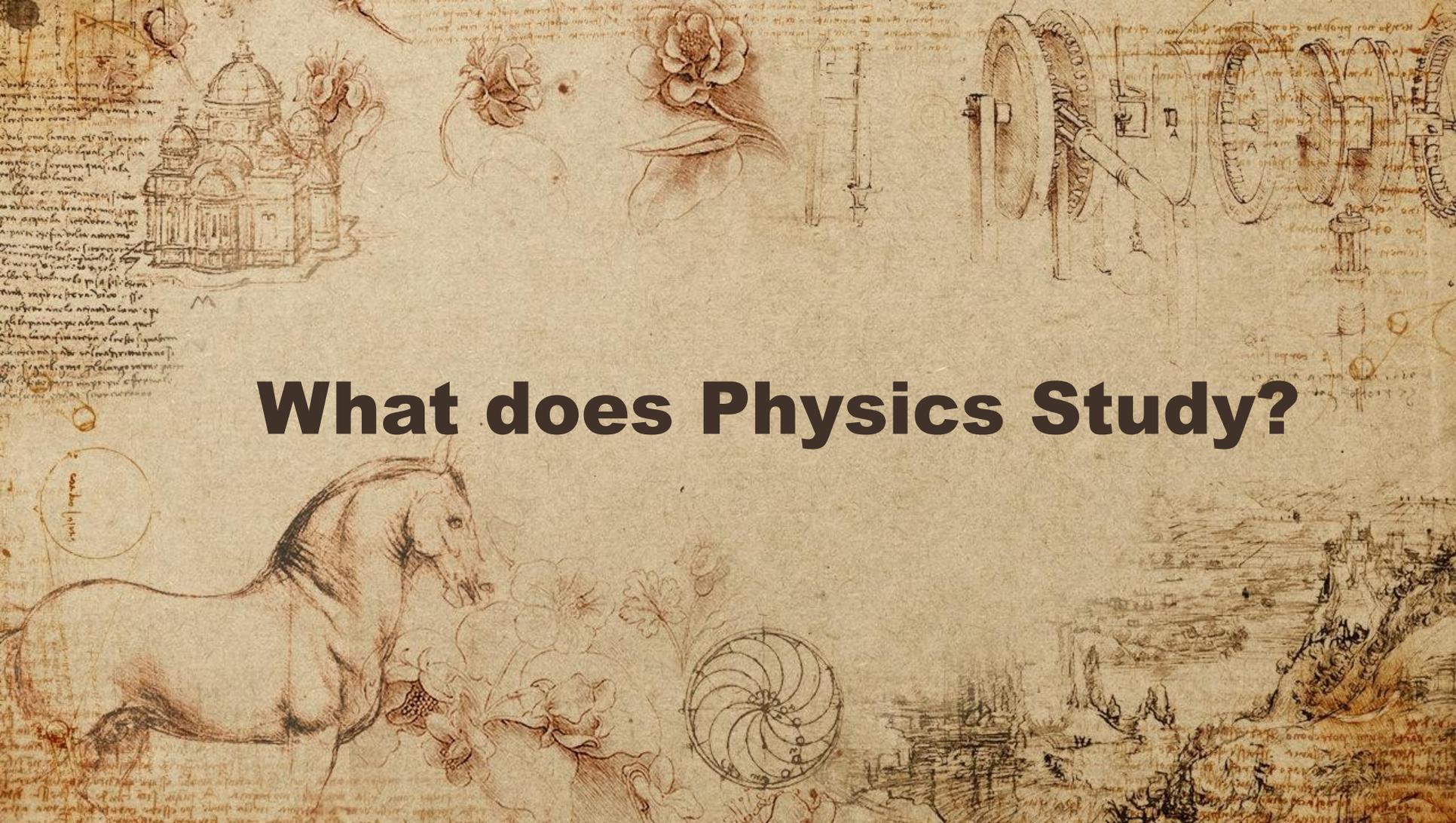
What's a Bachelor's Degree Worth?

