Mission is to increase the number of culturally responsible Black engineers who excel academically, succeed professionally, and positively impact the community.
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INTRODUCTION TO NSBE

NSBE

The National Society of Black Engineers (NSBE) was founded in 1975 by six black engineering students at Purdue University nicknamed the Chicago 6. The original aspiration was to establish a student organization to help improve the recruitment and retention of black engineering students. NSBE is now the largest student-managed organization in the United States with more than 25,000 members.

NSBE is comprised of more than 300 chapters on college and university campuses, 75 professional chapters nationwide and over 100 NSBE Jr. chapters. These chapters are geographically divided into six regions. The NSBE mission is to increase the number of culturally responsible Black engineers who excel academically, succeed professionally and positively impact the community. For more information on NSBE, please visit www.nsbe.org.

In fulfillment of the NSBE objective to “stimulate and develop student interest in the various engineering disciplines”, the various programs and competitions were created for pre-college students.

PCI

The Pre-College Initiative (PCI) Program is the focus of the NSBE effort to promote college, academics, technology, and leadership to pre-college students. Our primary focus is to encourage students in grades 6-12 to develop interest in Science, Technology, Engineering and Mathematics (STEM).

The mission of PCI is to lead the world in enhancing the pre-college students’ academic, technical, and leadership skills in order to maximize their success in life. The vision is to establish PCI as an incubator for our youth, where they can be nurtured and guided in their academic careers.

NSBE Chapters support PCI through the multiple programs.

NSBE JR.

A vital component of the PCI program is NSBE Jr., which serves as the membership category for pre-college students and institutions that are officially chartered with NSBE. NSBE Jr. members and chapters are at the core of PCI, as they are the primary focus and beneficiaries of PCI programs.

NSBE Jr. focuses on enhancing the education received by African-American and other minority pre-college students, as well as influencing these students to become tomorrow’s corporate executives, entrepreneurs, and leaders. In this spirit, NSBE Jr. is the quintessential recruitment, teaching, and preparation device for the NSBE.
TAKE THE PLEDGE!

NSBE 2025

Engineering is a mainstay of innovation and a pillar of the global economy, largely responsible for the prosperity our nation has enjoyed for many decades. But as engineering has grown in importance, the percentage of African Americans in the field has been stagnant or in decline.

To meet this challenge, NSBE has set an ambitious goal: to lead the U.S. to produce 10,000 new Black Engineers annually, with bachelor’s degrees, by the year 2025, up from 3,501 in 2014. NSBE’s 2025 Campaign (“Be 1 of 10,000”) asks African-American 7th through 12th graders across the country to pledge to achieve academic excellence in science, technology, engineering and math (STEM). NSBE wants these students to see themselves as future engineers and then make their visions real. Go to Graduate10K.NSBE.org, and take the pledge!
FIRST® LEGO® League Jr.

NSBE FIRST® LEGO® League Jr. is not a COMPETITION

FIRST® LEGO® League Jr. OVERVIEW

Focused on building an interest in science and engineering in children ages 6-10, FIRST® LEGO® League Jr. is a hands-on program designed to capture young children’s curiosity and direct it toward discovering how science and technology impact the world around them. This program features a real-world challenge, to be explored through research, critical thinking and imagination.

Guided by adult coaches, teams (up to 6 members, grades K-4) explore a real-world scientific problem such as food safety, recycling, energy, etc. Then they create a Show Me poster that illustrates their journey of discovery and introduces their team. They also construct a motorized model of what they learned using LEGO elements. In the process, teams learn about teamwork, the wonders of science and technology, and the FIRST® LEGO® League Jr. Core Values, which include respect, sharing, and critical thinking. At the close of each season, teams come together at NSBE’s Annual Convention to show off their accomplishments, share ideas, celebrate, and have fun!

Every year, FIRST® LEGO® League Jr. works with experts in the field to create a Challenge that relates to an important real world issue. Past Challenges have been based on topics such as nanotechnology, climate, quality of life for the handicapped population, and transportation. The end result of the design process is a Challenge with two defined parts – the Show Me Poster and the Model. The culmination of the hard work for our teams is the participation in the showcase event at the NSBE’s Annual Convention. Volunteer reviewers at the event interview the teams to learn about their LEGO Model and Show ME poster. All the teams are celebrated and leave with an award.

FIRST® LEGO® League Jr. teams get to:

- Explore challenges facing today’s scientists
- Discover real-world math and science
- Design and build a challenge-related model with a moving part using LEGO® elements
- Create a Show Me Poster and practice presentation skills
- Develop teamwork skills
- Choose to participate in Expos and showcases
- Engage in team activities guided by the FIRST LEGO League Jr. Core Values
Core Values

The FIRST® LEGO® League Jr. Core Values are the cornerstones of the program. They are among the fundamental elements that distinguish FIRST® LEGO® League Jr. from other programs of its kind. We ask that everyone associated with every team understand and honor these Core Values.

