



The Governor's JOBS1st PA STEM Competition Rules

INTRODUCTION

Pennsylvania is home to some of the most technologically diverse and scientifically sophisticated companies in the world. With these avenues for employment existing in our communities, it is important that students develop an understanding of STEM concepts and gain STEM competencies. The Governor's JOBS1st PA STEM Competition is an annual, rotating themed academic contest for students in grades 9-12 that is focused on exposing students to STEM concepts, skills, and occupations. This year's theme is "Building a Stronger Pennsylvania." The purpose for the competition is to increase STEM-related educational opportunities for students at the regional and state levels. Furthermore, the JOBS1st PA STEM Competition intends to raise awareness of the importance of science, technology, engineering, and mathematics education.

CHALLENGE

Teams of high school students from across the Commonwealth are challenged to select a real-world problem, conduct research, design, build, and present a device that is capable of making the quality of life better for citizens of Pennsylvania. Teams are provided with a \$500 stipend to fabricate a prototype of their device. Throughout the challenge, students engage with their local community to learn about STEM careers and the skills necessary to be employable and successful in STEM-related Pennsylvania industries. Specifically, teams shall collaborate with a local company and work with a mentor employed by the business. To culminate the experience, students present their device and findings to a panel of judges. The challenge will test teams' communication, problem solving, critical thinking skills, and creativity.

Teams are encouraged to look at the competition rubrics to gain a better understanding of how projects and presentations will be evaluated. All rubrics related to the regional and state competitions can be found at PAstemcompetition.com.

AWARDS/PRIZES

Each student member of the teams that finish first, second and third at the **state competition** will receive college scholarships. The value of the scholarships is as follows:

Each member of the state competition's First Place team will receive a \$2,000 college scholarship and an additional \$1,000 if they choose to attend a PASSHE school.

Each member of the state competition's Second Place team will receive a \$1,000 college scholarship and an additional \$500 if they choose to attend a PASSHE school.

Each member of the state competition's Third Place team will receive a \$500 college scholarship and an additional \$500 if they choose to attend a PASSHE school.

REGIONAL COMPETITION

Regional competitions will be held at each of the Commonwealth's Intermediate Units (IU) during the month of February at a date and time identified by each IU. The one-day regional competition will be comprised of three phases. Each phase will be evaluated by a panel of judges consisting of, at minimum, one IU representative, one business representative, and one local postsecondary institution representative.

- **PHASE 1: DEVICE/ PROJECT PROPOSAL AND PRESENTATION** – Beginning in October 2014, teams will research and identify a real-world challenge facing Pennsylvanians. Not exceeding the \$500 provided stipend, and using only materials purchased with these funds, students will create a single prototype of their device that effectively addresses the challenge they have identified. In order to ensure equity, teams will not be permitted to use more than \$500 worth of materials for their prototype. This includes any materials/components that are donated to the team. For example, a project cannot include a \$700 component that was donated by a community sponsor. Any team that exceeds the allotted budget will be subject to a significant point reduction.

To support the presentation, each team will also submit a written proposal or project plan, not to exceed 1,000 words. The proposal must be submitted to the appropriate IU on January 30, 2015, prior to the regional competition, in order to provide judges with enough time to review it. The proposal should include the following information, which will be evaluated by the judges:

- Describe a real-world problem within the community
- Identify community needs and possible improvements
- Use of engineering processes and principles
- Budget documentation
- A plan for and identification of the costs of improvement
- Written communication, including conventions

For the final component listed for the proposal, students must outline how they would spend an additional \$750 to improve their prototype/device if they made it to the state competition finals, justify how their proposed upgrades would improve the project and benefit intended users, and provide a brief explanation of any improvements they would make above and beyond a \$750 limit and what kind of STEM professions would be needed to make their prototype/device a reality.

Build Requirements:

- Teams cannot spend more than their project stipend and must provide proof of purchase for all components used in their creation.
- Mechanisms should be primarily autonomous. Remote control is permitted to initiate a command, but not control the function of a task.

At the competition, students will have 20 minutes to present their device to the panel of judges, and will be scored on the following components:

- Knowledge of the team's device and its application
 - Understanding of STEM skills and processes
 - Appearance and creativity of the device
 - Design of the device
 - Scalability of the device
 - Local business/industry connections
 - Delivery methods and oral communication
- **PHASE 2: STEM IN YOUR COMMUNITY** – Each team will partner with a local STEM-related company and work with a mentor that is employed by the company. Through interviews of local STEM employers and employees, students develop a general level of understanding of the current STEM opportunities in their IU region, as well as emerging or future STEM opportunities. Teams must demonstrate a thorough understanding of the skills and

training needed to successfully pursue STEM career opportunities. The school-business partnership will serve to teach students how the company utilizes STEM to either create a product or solve a problem. Armed with this knowledge, students provide 10-minute presentation focused on how STEM is utilized within their community to solve problems. Teams will also be asked to provide a team reflection on the work performed by every team member and what they learned/gained from the experience.

