



# Royersford Elementary School

**STEM In-Practice Initiative**

**SIP**

# Taking Spring-Ford to the next level

- Understanding the problem
- Creating a pilot program to evaluate concept and demand (SIP)
- Developing a solution (plan)
- Implementation

# Understanding the problem

- Job trends and education
- We need to educate children geared toward availability of jobs focusing on matching talent and interest to economic demand signal
- Realistic approach to career counseling

United States Department of Labor BLS  
Occupational Employment Statistics

<b>Area: National</b>	<u>Employment(1)</u>	<b>Hourly mean wage</b>	<u>Annual mean wage(2)</u>
<b>Accountants and Auditors(132011)</b>	1168330	\$34.86	\$72,500.00
<b>Computer and Mathematical Occupations(150000)</b>	3696180	\$39.43	\$82,010.00
<b>Computer Occupations(151100)</b>	3573120	\$39.36	\$81,860.00
<b>Software Developers and Programmers(151130)</b>	1442500	\$44.63	\$92,820.00
<b>Computer Programmers(151131)</b>	312340	\$38.91	\$80,930.00
<b>Computer Network Architects(151143)</b>	141270	\$46.97	\$97,700.00
<b>Mathematical Science Occupations(152000)</b>	123070	\$41.57	\$86,470.00
<b>Mathematicians(152021)</b>	3030	\$49.67	\$103,310.00
<b>Operations Research Analysts(152031)</b>	72680	\$39.26	\$81,660.00
<b>Statisticians(152041)</b>	24950	\$40.05	\$83,310.00
<b>Aerospace Engineers(172011)</b>	71500	\$50.70	\$105,450.00
<b>Biomedical Engineers(172031)</b>	19890	\$45.18	\$93,960.00
<b>Chemical Engineers(172041)</b>	33300	\$50.16	\$104,340.00
<b>Electrical and Electronics Engineers(172070)</b>	303450	\$45.86	\$95,380.00
<b>Electrical Engineers(172071)</b>	168100	\$44.89	\$93,380.00
<b>Materials Engineers(172131)</b>	24190	\$43.23	\$89,930.00
<b>Mechanical Engineers(172141)</b>	258630	\$41.31	\$85,930.00
<b>Nuclear Engineers(172161)</b>	16400	\$51.38	\$106,860.00
<b>Petroleum Engineers(172171)</b>	34910	\$71.72	\$149,180.00
<b>Biological Scientists(191020)</b>	100620	\$37.32	\$77,630.00
<b>Biochemists and Biophysicists(191021)</b>	29110	\$44.06	\$91,640.00
<b>Conservation Scientists(191031)</b>	18590	\$30.45	\$63,330.00
<b>Medical Scientists(191040)</b>	109620	\$42.98	\$89,390.00
<b>Medical Scientists, Except Epidemiologists(191042)</b>	104280	\$43.38	\$90,230.00
<b>Physicists(192012)</b>	17340	\$56.27	\$117,040.00
<b>Chemists(192031)</b>	87560	\$37.37	\$77,740.00
<b>Physical Scientists, All Other(192099)</b>	23290	\$45.65	\$94,950.00

**Footnotes:**

(1) Estimates for detailed occupations do not sum to the totals because the totals include occupations not shown separately. Estimates do not include self-employed workers.

(2) Annual wages have been calculated by multiplying the hourly mean wage by 2,080 hours; where an hourly mean wage is not published, the annual wage has been directly calculated from the reported survey data.