Typical Salary Offers by Campus Recruiters, AY 2008-09

Bachelor's Field



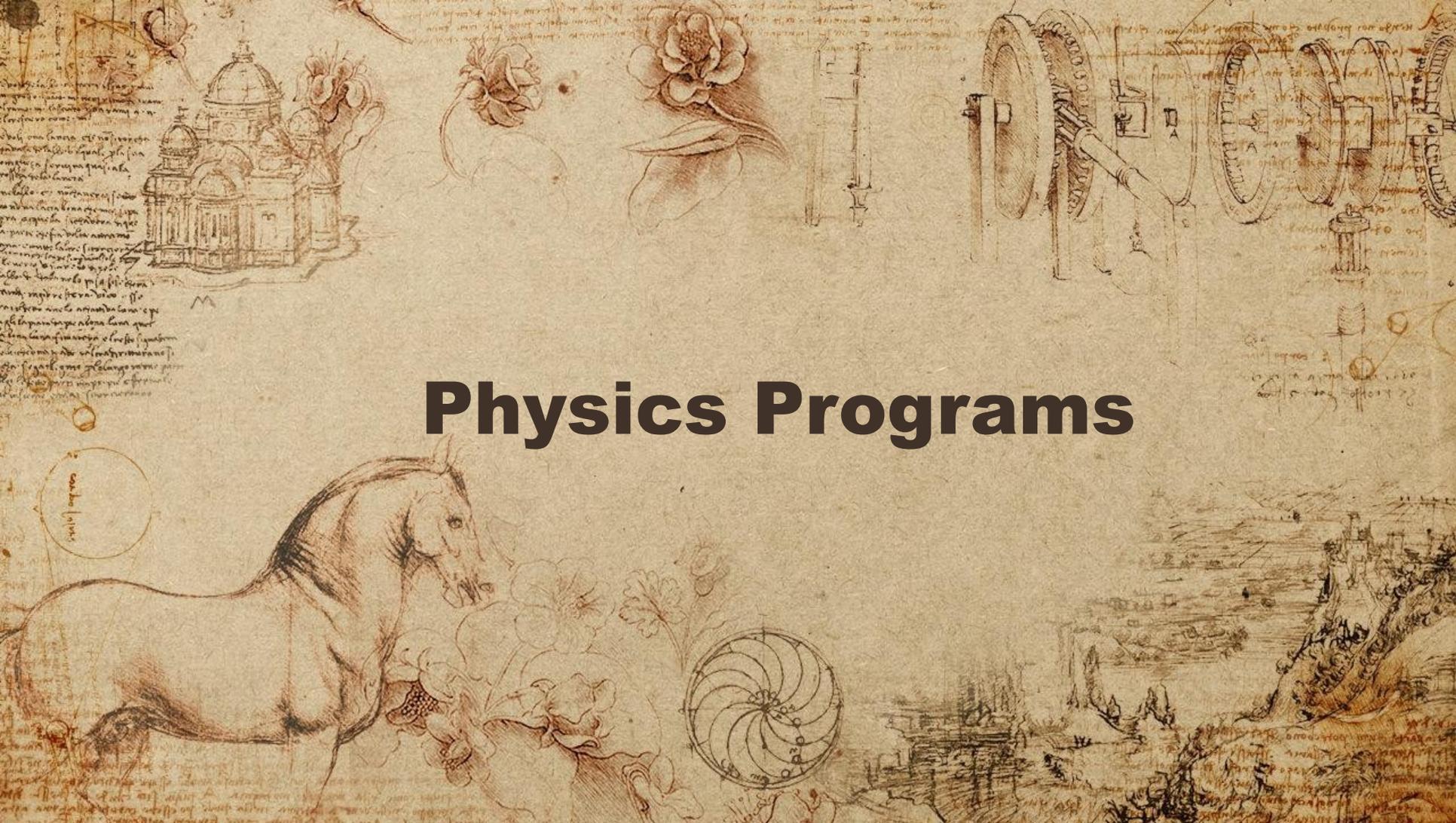
What does Physics Study?

