Students entering the 21st century workplace will face an occupational world unrecognizable to their parents. Many of the jobs they will pursue did not exist ten years ago.

The majority of high paying jobs will be in STEM related career fields. Some will require advanced degrees, but many will just require advanced training.

One thing they all require though, is a commitment to being the best at what you do. It is critical for students to discover a career that gets them excited, one where they discover their passion.

This STEM Summit intends to help students do that: to realize that careers can be fun and really cool!
A new definition of STEM

A STEM job is any job that requires specialized knowledge in SCIENCE, TECHNOLOGY, ENGINEERING, or MATH.

Previous STEM studies have neglected the many blue collar and technical jobs that require considerable STEM knowledge. But this study finds that 50% of STEM jobs do not require a bachelor’s degree. As a result, STEM knowledge plays a much larger role in our economy than previously thought:

- There are 26 million STEM jobs in the U.S.
- STEM jobs comprise 20% of all U.S. jobs.
- The share of jobs requiring STEM knowledge has doubled since the Industrial Revolution.

STEM occupations requiring the most knowledge

<table>
<thead>
<tr>
<th>Occupation</th>
<th># of jobs</th>
<th>avg. wages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomedical Engineers</td>
<td>16,590</td>
<td>$88,360</td>
</tr>
<tr>
<td>Chemical Engineers</td>
<td>27,070</td>
<td>$99,440</td>
</tr>
<tr>
<td>Biochemists and Biophysicists</td>
<td>26,150</td>
<td>$87,640</td>
</tr>
<tr>
<td>Engineers, All Other</td>
<td>125,960</td>
<td>$92,260</td>
</tr>
<tr>
<td>Nuclear Engineers</td>
<td>18,630</td>
<td>$105,660</td>
</tr>
<tr>
<td>Agricultural Engineers</td>
<td>2,650</td>
<td>$78,400</td>
</tr>
<tr>
<td>Materials Scientists</td>
<td>7,900</td>
<td>$96,600</td>
</tr>
<tr>
<td>Engineering Teachers</td>
<td>33,660</td>
<td>$91,260</td>
</tr>
<tr>
<td>Hydrologists</td>
<td>6,960</td>
<td>$79,070</td>
</tr>
<tr>
<td>Materials Engineers</td>
<td>22,160</td>
<td>$86,790</td>
</tr>
</tbody>
</table>

Wage premium, bachelor’s or higher STEM jobs vs. non-STEM jobs with similar educational requirements: +14%

Most common STEM occupations requiring an Associate’s Degree or less

<table>
<thead>
<tr>
<th>Occupation</th>
<th># of jobs</th>
<th>avg. wages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered Nurses</td>
<td>2,798,670</td>
<td>$69,710</td>
</tr>
<tr>
<td>Auto Technicians and Mechanics</td>
<td>507,570</td>
<td>$30,560</td>
</tr>
<tr>
<td>Carpenters</td>
<td>588,500</td>
<td>$44,330</td>
</tr>
<tr>
<td>Supervisors of Production Workers</td>
<td>559,930</td>
<td>$56,690</td>
</tr>
<tr>
<td>Electricians</td>
<td>512,290</td>
<td>$52,290</td>
</tr>
<tr>
<td>Computer Systems Analysts</td>
<td>497,740</td>
<td>$82,330</td>
</tr>
<tr>
<td>Supervisors of Mechanics, etc.</td>
<td>480,930</td>
<td>$60,290</td>
</tr>
<tr>
<td>Machinists</td>
<td>367,310</td>
<td>$50,520</td>
</tr>
<tr>
<td>Plumbers, Pipefitters, Steamfitters</td>
<td>349,120</td>
<td>$51,830</td>
</tr>
<tr>
<td>Welders, Cutters, Solderers, Brazers</td>
<td>316,290</td>
<td>$37,890</td>
</tr>
</tbody>
</table>

Wage premium, sub-bachelor’s STEM jobs vs. non-STEM jobs with similar educational requirements: +10%
Overview of STEM Summit

The STEM Summit is a day-long program held at local high schools across South Central PA. It consists of nine, thirty-minute sessions to include science, technology, engineering, and math activities. The fast pace and constant motion create an atmosphere of excitement and energy.

The program, which is coordinated and run by Junior Achievement, involves up to 35 business volunteers who work with the students during the day. Volunteers have specific careers and are encouraged to share how STEM influences their job with the students throughout the day.

The goal of the STEM Summit is to inspire students to pursue an academic STEM focus in the remainder of their high school courses. After the completion of the Summit, guidance counselors have a foundation to work with students on appropriate school course work.

What grade level is the STEM Summit designed for?

JA encourages schools to consider implementing it at the freshman or sophomore levels. The goal is to help students realize the importance of taking math and science classes in high school.