SOC code: Standard Occupational Classification code -- see <http://www.bls.gov/soc/home.htm>

United States Department of Labor BLS  
Occupational Employment Statistics

**Area: National**

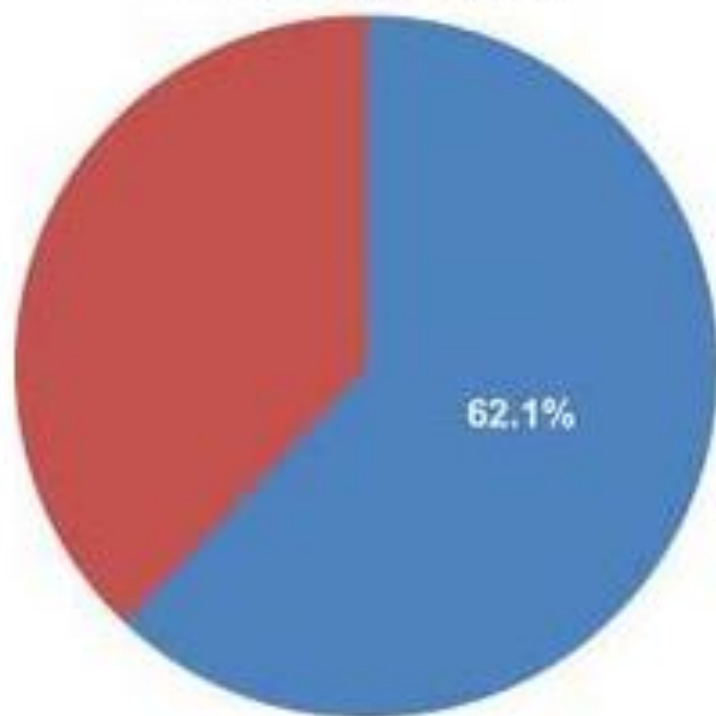
	<a href="#">Employment(1)</a>	<b>Hourly mean wage</b>	<a href="#">Annual mean wage(2)</a>
<b>Counselors, Social Workers, and Other Community and Social Service Specialists(211000)</b>	1830190	\$21.49	\$44,690.00
<b>Substance Abuse and Behavioral Disorder Counselors(211011)</b>	83120	\$19.75	\$41,090.00
<b>Elementary and Middle School Teachers(252020)</b>	1984360	<a href="#">(4)-</a>	\$56,420.00
<b>Art and Design Workers(271000)</b>	507370	\$24.63	\$51,240.00
<b>Craft Artists(271012)</b>	4750	\$17.60	\$36,600.00
<b>Graphic Designers(271024)</b>	194360	\$23.85	\$49,610.00
<b>Physical Therapist Assistants and Aides(312020)</b>	121270	\$20.37	\$42,360.00
<b>Physical Therapist Assistants(312021)</b>	72640	\$25.63	\$53,320.00
<b>Physical Therapist Aides(312022)</b>	48630	\$12.50	\$25,990.00
<b>Hairdressers, Hairstylists, and Cosmetologists(395012)</b>	351960	\$13.24	\$27,530.00
<b>Retail Sales Workers(412000)</b>	8500690	\$11.39	\$23,690.00

**Footnotes:**

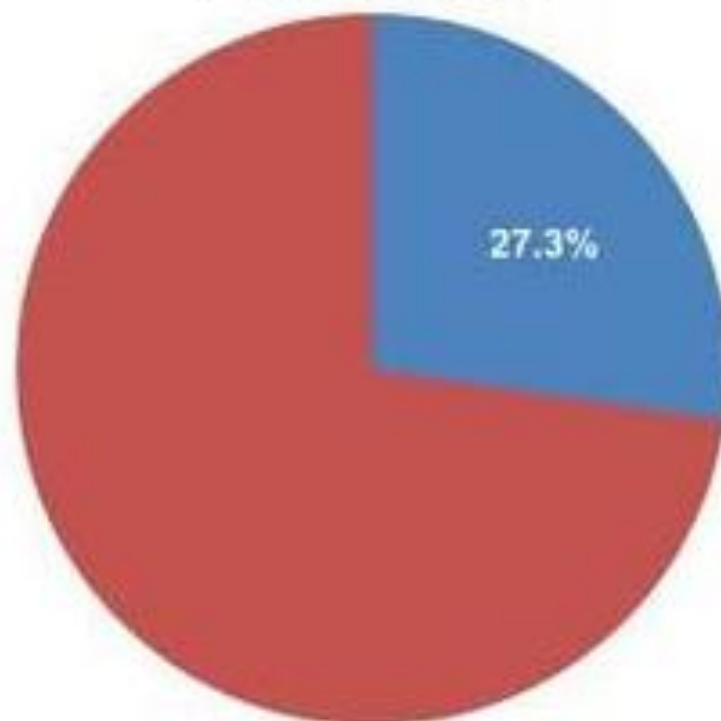
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- [\(2\)](#) Annual wages have been calculated by multiplying the hourly mean wage by 2,080 hours; where an hourly mean wage is not published, the annual wage has been directly calculated from the reported survey data.
- [\(4\)](#) Wages for some occupations that do not generally work year-round, full time, are reported either as hourly wages or annual salaries depending on how they are typically paid.