• We are a team.
• We do the work. Our coaches and mentors help us learn, but we find the answers ourselves.
• We share our experiences and discoveries with others.
• We are helpful, kind, and show respect when we work, play, and share. We call this Gracious Professionalism®.
• We are all winners.
• We have fun.

Show Me Poster

The Show Me Poster requires teams to illustrate their research and team journey. It provides an opportunity for them to share what they studied, what they learned, and to show information about the team and each team member.

• Create a Show Me Poster using a flat poster board or tri-fold presentation board.
• Use words, drawings, photos, and small objects to tell about what they have learned during their Challenge research.
• Show where they hunted for answers and describe the people they spoke with on their journey.
• Describe their Model and simple machine.
• Tell observers about the team itself.

Model

The Model gets teams moving! Teams build a representation of what they are researching, based off the Challenge, and incorporate simple machines and movement into their creation.

• Create a Model that fits within a 15” x 15” footprint.
• Design a Model made of LEGO® parts. Typically, a team of six will use 400 to 1,000 LEGO parts during the season.
• Must have at least one motorized piece on the Model.
• Create a simple machine using LEGO ramps, levers, pulleys, gears, wheels and axles, screws, or wedges and incorporates this into their model.
Application Procedure

NSBE FIRST®LEGO® League Jr. registration is completed via an online application through NSBE Connect. Each team interested in participating for the 2016-2017 program year must submit an application for the program and meet all of the team requirements. Completing all of the information in the application is vital.

NSBE FIRST®LEGO® League Jr. Registration Information

Team Requirements
Every NSBE FIRST®LEGO® League Jr. team must:
• Consist of a minimum of two and up to a maximum of six participants
• Consist of a combination of students in Kindergarten through 4th grade
• Attend the 43rd Annual Convention in Kansas City, MO
• Consist of active NSBE Jr. members or active participants (if ineligible for membership) in an active NSBE Jr. Chapter
• Complete the application request before the deadline
• Assign a chapter advisor and team coach to complete the FIRST Youth Protection Program. (Each team needs 2 registered coaches through FIRST®.)

IMPORTANT NOTE: A NSBE FIRST®LEGO® League Jr. coach can prepare more than one NSBE FIRST®LEGO® League Jr. team for the Annual Convention showcase.

Critical 2016-2017 Dates

For quick reference, the following target dates are listed to ensure your participation in NSBE FIRST®LEGO® League Jr. For further information on the upcoming NSBE conferences, please visit nsbe.org

<table>
<thead>
<tr>
<th>Team Responsibility &amp; Events</th>
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<tr>
<td>NSBE FIRST®LEGO® League Jr. Team Application</td>
<td>Final submission deadline is Saturday, October 1, 2016. Participation confirmation will be sent out by Friday, October 7, 2016</td>
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<tr>
<td>NSBE FIRST®LEGO® League Jr. 2016-17 Challenge</td>
<td>All teams need to register through the FIRST® website by October 1, 2016. The NSBE FIRST LEGO League Jr. Challenge details can be found on the FIRST LEGO League Jr. Website</td>
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<tr>
<td>National Showcase</td>
<td>Held at NSBE’s Annual Convention March 29, 2016 – April 2, 2017 in Kansas City, MO</td>
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FIRST® LEGO® League

FIRST®LEGO® League OVERVIEW

The FIRST®LEGO® League competition will only be held at national convention. Teams will build and program robots to compete in this year’s Animal Allies themed challenge.

Each year FIRST®LEGO® League releases a Challenge, which is based on a real-world scientific topic. Each Challenge has three parts: the Robot Game, the Project, and the Core Values. Teams of up to ten students, with at least one adult coach, participate in the Challenge by programming an autonomous robot to score points on a themed playing field (Robot Game), developing a solution to a problem they have identified (Project), all guided by the FIRST®LEGO® League Core Values. The culmination of the hard work for our teams is the participation in the competition at NSBE’s Annual Convention.