Which students should participate in the STEM Summit?

The STEM Summit gives every student an opportunity to see the applications of science, technology, engineering, and math in the real world. As a result, JA requires that the program be available to all students at grade level.

What is the charge to schools for the STEM Summit?

Junior Achievement provides the STEM Summit to schools for free. There is some work required by the school to run the event to include; promoting volunteer need within district, preparing agendas, providing teachers to supervise discipline, and having a facility team available for set up and take down.
Chemists from North Industrial Chemical and Glatfelter work with students on experiments focused on polymers and chemistry.

Electrical professionals from IBEW work with students on assembling electrical junction boxes.
The Trades

STEM careers cover many fields, industries, and professions. One important category are STEM jobs that do not require a college degree.

We have three modules available on the trades: Electrical, Plumbing, and Automotive. These activities are hands on and allow students to work in teams to complete assignments. Teamwork and collaboration are key elements in these modules.

Comments from Teachers

“I found the program helped students make connections between STEM knowledge learned in the classroom and STEM application and careers discovered at the Summit.

Students returned to the classroom eager to discuss the event and had a new purpose for high classroom performance.”

Beverly Whiteford
Science Department Chair
Kennard-Dale High School

Competitions

The STEM Summit’s immersive style creates situations where students are involved in science and math without even knowing it. Competitions are where students work together in small groups to complete an activity. Scores are kept and prizes given to the winning teams at the end of the day.

The Robotics competition is an opportunity for students working in teams to compete against other teams. VEX Robotics provides the robotic equipment for this competition. The Relay Competition combines a number of engineering and scientific activities as teams compete against each other. The Math Competition has the students competing in various math activities from algebra to geometry and more.

Experiments

Experiments give students an opportunity to get hands on with science. The students will learn about foam/polymers through a fun Chemistry experiment. They will diagnose a patient’s illness through a simulated urinalysis and agglutination testing and learn about the spread of disease through a biology experiment. The students are introduced to computer programming concepts through the Scratch language and code a computer game.

The goal of each set of experiments is not to teach science, but to give students a fun look at science and its application to the real world.
The STEM Summit is a fun, engaging opportunity for students to learn about STEM careers. It demonstrates how science, technology, engineering, and math coursework are important to prepare for pursuing 21st century jobs. The STEM Summit is not intended to teach science or math, but rather to inspire students to want to learn.

In the Math Competition, students cycle through several different problem solving challenges. Students drive robots using a controller and must work together to pick up and stack cones. High point winners are awarded prizes.

Program evaluation charts increased interest in STEM by students

Junior Achievement is completing regular program survey from students, volunteers and educators to ensure effectiveness. Continuous improvement is taking place to enhance learning.
How to get involved?

Junior Achievement of South Central PA is pleased to be able to make this program available to local high schools, free of charge, thanks to the support of the business community.

Business Involvement:

There are two ways that a business can become involved in the STEM Summit.

1. Provide professional volunteers

Each STEM Summit day requires approximately 35 business volunteers. The volunteer is assigned to one of the nine modules and works with groups of students for 30 minutes for each group. This is a full day assignment running from approximately 8:00 AM to 2:00 PM.

2. Provide financial support

Junior Achievement’s annual budget is over $2.1 million. Approximately 90% of this funding comes from the business community. The STEM effort is one of many programs that require financial support.

Sponsorship levels are available specifically for our STEM programs in JA BizTown and the STEM Summit. Typically, these range from $25,000 to $1,000. Recognition is sized to the level of support.

- $1,000 – Name of your company in all collateral materials.
- $5,000 – Small logo in all collateral materials.
- $10,000 – Large logo in all collateral materials
- $25,000 and up – Special recognition in JA BizTown and large logo

JA scales recognition based on the level of support. For information on support levels, contact Tom Russell at Trussell@jascpa.org.

Educator Involvement:

To help ensure that all students are on track for meaningful postsecondary engagement and success, the Pennsylvania Department of Education has included a measure of students’ career exploration and preparation under the Every Student Succeeds Act (ESSA). Every student is required to provide examples of engagement at 5th, 8th, and 11th grade.

Junior Achievement, in working with local school districts, has developed a series of templates for artifacts tied to students participating in the STEM Summit program. These Templates are available for download from the jascpa.org website under Educator tab.

If your school has an interest in getting involved, please contact Heidi Potter at the JA office. You can do this by phone at (717) 843-8028 or by email to hpotter@jascpa.org.

Comments from Students:

“It was one of the best things I did in my high school career. I would love to do it again.”

“I am now certain I want to be an engineer.”

“An amazing learning experience.”

“I thought the STEM Summit was awesome. It was better than I thought it was going to be.”