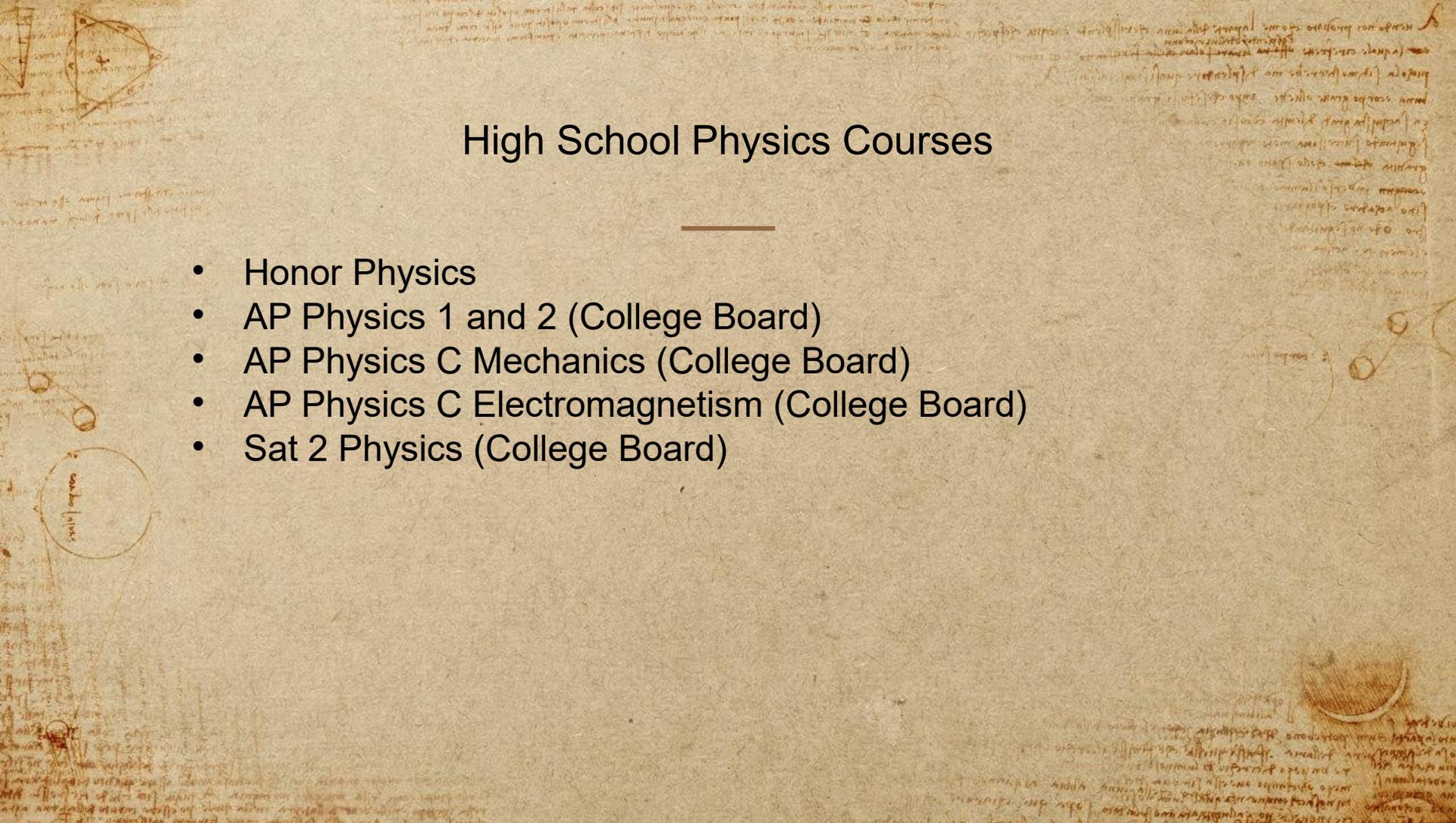


Fundamental Principles of Physics

- Classical Mechanics
- Thermal-dynamics
- Wave and Sound
- Optics
- Electrostatics
- Magnetostatics
- Electromagnetism
- Atomic Physics
- Nuclear Physics
- Special Relativity
- Quantum Physics
- Particle Physics
- Astrophysics and cosmology

Physics Programs





High School Physics Courses

- Honor Physics
- AP Physics 1 and 2 (College Board)
- AP Physics C Mechanics (College Board)
- AP Physics C Electromagnetism (College Board)
- Sat 2 Physics (College Board)

High School Physics Competitions

- U.S. Physics Olympiad
 - $F=ma$ entrance exam (link to syllabus)
 - USPhO semi final (link to syllabus)
- U.S. High School Physics Bowl
- U.S. Science Olympiad
- NJ Science League

Result from recent years: <http://njsci.org>

Research Opportunity for High School Students with Dr. Liu

- Students write research papers based on state of the art numerical calculation of fluid dynamics simulations. Students learn how to work with Navier-Stokes equations, partial differential equations, linear algebra, finite difference and finite volume methods, numerical analysis techniques, matlab and Fortran programming, scientific and parallel programming with MPI, graphing and analyzing data, writing scientific paper using latex. Students gain understanding and confidence in applying math, physics and computer science principles they learned through real world applications.

Why should high school students study Physics

- Physics is the mother of all sciences. Want to understand how chemistry works? Learn physics. Want to understand how biology works? Learn physics. There are few scientific, technical, or mechanical disciplines where a basic understanding of physics won't improve your abilities.
- Physics is the answer key to how the universe works. Why will my car skid on a wet road? Physics can tell us. How does my microwave oven heat my food? Physics can tell us.