FIRST®LEGO® League Competition Components

General

- Team members must make all decisions and do all the work on the Robot Game and Project. This includes deciding on strategy, building, programming, researching, choosing a problem and innovative solution, and presenting at a tournament.
  - Anyone who works with the team (coaches, mentors, topic experts, parents, etc.) may teach team members new skills, handle logistics for the team, ask questions to get team members thinking, and remind them of the FIRST LEGO League rules. Adults play an important role in coaching and supporting their team, but the team’s robot and project should be the work of team members.
Team Members

- A team must have a minimum of two (2) and a maximum of ten (10) students. A team with more than ten (10) children will not be eligible for awards at an official tournament.
- Students may be members of only one (1) FIRST LEGO League team per season.
- No team member may be outside the maximum allowed age in your region prior to January 1 of the year the Challenge is released.
- Allowed ages in U.S., Canada, and Mexico: 9-14 years
- For example, in the United States a student who turns 15 in May of 2016 would be eligible to compete in the Challenge released in August of 2016, whereas a child who turned 15 in December 2015 would not.

Robot Game

- Each team's robot must be built in accordance with all allowable parts, software and other rules.

Project

- Teams must demonstrate completion of all three (3) steps of the Project (identify a problem, develop an innovative solution, and share with others) as part of their presentation, and fulfill any other requirements as defined in the annual Project document

Core Values

The FIRST®LEGO® League Core Values are the cornerstones of the program. They are among the fundamental elements that distinguish FIRST®LEGO® League from other programs of its kind. We ask that everyone associated with every team understand and honor these Core Values.

- We are a team.
- We do the work. Our coaches and mentors help us learn, but we find the answers ourselves.
- We share our experiences and discoveries with others.
- We are helpful, kind, and show respect when we work, play, and share. We call this Gracious Professionalism®.
- We are all winners.
- We have fun.

Judging and Awards

Official tournaments, including the event at NSBE’s annual convention, must follow the judging and awards structure determined by FIRST LEGO League. Although the audience mostly sees teams playing the Robot Game at tournaments, teams are also being judged on:

- Core Values
- Project
- Robot Design

Tournament rubrics and award descriptions can be found on the FIRST®LEGO® League website.
Application Procedure

NSBE FIRST®LEGO® League registration is completed via an online application through NSBE Connect. Each team interested in participating for the 2016-2017 program year must submit an application for the program and meet all of the team requirements. Completing all of the information in the application is vital.

NSBE FIRST®LEGO® League Registration Information

Team Requirements
Every NSBE FIRST®LEGO® League team must:
• Consist of a minimum of two and up to a maximum of six participants
• Consist of a combination of students in grades 6-8
• Attend the 43rd Annual Convention in Kansas City, MO
• Consist of active NSBE Jr. members
• Complete the application request before the deadline
• Assign a chapter advisor and team coach to complete the FIRST Youth Protection Program. (Each team needs 2 registered coaches through FIRST®)

IMPORTANT NOTE: A NSBE FIRST®LEGO® League coach can prepare more than one NSBE FIRST®LEGO® League team for the Annual Convention.

Critical 2016-2017 Dates

For quick reference, the following target dates are listed to ensure your participation in NSBE FIRST®LEGO® League Jr. For further information on the upcoming NSBE conferences, please visit nsbe.org

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<tr>
<td>NSBE FIRST®LEGO® League Jr. 2016-17 Challenge</td>
<td>All teams need to register through the <a href="#">FIRST® website</a> by October 1, 2016. The NSBE FIRST LEGO League Challenge details can be found on the FIRST LEGO League website.</td>
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<tr>
<td>National Competition</td>
<td>Held at NSBE’s Annual Convention March 29, 2016 – April 2, 2017 in Kansas City, MO</td>
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The **MATHCOUNTS Competition** is a fun and challenging math program designed for middle school students to increase their academic and professional opportunities. The competition builds math skills, promotes logical thinking and sharpens students’ analytical abilities. MATHCOUNTS motivates and rewards students by fostering teamwork and a competitive spirit. It involves students and teachers in year-long coaching sessions and helps students at all levels improve their critical-thinking and problem-solving skills.

**Team Registration:**

- Each team will consist of exactly FOUR 6th-8th grade students
- Each team will be given access to Mathletics, an online mathematics tutorial program
- Incentives will be awarded to teams and individual students based off points earned using the Mathletics program
- Teams must be comprised of active NSBE Jr. members
- Attendance at the 43rd Annual Convention in Kansas City, MO is required

**MATHCOUNTS® Competition Components**

MATHCOUNTS Written Competitions are designed to be completed in approximately two hours at Annual Convention:

The **SPRINT ROUND** (40 minutes) consists of 30 problems. This round tests challenges students accuracy in completing all of the problems in a limited period of time. **Calculators are not permitted.**

The **TARGET ROUND** (approximately 30 minutes) consists of 8 problems presented to competitors in four pairs (6 minutes per pair). This round features multistep problems that engage students in mathematical reasoning and problem-solving processes. Problems assume the use of calculators.