## Share of College Graduates Working in a Job Requiring a College Degree or Related to Their College Major

College Degree Match



College Major Match



Source: U.S. Bureau of the Census, 2010 American Community Survey; authors' calculations.

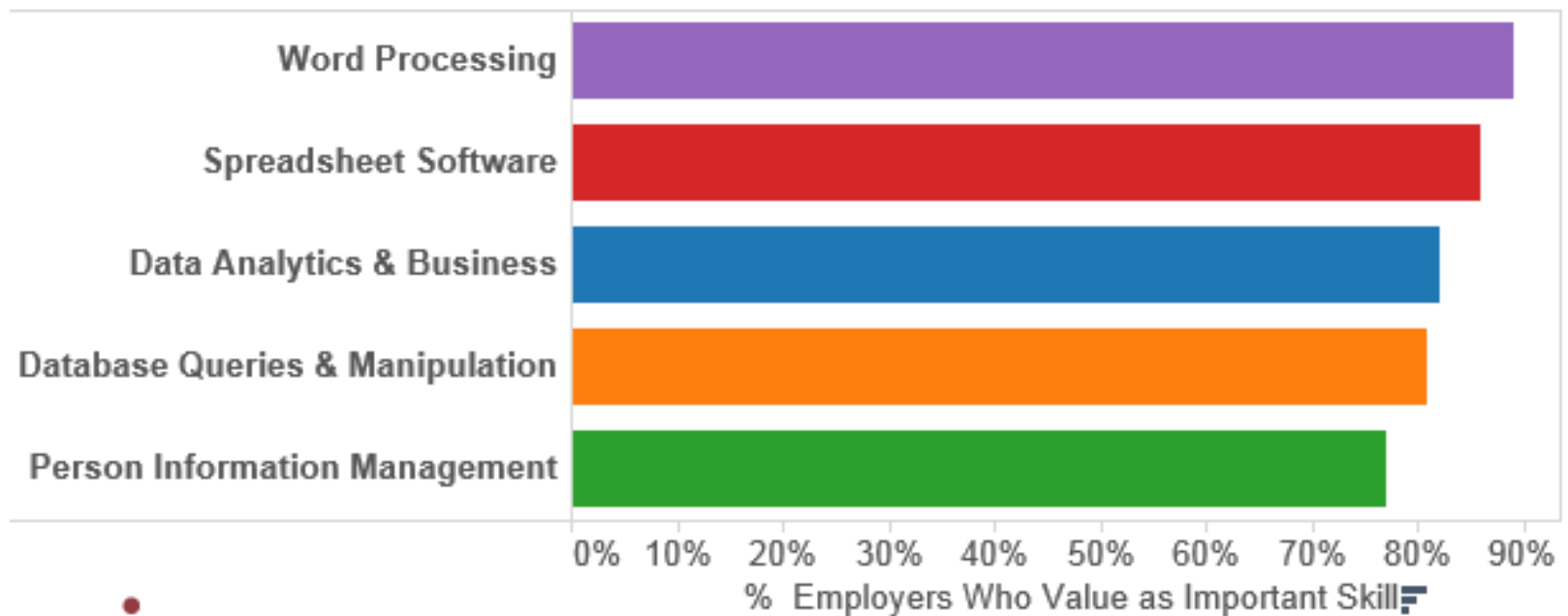
Note: Individuals with graduate degrees are not included in the calculation of college major matching because the information available on majors relates to the undergraduate degree.