At the competition, students will be scored on the following components:

- Partnership with a STEM business
- Identify of how STEM is used to solve community challenges, now and in the future
- Explain how research influenced the device
- Identify skills/ training needed for STEM jobs and why they are needed
- Team reflection
- Delivery and oral communication

While the research conducted by students does not necessarily have to be in the same STEM industry as their identified device/prototype, students will be expected to utilize their findings of STEM business concepts to explain the *practical application* of their device/prototype and how it will meet the needs of the individuals, communities, or the state.

- **PHASE 3: WORKING AS A TEAM** – At the regional competition, teams will be given a box of materials and 30 minutes to complete a set of tasks. This exercise will be an opportunity to demonstrate to the judges the cohesive nature of the team and receive points for teamwork, ingenuity, positive attitudes, etc.

Teams will be judged on the following components:

- Collaborative communication
- Teamwork
- STEM skills demonstrated
- Task completion

For all three phases of the regional competition, the IU panel of judges will use a rubric, provided by the Statewide STEM Planning Committee, to provide a score to each participating team. The average score from each of the judges will be awarded to the team. All rubrics are available to teams to guide the development of their written proposal, device, and presentation. These rubrics, along with contest rules, Frequently Asked Questions and other materials are available on the JOBS1st PA STEM Competition website at PAstemcompetition.com.

All regional competitions must be concluded by February 27, 2015 and the identity of winning teams must be submitted to the Pennsylvania Department of Education by March 2, 2015.

TEAM ELIGIBILITY

Participation in the JOBS1st PA STEM Competition is limited to students in grades 9-12 from Pennsylvania schools. Teams of five students are selected from each interested school to compete. Eligible participants include public schools, career and technical education centers, charter schools and private schools.

While there is no limit to the number of teams a school district or IU can have enter in the competition, **each school can only field one team**. Entries will be accepted on a first-come, first-serve basis.

TEACHER ADVISOR

Each team must have a teacher advisor that is approved by the participating school to serve in this capacity. This individual will work with the team as an advisor, but may not directly help with the development of the team's solution. The role of the teacher advisor is to supervise work sessions, provide support, and facilitate positive collaboration and teamwork. Judges reserve the right to disqualify or deduct points from any team that is found to have violated the rules or the spirit of the rules.

TEAM REGISTRATION

Teams must indicate their intent to participate by **Sept. 29, 2014** via the competition website – PASTEMCompetition.com. Registration packets containing key information and permission slips will be sent **Sept. 30, 2014** and must be returned by **Oct. 10, 2014**. Competition packets will be sent **Oct. 17, 2014**.

To register, each team member must have a signed permission slip from his/her parent and/or guardian.

Teams must also have written permission from the LEA's superintendent, school principal, and teacher advisor.

Teams are responsible for their transportation to and from all competitions.

JUDGES

Each phase will be evaluated by a panel of judges consisting of, at minimum, one IU representative, one business representative, and one postsecondary institution representative. IUs will be responsible for selecting judges and determining the appropriate number that will be needed. For example, IUs with a large number of teams may elect to have an additional number of judges. Different sets of judges could then be asked to judge different phases of the competition. However, if more than one set of judges is utilized, it is advised that the sets of judges each be assigned a specific phase. This will ensure consistency and that allow judges to focus on one specific phase (i.e. STEM in Your Community, etc.)

STIPEND

All registered schools will receive \$500 stipends to design and build a prototype of their prototype/device Stipends will be provided to school principals, who will disperse funds to her/his school team as requested. Teams are not required to spend the entire \$500 stipend, but must account for funds as part of its budget document. Any team that drops out of the competition and does not participate in the regional competition will be required to immediately return the full amount of the stipend.

STATE COMPETITION

The Statewide JOBS1st PA STEM Competition will be held at Thaddeus Stevens College of Technology on May 29, 2015. The one-day statewide STEM competition will be comprised of two phases. Each phase will be evaluated by a panel consisting of, at minimum, one IU representative, two to four businesses and two to four representatives from postsecondary institutions.

- **PHASE 1: PROTOTYPE & PROJECT PLAN VERSION 2.0** – Beginning on March 2, 2015, teams that successfully move on to the statewide competition will implement improvements as identified in their regional competition project plans. Teams will receive an additional stipend of \$750 to make any modifications listed in their project plan, as well as any additional improvements that the stipend allows. Teams will then have from March 2 - May 15 to make the necessary modifications. In order to ensure equity, teams will not be permitted to have more than \$750 worth of new equipment in their prototype or exceed the total stipend for both phases of \$1,250. This includes any materials/components that are donated to the team. For example, a project cannot include a \$1,500 component that was donated by a community sponsor. Any team that exceeds the allotted budget will be subject to a significant point reduction.