The **TEAM ROUND** (20 minutes) consists of 10 problems that team members work to solve together. Team member interaction is permitted and encouraged. Problems assume the use of calculators.

The MATHCOUNTS Final Countdown Round is designed for individual students to compete. A problem is presented to two students at a time. The question will be read aloud, as well a on a screen. Students can use a pencil and scratch paper. Students have 45 seconds to determine the answer and hit a buzzer when they are ready to answer. The other student can continue to work while their opponent is presenting. The student that answers the most questions out of three correct moves on to the next round. **Calculators are not permitted.**
COMPETITION RULES

Pencils and paper will be provided for students. However, students may bring their own pencils, pens and erasers if they wish. They may not use their own scratch paper or graph paper.

Calculators are not permitted in the Sprint Round, but they are permitted in the Target, Team and Tiebreaker (if needed) Rounds. When calculators are permitted, students may use any calculator (including programmable and graphing calculators) that does not contain a QWERTY (typewriter-like) keypad. Calculators that have the ability to enter letters of the alphabet but do not have a keypad in a standard typewriter arrangement are acceptable. Smart phones, laptops, iPads®, iPods®, personal digital assistants (PDAs), and any other “smart” devices are not considered to be calculators and may not be used during competitions. Students may not use calculators to exchange information with another person or device during the competition. Coaches are responsible for ensuring that their students use acceptable calculators, and students are responsible for providing their own calculators (and batteries).

Pagers, cell phones, iPods® and other MP3 players should not be brought into the competition room. Failure to comply could result in dismissal from the competition.

Should there be a rule violation or suspicion of irregularities, the MATHCOUNTS® coordinator or competition official has the obligation and authority to exercise his or her judgment regarding the situation and take appropriate action, which might include disqualification of the suspected student(s) from the competition.

Use of notes or other reference materials (including dictionaries and translation dictionaries) is not permitted.

Communication with coaches is prohibited during rounds but is permitted during breaks. All communication between guests and students is prohibited during competition rounds. Communication between teammates is permitted only during the Team Round.

SCORING

Competition scores do not conform to traditional grading scales. Coaches and students should view an individual written competition score of 23 (out of a possible 46) as highly commendable.

The individual score is the sum of the number of Sprint Round questions answered correctly and twice the number of Target Round questions answered correctly. There are 30 questions in the Sprint Round and 8 questions in the Target Round, so the maximum possible individual score is 30 + 2(8) = 46.
The team score is calculated by dividing the sum of the team members’ individual scores by 4 (even if the team has fewer than four members) and adding twice the number of Team Round questions answered correctly. The highest possible individual score is 46. Four students may compete on a team, and there are 10 questions in the Team Round. Therefore, the maximum possible team score is \( ((46 + 46 + 46 + 46) \div 4) + 2(10) = 66 \).

Ties will be broken as necessary to determine team and individual prizes. For ties between individuals, the student with the higher Sprint Round score will receive the higher rank. If a tie remains after this comparison, specific groups of questions from the Sprint and Target Rounds are compared. For ties between teams, the team with the higher Team Round score, and then the higher sum of the team members’ Sprint Round scores, receives the higher rank. If a tie remains after these comparisons, specific questions from the Team Round will be compared. Note: These are very general guidelines. Competition officials receive more detailed procedures.

In general, questions in the Sprint, Target and Team Rounds increase in difficulty so that the most difficult questions occur near the end of each round. In a comparison of questions to break ties, generally those who correctly answer the more difficult questions receive the higher rank.

Protests concerning the correctness of an answer on the written portion of the competition must be registered with the room supervisor in writing by a coach within 30 minutes of the end of each round. Rulings on protests are final and may not be appealed.

Application Procedure

MATHCOUNTS® registration is completed via an online application through NSBE Connect. Each team interested in participating for the 2016-2017 program year must submit an application for the program and meet all of the team requirements. Completing all of the information in the application is vital.