Rank	Major	% Underemployed	Reason for Underemployment			Starting Median Pay	% Male	% Female	% Who Feel Underpaid and are Actually Underpaid	Common Underemployed Jobs for These Majors
			I am underpaid	I am not using my education or training	I work part-time but want full-time work					
1	Criminal Justice	62.4%	78.7%	19.1%	2.1%	\$34,500	53%	47%	44.3%	Paralegal / Legal Assistant, Security Guard, Police Officer
2	Business Management & Administration	60.0%	81.2%	16.7%	2.1%	\$44,300	48%	52%	44.6%	Office Manager, Customer Service Representative, Retail Store Manager
3	Health Care Administration	57.6%	83.8%	13.8%	2.5%	\$43,800	24%	76%	44.4%	Medical or Dental Office Manager, Medical Office Biller, Medical Coding Specialist
4	General Studies	54.5%	76.1%	17.4%	6.5%	\$32,100	39%	61%	47.1%	Administrative Assistant, Customer Service Representative, Cashier,
5	Sociology	52.5%	79.4%	15.9%	4.7%	\$38,900	30%	70%	53.4%	Receptionist, Human Resources Assistant, Teacher Assistant
6	English Language & Literature	52.1%	75.3%	21.3%	3.4%	\$39,700	30%	70%	47.8%	Administrative Assistant, Paralegal / Legal Assistant, Office Manager
7	Graphic Design	51.5%	84.6%	10.3%	5.1%	\$37,300	43%	57%	50.5%	Web Developer, User Interface Designer, Marketing Assistant
8	Liberal Arts	50.3%	64.9%	24.7%	10.4%	\$34,200	30%	70%	37.7%	Receptionist, Retail Store Manager, Bank Teller
9	Education	50.0%	73.6%	20.8%	5.6%	\$40,500	30%	70%	44.4%	Daycare Teacher, Teacher Assistant, Tutor
10	Psychology	49.5%	70.7%	23.8%	5.6%	\$38,200	27%	73%	46.4%	Human Resources Assistant, Mental Health Technician, Sales Associate

## Least Underemployed Majors

- Civil and Environmental Engineering
- Aerospace Engineering
- Computer Engineering
- Law
- Physics
- Mechanical Engineering
- Electrical Engineering
- Geology
- Mathematics

## Top 5 Hard Skills Employers Want





# U.S. National Security Strategy

<http://nssarchive.us/wp-content/uploads/2015/02/2015.pdf>

## Lead in Science, Technology, and Innovation

Scientific discovery and technological innovation empower American leadership with a competitive edge that secures our military advantage, propels our economy, and improves the human condition. Sustaining that edge requires robust Federal investments in basic and applied research. We must also strengthen science, technology, engineering, and mathematics (STEM) education to produce tomorrow's discoverers, inventors, entrepreneurs, and high-skills workforce. Our commitment remains strong to preparation and compensation for STEM teachers, broadband connectivity and high-tech educational tools for schools, programs that inspire and provide opportunities for girls and underrepresented minorities, and support for innovation in STEM teaching and inclusion in higher education. We will also keep our edge by opening our national labs to more commercial partnerships while tapping research and development in the private sector, including a wide range of start-ups and firms at the leading edge of America's innovation economy.

# STEM in Practice: General Concept:

- Start children out fast and early
- They will accept and work toward the expectations we set for them
- Spring-Ford can lead in education and our area can become a technology hub
- Everything in future technology development will require advanced mathematics and computer skills and our nation is badly lagging behind
- Focus on language associated with technology research, development, and testing for STEM, Aerospace, and Biotechnology (German)

**Mission Statement:** To make Spring-Ford school district a STEM center of excellence. Creating a collaborative environment between education, industry, and other partners, where students have a heavy focus on mathematics and science and are given training in language and computer science early (2<sup>nd</sup> or 3<sup>rd</sup> grade).

