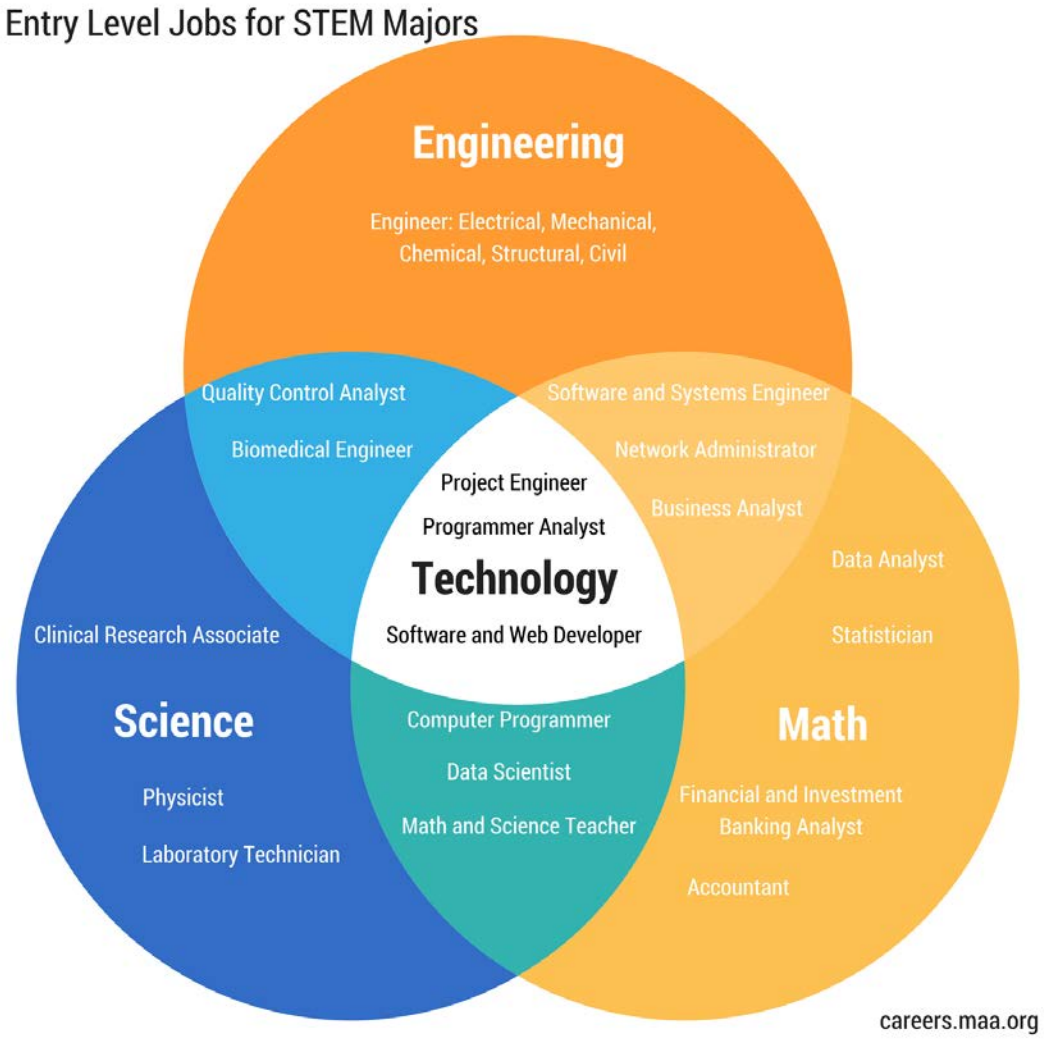
The Mathematics Vocations

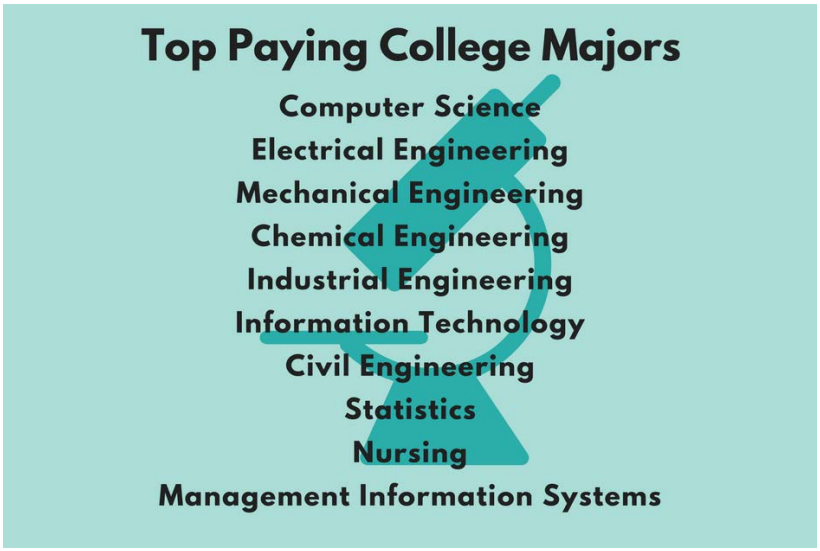
This graphic below is part of the article at mathcareers.maa.org, published on February 16, 2017. The full article regarding STEM-related vocations may be found at http://mathcareers.maa.org/26-entry-level-jobs-stem-majors.