Critical 2016-2017 Dates

For quick reference, the following target dates are listed to ensure your participation in MATHCOUNTS®. For further information on the upcoming NSBE conferences, please visit nsbe.org
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<tr>
<td>MATHCOUNTS® Team Application</td>
<td>Final submission deadline is <strong>Saturday, October 1, 2016</strong>. Participation confirmation will be sent out by <strong>Friday, October 7, 2016</strong></td>
</tr>
<tr>
<td>MATHCOUNTS® 2016-17 Challenge</td>
<td>Teams must submit a list of (4) participating students to <a href="mailto:pci@nsbe.org">pci@nsbe.org</a> and download the MATHCOUNTS School Handbook from the <a href="#">MATHCOUNTS® website</a> by <strong>Friday, October 14, 2016</strong>. Student report cards must be submitted to <a href="mailto:pci@nsbe.org">pci@nsbe.org</a> by <strong>Sunday, January 15, 2017</strong> to be eligible to compete at convention</td>
</tr>
<tr>
<td>National Competition</td>
<td>Held at NSBE’s Annual Convention <strong>March 29, 2016 – April 2, 2017</strong> in Kansas City, MO</td>
</tr>
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</table>
The Math Video Challenge is an innovative program that empowers middle school students to be math teachers, video producers, actors and artists — all at the same time! Working together in teams, students create their own videos about math problems and the concepts associated with them. Formerly known as the Reel Math Challenge, the Math Video Challenge is designed to get students excited about math while giving them the opportunity to hone their creativity and communication skills. During the year, students create a video that teaches the solution to one of the problems from the MATHCOUNTS School Handbook and also demonstrates the real-world application of the math concepts used in the problem.

Team Registration:
- Each team will consist of exactly FOUR 6th-8th grade students
- Teams must be comprised of active NSBE Jr. members
- Attendance at the 43rd Annual Convention in Kansas City, MO is required

Math Video Competition Components

Getting Started in the Math Video Challenge
1. Assemble a team of 4 students + team advisor
2. Register your team
3. Review critical deadlines and get started on the video project
4. Submit your team’s video

Rules for Videos and Video Submission

- All student teams must have exactly four members, although all four members do not necessarily need to appear in the video. The students may split up the various tasks associated with the project, as they like. Subject to securing the appropriate written permissions, additional people not on the official team may appear in the video, but only the four team members will be recognized for advancement and recognition in the contest. Students do not have to combine with students from their own school, or even students from their hometown or state.

- Videos submitted must be no more than 5 minutes in length. Furthermore, videos must be in English or subtitled in English.
• Content in the videos, including music, audio, speech/voiceovers, stills, video supers or other audiovisual materials must be: 1) entirely original, created and performed by the entrants; 2) original creations of works in the public domain and/or 3) content that allows royalty-free use of the material with no restrictions by entrant and MATHCOUNTS. Videos cannot contain copyrighted content owned by third parties except as noted. For more information please visit http://videochallenge.mathcounts.org/what-music-andor-video-can-i-use-my-video.

• Other than the Team Members, no one else may appear or provide voiceover for the video entries unless the team has obtained written permission from those persons whose name, image, likeness, or voice (“Likeness”) is included in the video, and that such person(s) have granted the team and MATHCOUNTS all necessary rights to use the person’s Likeness as described in these rules, and that team provides written permission from the minor’s parent or legal guardian authorizing the use of the minor’s Likeness on behalf of the minor.

• Video content may not defame or disparage any individuals, companies, organizations or institutions. Furthermore, the videos may not contain nudity, lewd or vulgar behavior, offensive language and/or gestures.

• Students may participate on more than one team.

• Each team may submit more than one (1) video. However, a team may only have one video submission be eligible for advancement. Should a team have more than one video place in the top 100 in votes received, only the highest ranked video will be eligible to advance to the top 20 semifinalist videos.

• While teams are eligible to submit more than (1) video, each submission must feature a different handbook problem.

• Prior to uploading a video submission, each entrant must register for the contest. To register for the contest, entrants must access and submit the Team Member Registration Form on the contest website. In addition to submitting a completed Registration Form, each entrant must have his/her parent complete a digital Release Form before any video submission can take place. Each member of the team must have a parent or guardian provide approval on the release form in order to approve the team’s submission.
Application Procedure

Math Video Challenge registration is completed via an online application through NSBE Connect. Each team interested in participating for the 2016-2017 program year must submit an application for the program and meet all of the team requirements. Completing all of the information in the application is vital.

For quick reference, the following target dates are listed to ensure your participation in Math Video Challenge. For further information on the upcoming NSBE conferences, please visit nsbe.org

<table>
<thead>
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<td>Final submission deadline is <strong>Saturday, October 1, 2016</strong>. Participation confirmation will be sent out by <strong>Friday, October 7, 2016</strong></td>
</tr>
<tr>
<td>Math Video Challenge 2016-17 Registration</td>
<td>Teams must also register on the <a href="#">Math Video website</a> and download the Math Video Challenge Playbook from the website by <strong>Friday, October 14, 2016</strong>. (Please indicate that you are a NSBE Jr. Chapter.) Teams must submit a list of (4) participating students to <a href="mailto:pci@nsbe.org">pci@nsbe.org</a> by <strong>Friday, October 21, 2016</strong></td>
</tr>
<tr>
<td>National Competition</td>
<td>Held at NSBE’s Annual Convention <strong>March 29, 2016 – April 2, 2017 in Kansas City, MO</strong></td>
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The National Society of Black Engineers presents the NSBE Jr. Explorer Technical Innovations Competition (formerly known as the science fair). This program is tailored to allow pre-college students the opportunity to compete and explore the many applications of science utilizing projects, competitions, and science fairs. The NSBE Jr. Explorer Technical Innovations Competition (TIC) will occur at Annual Convention.