Focus areas driving innovation:

- Biotechnology
- Aerospace
- Robotics
- Advanced Sensing

# Baseline and follow-on testing

- Pilot group baseline tested at a 6<sup>th</sup> grade level for Physics, elementary level German, and on basic computer concepts.
- Baseline testing scores:
  - Physics 35%
  - German 22%
  - Computer Concepts and Code Writing 22%note: testing multiple choice
- Follow-on testing scheduled for June

# Weekly Schedule

## Monday

- Friday Review
- Elementary German language training

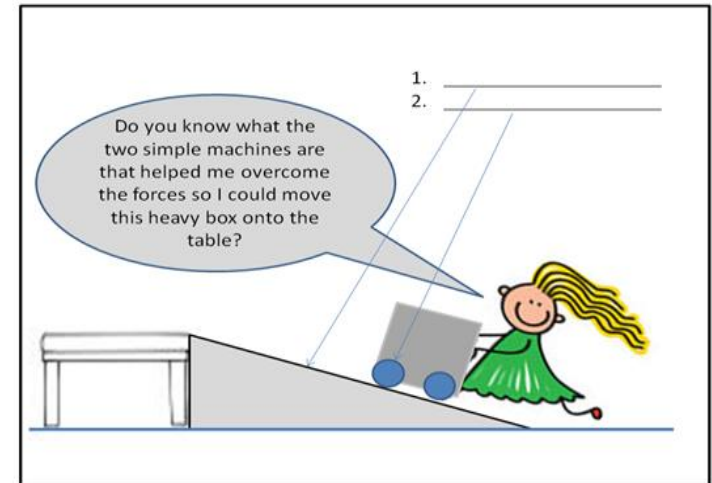
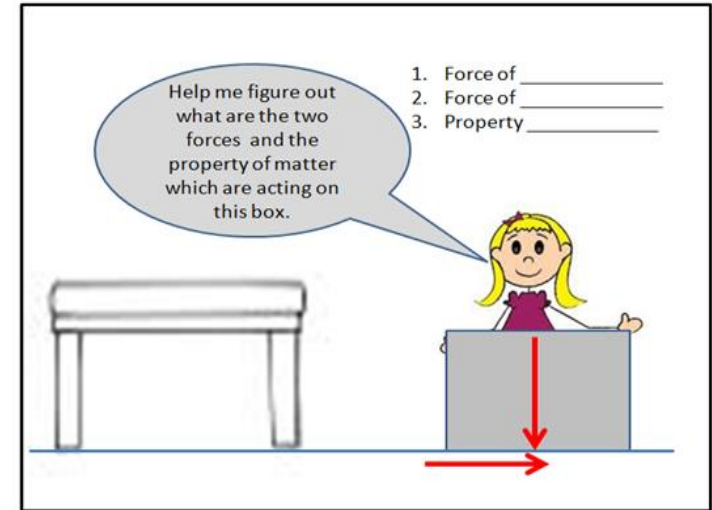
## Wednesday

- Monday Review
- Science and Math Training
  - Focus on Physics of forces
  - Simple Machines
  - Combustion Engine Design History, Function, and Innovation

## Friday

- Wednesday Review
- Basic Code Writing
- Excel Usage for Statistical Analysis

## Jaime Sue's Amazing Adventure 1



# Two Year Overview:

## Year One

- Start program as voluntary pilot open to 30 math proficient students 3 days a week
- Program to combine focus on STEM (Science Technology Engineering and Math) with writing computer code, and foreign language (German)
- Technology focus engine design
- Begin offering program at second grade
- Volunteer Instructors from Springford High School, and area Universities with guest technology speakers
- Source funding grants
- Partner with industry for funding and equipment

## Year Two

- Try to begin incorporating aspects of program into curriculum
- Open to broader student base

# A path forward

**We can become the STEM leader in the United States!**

We need focus, a focus on top level goals from curriculum through financial investment.

- Developing a solution (plan)
- Implementation