The Bureau of Labor Statistics' ***Occupational Outlook Handbook*** has an electronic page containing information on median pay, required education, job outlook, etc. for the calendar year 2016. The link is https://www.bls.gov/ooh/math/mathematicians-and-statisticians.htm

STEM Major Vocation Pay

One factor when considering a major is the potential salary coming out of college. According to Glassdoor, a job search company, STEM majors have the highest salaries in the five years after graduating college according to a 2016 https://www.glassdoor.com/blog/50-highest-paying-college-majors/ Glassdoor analyzed in excess of a hundred thousand resumes and salary reports to determine which majors have the highest starting salaries after graduation.



According to the ***Wall Street Journal***, a mathematician is considered the "Best Job of All Jobs." Mathematicians' median annual income was pegged at $94,160. The top 3 jobs on the list were: mathematician, actuary and statistician. Five of the 6 "Best Jobs" in terms of low stress, high compensation, autonomy, and hiring demand in the "Job Related Almanac" by Les Krantz are all math related.

According to Kiplinger.com (https://www.kiplinger.com/slideshow/college/T012-S001-best-college-majors-for-your-career-2016-2017/index.html), the following were the top ten best college majors for careers for 2013-14. More recent survey results are also available.

1. Pharmacy and Pharmaceutical Science
2. Computer Science
3. Civil Engineering
4. Information Systems Management
5. Nursing
6. Information Systems
7. Finance
8. Math
9. Information Science
10. Construction Services

WeUseMath.org (http://weusemath.org/?page_id=800) is a website focusing on educating the public about the variety of mathematics-intensive vocations available in the United States and perhaps beyond. This is a superb site which clearly defines many mathematics-intensive vocations, required education, required mathematics skills and courses, exactly when mathematics is used in the vocation, potential employers, other facts about the vocation and works cited. Particular vocations described in more detail at the website are included in the table below.

Actuary	**Air Traffic Controller**	**Animator**
Architect	**Astronaut**	**Attorney**
Biologist	**Biostatistician**	**Budget Analyst**
Cartographer	**Chemical Engineer**	**Chemist**
Climatologist	**College Professor**	**Computational Biologist**
Computer Scientist	**Cost Estimator**	**Cryptanalyst**
Economist	**Electrical Engineer**	**Epidemiologist**
Foreign Exchange Trader	**Forensic Analyst**	**Geographer**
Geologist	**Hydrologist**	**Inventory Control Specialist**
Market Research Analyst	**Mathematical Biophysicist**	**Mathematical Physicist**
Mathematician	**Mechanical Engineer**	**National Security Analyst**
Petroleum Engineer	**Physician**	**Political Scientist**
Psychometrician	**Purchasing Agent**	**Quantitative Financial Market Analyst**
Statistician	**Stockbroker**	**Teacher, High School**
Technical Writer	**Urban Planner**	

MyMajors.com (https://www.mymajors.com/career/mathematicians/) provides a general job description for a mathematics career. According to this website a mathematician conducts "research in fundamental mathematics or in application of mathematical techniques to science, management, and other fields. Solve[s] problems in various fields using mathematical methods." MyMajors.com meticulously reports answer to the following regarding mathematics vocations:

1. Which skills are required and what knowledge is needed?
    a. Mathematics Knowledge—arithmetic, algebra, geometry, statistics, calculus, linear algebra, logic, etc.
    b. Reading Comprehension
    c. Basic Applications of Mathematics in Multiple Areas: Computers, Engineering, Physics, Chemistry, Architecture, Data Science, etc.
    d. Critical Thinking—using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems
    e. Complex Problem Solving
    f. Active Learning—understanding the implications of new information for both current and future problem-solving and decision-making
    g. Active Listening—giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times
    h. Effective writing—appropriate for the needs of the audience
    i. Effective speaking
    j. Learning Strategies—selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things
    k. Science
    l. Judgment and Decision Making—considering costs and benefits of potential actions to choose the most appropriate one
    m. Systems Analysis
    n. Systems Evaluation
    o. Time Management
    p. Coordination—adjusting actions in relation to others' actions
    q. Social Perceptiveness—being aware of others' reactions and understanding why they react as they do
    r. Persuasion
    s. Management of Resources
    t. Programming or Algorithm Development—writing computer programs for various purposes

2. Which work styles are most preferred?
    a. Analytical Thinking
    b. Attention to Detail
    c. Innovation
    d. Integrity
    e. Achievement/Effort
    f. Persistence
    g. Independence
    h. Initiative
    i. Dependability

j. Adaptability/Flexibility
k. Self-Control
l. Stress Tolerance
m. Cooperation
n. Leadership
o. Concern for Others

3. What do employees in these vocations do?
    a. Apply mathematical theories and techniques to the solution of practical problems in business, engineering, the sciences, or other fields
    b. Develop mathematical or statistical models of phenomena to be used for analysis or for computational simulation
    c. Maintain knowledge
        i. Professional journals
        ii. Communication with other professionals
        iii. Attending professional conferences
    d. Perform computations and apply methods of analysis to data
    e. Develop computational methods
    f. Disseminate research
        i. Writing reports
        ii. Publishing papers
        iii. Presenting at conferences
    g. Analyze relationships of quantities, magnitudes, and forms through the use of numbers and symbols
    h. Conduct research to extend mathematical knowledge
    i. Design, analyze, and decipher encryption systems (military, political, financial, or law enforcement)