ELIGIBILITY
Students in grades 6-12 are eligible for the NSBE Jr. Explorer’s Technical Innovation Competition. Participants must be PAID NSBE Jr. members.

The fair will be divided into two classifications:
Middle School (Junior): 6th-8th grade students
High School (Senior): 9th-12th grade students

In the terms of awards, Team Projects will be judged separately from individual projects.

CRITERIA
1. A chapter may have as many participants as desired.
2. Each student is only allowed to enter one project. The project may include no more than 12 months of continuous research.

NSBE Jr. TIC Competition Components
Each individual and team is awarded a numerical score in each of the three events. At the end of the competition the total points earned is computed by the following rubric listed below. The individual and team with the highest point total is the winner. There is a first and second place winner for each division (high school and middle school, team and individual) of the competition. There will also be one overall winner designated for each segment of the competition.

In order to qualify for an award, each team must meet the minimum qualification points total in each category. No individual or team will be eligible for a prize if the minimum point totals have been awarded by the judges. If no teams or individuals meet the minimum, awards will not be awarded in that category.

<table>
<thead>
<tr>
<th>Event</th>
<th>Total Points</th>
<th>Weighted Point Table</th>
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<tbody>
<tr>
<td>Project Summary</td>
<td>200 (260 Minimum)</td>
<td>30</td>
</tr>
<tr>
<td>Oral Multimedia Presentation</td>
<td>100 (85 Minimum)</td>
<td>35</td>
</tr>
<tr>
<td>Poster Display</td>
<td>100 (85 Minimum)</td>
<td>35</td>
</tr>
</tbody>
</table>
PROJECT REQUIREMENTS

Projects must fit within one of three categories:

1. **Biological/Life and Earth Sciences** (Botany, Ecology, Geology, etc.) - A Biological/Life Science project examines some aspect of the life or life style of an organism or rocks. Example: The Effect of Sound on Plants, The Correlation of History Discovered in Rocks

2. **Physical Sciences** (Physics, Chemistry, etc.) - A Physical Science project studies an abiotic phenomenon in order to understand the relation of identified factors, perhaps including a cause and effect relationship. Example: Observation of Freezing Rates of Water for Different Starting Temperatures, The Environmental Impact of Global Warming

3. **Engineering** (Electronics, Robotics, Mechanics, etc.) - An Engineering project applies physical science knowledge to solve a problem or achieve a purpose. Example: Design Considerations for Solar-Cell Powered Homes, The Power of Programming and Electronics, Bridge Experiments & Analysis

Ethics Statement

Scientific fraud and misconduct are not condoned at any level of research or competition. This includes plagiarism, forgery, use or presentation of other researcher’s work as one’s own, and fabrication of data. Fraudulent project will fail to qualify for the competition. NSBE reserves the right to revoke recognition of a project subsequently found to be fraudulent.

Safety

The safety of our members and the public is of the utmost importance. Precautions must be taken to prevent the possibility of personal injury, property damage, and the legal action that could result from a lack of concern for safety.

Exhibits must be sturdy, with moving parts firmly attached and approved for safety. Each exhibit must be self-supporting. Electricity (AC I 10 volt cycle) will be supplied, if requested; however, no gas or water outlets will be provided. Switches and cords must be of the approved variety and fuses or circuit breakers must protect circuits. Cell or battery- fed circuits should be both safe in design and operation.

All sharp edges or corners on prisms, mirrors, enclosures, and glass and metal plates must be removed or otherwise protected. The length of hoses or extension cords is to be kept to a minimum and out of the way to eliminate tripping hazards. Use tape for securing.

Aisles and exits should not be obstructed.
Moving exhibits (e.g. radio-controlled vehicles, robots) should be restricted to the regulation display space. The Host Committee will try to provide an exhibition area to safely demonstrate projects that require more space than the regulated exhibit display space.

In addition to the regulations noted here, there may be local municipal or provincial regulations, which must be followed. The Host Committee shall share any such restrictions preceding the fair.

**Fire Safety**

Restrictions have been defined on the construction of displays to reduce the possibility of accidental fire during the fair. The Host Committee will be responsible for ensuring that fire extinguishers of proper size and rating are available in the exhibition area, as well as evacuation guidelines in case of an emergency.