Credit [Quora Why should high school students study Physics](#)

Why should high school students study Physics

- Still thinking "I don't care."? Okay, if unlocking the universe isn't motivating enough, let's get more pragmatic. One of the most important things a school can teach its students is problem solving skills. Success in life requires being able to approach a problem, analyze that problem, identify the variables and their relationships, and arrive at a solution. Learning a skill such as problem solving requires repeated exercising of the skill, in more and more challenging ways.

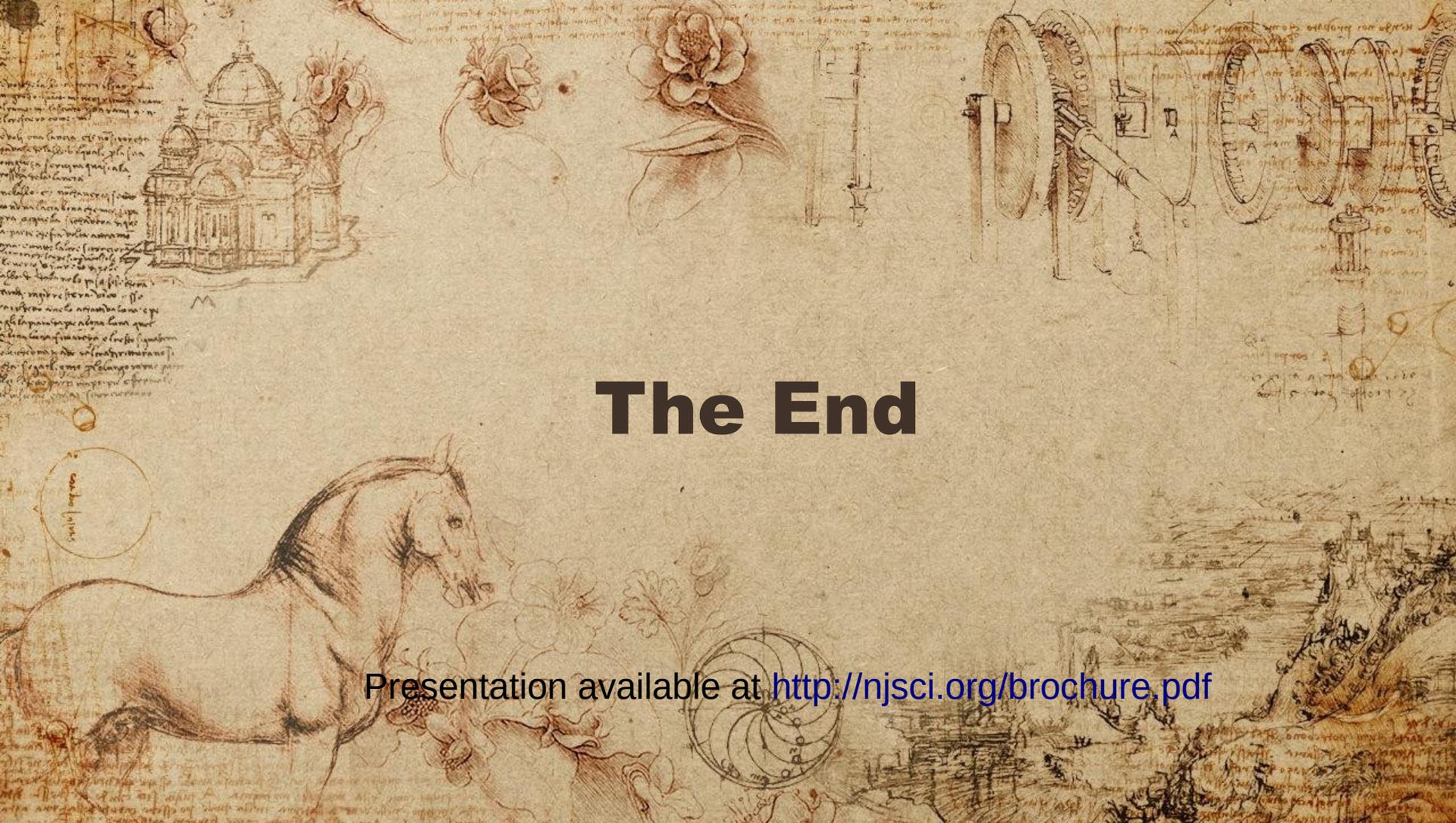
Credit [Quora Why should high school students study Physics](#)

Why should high school students study Physics

- Sure, we could waste time in some boring abstract math class solving generic problems - but physics presents us with real problems that are transferable to our lives, not abstractions. Going to build a shelf in your den? Might be nice to be able to figure out how much weight it can hold. Going to drive in the rain? It might be nice to understand why you should leave more room between you and the next car, when the roads are wet