To support the presentation, each team will also submit a written proposal or project plan, not to exceed 1,000 words. The proposal must be submitted to the Pennsylvania Department of Education on May 15, 2015, prior to the state competition, in order to provide judges with enough time to review it. The proposal should include the following information, which will be evaluated by the judges:

- Describe a real-world problem within the community
- Identify community needs and possible improvements
- Use of STEM processes and principles related to their creation
- Budget documentation
- A plan for and identification of the cost of improvements beyond the competition.
- Written communication, including conventions

At the competition, students will have 20 minutes to present their prototype/device to the panel of judges, and will be scored on the following components:

- Knowledge of the team's device and the practicality of their improvements
- Understanding of STEM skills/thought process used identifying areas of improvement
- Appearance and creativity of the device
- Identification of the level to which modifications improved device performance.
- A sense of scale for their prototype and must demonstrate the calculations on how their prototype/project would need to be up-scaled if it were to be produced.
- An understanding of the STEM related skills / careers necessary to bring their ideas to life if they were to mass produce their device for all Pennsylvanians.
- Delivery methods and oral communication

- **PHASE 2: BUILDING A STRONGER PA PRESENTATION** – After redesigning the prototype and completing the intense research behind the development and application of their device, teams will have 5 minutes to explain to a panel of judges the STEM related skills / careers that are essential to ensuring a strong economy and prosperous future for Pennsylvania. Teams will additionally define the skills that enabled their team to successfully redesign their device. Finally, each team will describe how their device would help an individual, their community or all Pennsylvanian's if their device were to be mass produced.

At the competition, students will be scored on the following components:

- Identify essential STEM related skills / careers in PA.
- Identify of how STEM is used to solve community challenges, now and in the future
- Explain how research influenced the device
- Identify skills/ training needed for STEM jobs and why they are needed
- Team reflection
- Delivery and oral communication

For all three phases of the regional competition, the IU panel of judges will use a rubric, provided by the Statewide STEM Planning Committee, to provide a score to each participating team. The average score from each of the judges will be awarded to the team. All rubrics are available to teams to guide the development of their written proposal, device, and presentation. These rubrics, along with contest rules, Frequently Asked Questions and other materials are available on the JOBS1st PA STEM Competition website at PASTEMCompetition.com.

TEAM REGISTRATION

All regional competitions must be concluded by February 27, 2015 and the identity of winning teams must be submitted to the Pennsylvania Department of Education by March 2, 2015.

Beginning March 2, 2015, teams that successfully move on to the statewide competition will implement improvements as identified in their regional competition project plans. Teams will receive a stipend to make any modifications listed in their project plan, as well as any additional improvements that the stipend allows. Teams will then have from March 2 - May 15 to make the necessary modifications. The Statewide STEM Competition will be held at Thaddeus Stevens College of Technology on May 29, 2015.

Teams are responsible for their transportation to and from the competition.

JUDGES

The one-day statewide STEM competition will be comprised of two phases. Each phase will be evaluated by a panel consisting of, at minimum, one IU representative, two to four businesses and two to four representatives from postsecondary institutions. Judges will be selected by the Pennsylvania Department of Education, in cooperation with participating IUs.

STIPEND

All state finalists will receive \$750 stipends to make any modifications listed in their project plan, as well as any additional improvements that the stipend allows. Stipends will be provided to LEA principals, who will disperse funds to her/his school team as requested. Teams are not required to spend the entire \$750 stipend, but must account for funds as part of its budget document. Any team that drops out of the competition and does not participate in the statewide competition will be required to immediately return the full amount of the stipend.

IMPORTANT DATES

- **Wednesday, September 10**
The Governor's JOBS1st PA STEM Competition officially announced and the competition website goes live
Competition/Rules packet sent to each IU with details about the competition and their roles
- **Monday, September 29**
Deadline for schools to decide if they plan to participate via the competition website at PAstemcompetition.com
- **Tuesday, September 30**
Registration packets distributed to schools
- **Friday, October 10**
Deadline for signed permission forms due back to schools
- **Friday, October 17**
Distribution of Competition packet for each team participating in a regional competition
- **Friday, January 23**
IUs must finalize lists of judges
- **Friday, January 30**
Deadline for teams to submit their project plan to their respective IU in order to be judged prior to the regional competitions
- **February 2015**
Regional competitions take place at IUs
- **Friday, February 27**
Deadline for all regional competitions to be concluded
- **Monday, March 2**
Deadline for IUs to submit their winning regional teams to the Pennsylvania Department of Education
- **Friday, May 15**
Deadline for state finalist teams to submit their project plan to the Pennsylvania Department of Education in order to be judged prior to the regional competitions
- **Friday, May 29**
JOBS1st PA STEM Competition finals held at Thaddeus Stevens College of Technology in Lancaster, PA

For more information about The Governor's JOBS1st PA STEM Competition and a complete set of rubrics and resources visit PAstemcompetition.com