- Combustible material must not be used near a heat source.
- Open flames must not be used.
- Smoking is not permitted in the exhibit area.
- Packing material must not be stored in the exhibit hall.

**Chemical Safety**

No containers of toxic or flammable chemicals are allowed. Dangerous chemicals are not allowed—this includes prescription drugs and over-the-counter medication.

Substitutes for toxic and corrosive materials must be used. Common salt, for example, can be used to simulate chemicals such as ammonium nitrate. Water may be used instead of alcohol, ether, and other highly flammable liquids. When chemicals are simulated, they should be labeled with the names of the substance they represent preceded by the word “simulated.” No project will be penalized because the key (but potentially dangerous) components were not on display.

**Electrical Safety**

Electrical exhibits shall use as low a voltage as possible. At the end of the viewing period, all electrical exhibits must be disconnected, and power bars switched off. Where practical and necessary, it is recommended that pilot lights be used to indicate that the voltage is on.

Cord-connected electrical appliances should have a 3-wire conductor with ground. Electrical devices must be protectively enclosed as far as it is practical. Any enclosure must be non-combustible. All non-current carrying metal parts must be grounded. No exposed live parts over 36 volts are allowed. Current (amperage) must be low so as not to cause any discomfort or danger if touched. Wet cells shall not be used because of the hazardous chemicals involved.
Structural and Mechanical Safety

Exhibits must be of a safe design with adequate stability to keep from tipping. Dangerous moving parts such as belts, gears, pulleys, and propeller blades must be suitably guarded. Pressurized vessels or compressed gas cylinders are not allowed.

TEAM PROJECTS

1. Team projects compete and are judged in their scientific category of research.
2. Teams may have two or three members. Teams may not have more than three members. Teams may not substitute members in a given research year.
3. Team members cannot be changed during a given research year, including converting from an individual project to a team project, or vice versa.
4. Each team is encouraged to appoint a team leader to coordinate the work and act as spokesperson. It is recommended that each member of the team be able to serve as spokesperson, be fully involved with the project, and be familiar with all aspects of the project. The final work should reflect the coordinated efforts of all team members and will be evaluated using similar rules and judging criteria as individual project.
5. Full names of team members must appear on the abstract, formal report, display and all forms.

WRITTEN TECHNICAL RESEARCH PAPER

ABSTRACT

All registered NSBE Jr participants must submit a 500-word maximum abstract to NSBE at pci@nsbe.org with the subject heading as follows Abstract_FirstName_LastName_DivisionLevel (EffectsofRecycling_John.Doe_MiddleSchool). It should briefly describe the objective, the experimental procedure, and expected results of the project.

Abstracts must be received no later than 11:59PM January 9, 2017 for the NSBE Jr. Explorer Technical Innovations Competition. Abstracts will be judged on creativity, originality, scientific content, and clarity. Please plan for weather and any other interference that will delay your submission. For students who live in areas where unpredictable weather may affect your ability to submit on time, plan to submit your paper 2-3 weeks early. As a general rule do not wait until the last possible day to submit your abstract. You must adhere strictly to these deadlines as there will be NO EXCEPTIONS for late submissions.

GUIDELINES FOR ABSTRACTS

An abstract is a shortened version of the main ideas of your research paper. An abstract is one-page paper that is written after you have completed your research paper. It should be easy to read, saving time from reading the entire research paper, and is used by the judges to check your research and reasoning. It must provide the necessary information to understanding what the research paper and project is about. Follow these instructions when writing the abstract.
The abstract should include the following:
   A. Purpose of the experiment
   B. Procedure
   C. Data
   D. Conclusions

It may also include any possible research applications. Only minimal reference to previous work may be included.

An abstract must not include the following:
   A. Acknowledgments (including naming the research institution and/or mentor with which you were working, or self-promotions and external endorsements
   B. Work or procedures done by the mentor

RESEARCH PAPER

This is a report in which you summarize everything you have read about the topic for your science project. The size of the font should be no larger than 12 in Times New Roman or Arial. The entire research paper should contain no more than 10 pages when you include the title page, table of contents, abstract, body of the paper (about 5 pages), picture page, and bibliography. The report will be submitted via email by 11:59 PM February 9, 2017. No late submissions will be accepted.