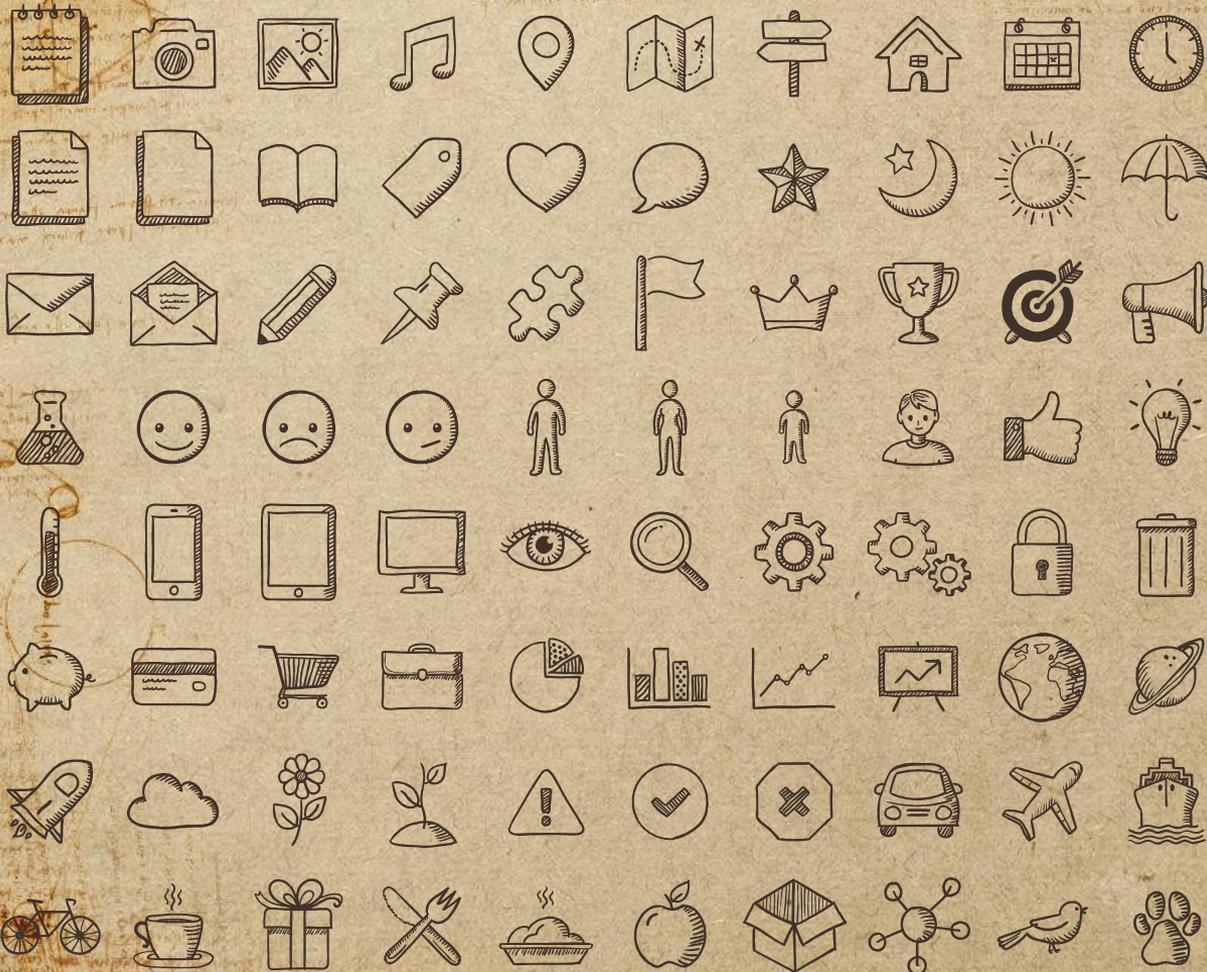
Why should high school students study Physics

- How about the desire to have an informed electorate? Want any hope of understanding whether climate change theories are real or not and whether the solutions of politicians will work? A basic understanding of physics allows that. Want to understand why it costs so much to put a satellite in orbit? A basic understanding of physics allows that. Want to understand why investment in infrastructure, like maintaining bridges, is a critical use of tax dollars? A basic understanding of physics allows that.
- Understanding physics opens our eyes to the world around us and creates an epiphany in much the same way that learning to read does. Everything becomes more clear and accessible



The End

Presentation available at <http://njsci.org/brochure.pdf>



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