ORDER OF THE REQUIRED SECTIONS OF THE RESEARCH PAPER

1. Title Page
2. Abstract
3. Table of contents
4. Introduction
5. Materials & Methods
6. Results
7. Discussion
8. Conclusion
9. References

» Acknowledgements—where this section is included may vary
» Images and charts can be integrated within the body of the research paper or included in an appendix.
PROJECT DISPLAY/VISUAL PRESENTATION

Information must be complete, clear, and logical. Color and contrast will add to the overall creativity of the display. The display must maintain an accurate experimental journal that shows all of the data observed during the experiment. Data entries should include:

1. Date of observation
2. Time of the observation
3. Accurate description of the observation
4. Note other observations like weather conditions, mistakes, expectation, etc.
5. Name

Use your creative skills to design a display that will catch the eye of judges and other observers. Your poster must stand alone (three panel or glossy single panel posters are acceptable), and display the required components of your project in the order listed below. They consist of the following:

- Title
- Abstract
- Purpose: State what will be determined by completing your experiment
- Hypothesis
- Materials: List everything that was used to complete the experiment.
- Methods
- Results: Include all pertinent data in graphs, data table or charts.
  - Tables, graphs, and charts may be used to display your collected data
- Conclusion: Write a statement that summarizes the results of your data, and based on your hypothesis.
- Acknowledgements
- If you use pictures, drawings, and/or photographs: Make sure captions and description are included.

A copy of the abstract should be maintained at the Project Display.

Reminder: Bring a hard copy of your report to the competition site

All exhibits, including all accessories, must be confined to a table or floor space not to exceed 36 inches front to back; 48 inches side to side; and 120 inches maximum height from the floor. All measurements will be made from the outermost points, including framework and appendages, and will be checked by the Host Committee. Exhibits exceeding these dimensions must be modified or risk rejection from the competition.
ORAL PRESENTATION

Each science fair participant will be given 10 minutes to complete an oral multimedia presentation. There will also be a five minute question and answer session at the end of the presentation. During the oral presentation, the participant should go through each of the major sections of the project (namely, the problem/research question, hypothesis, procedures/methods and materials, results, and the conclusion).

Participants must be ready to answer all of the judges’ questions related to their project. A well-organized multimedia presentation will give the judge most of what they are looking for. However, the judges will often ask questions simply for the purpose of finding out whether the participant understood what he/she was doing.

SAMPLE STRUCTURE OF PRESENTATION

1. Introduction
2. Purpose
3. Methods & Materials
4. Results
5. Conclusion
6. Reflections and Future Work/Plans
7. Acknowledgments

A student’s ability to efficiently articulate their research is an important part of their presentation. Students should be aware that they are representing themselves, schools, and NSBE to the public and should be dressed appropriately. Chewing gum, listening to music and cellular phones are strictly prohibited during competition. Students should be respectful of other students and judges.

Grading rubrics for all parts of the competition will be posted on the NSBE Jr. Website.
Application Procedure

NSBE Jr. Explorer TIC registration is completed via an online application through NSBE Connect. Each team interested in participating for the 2016-2017 program year must submit an application for the program and meet all of the team requirements. Completing all of the information in the application is vital.

NSBE Jr. Explorer TIC Registration Information

Team Requirements
Every NSBE Jr. Explorer TIC participants must:
• Consist of a minimum of one and up to a maximum of three participants
• Consist of a combination of students in grades 6-8 or grades 9-12
• Attend the 43rd Annual Convention in Kansas City, MO
• Consist of active NSBE Jr. members
• Complete the application request before the deadline

Critical 2016-2017 Dates

For quick reference, the following target dates are listed to ensure your participation in NSBE Jr. TIC. For further information on the upcoming NSBE conferences, please visit nsbe.org

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<thead>
<tr>
<th>Team Responsibility &amp; Events</th>
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<tbody>
<tr>
<td>NSBE Jr. Explorer TIC Application</td>
<td>Final submission deadline is Saturday, October 1, 2016. Participation confirmation will be sent out by Friday, October 7, 2016</td>
</tr>
<tr>
<td>NSBE Jr. Explorer TIC Abstract Due</td>
<td>Monday, January 9, 2017</td>
</tr>
<tr>
<td>NSBE Jr. Explorer TIC Research Paper Due</td>
<td>Monday, February 6, 2017</td>
</tr>
<tr>
<td>National Competition</td>
<td>Held at NSBE’s Annual Convention March 29, 2016 - April 2, 2017 in Kansas City, MO</td>
</tr>
</tbody>
</table>
The Ten80 STEM Initiative™ is a league in which middle and high school students practice the art of being professionals. Young men and women, supported by a community of mentors and educators, collaborate and compete in ways that mirror business & marketing executives, engineers, technicians, green transportation designers and professional motorsports teams.

Teams earn points and gain feedback from remote STEM mentors via the Student Racing Challenge website. Teams compete within the TEN80-NSBE League during the National NSBE conference each spring. Points race leaders earn invitations to the National STEM League Finals hosted in May of each year.

NSBE has committed to bringing members quality programming. A significant part of our commitment is the financial investment. Registering for NSBE’s TEN80 program means you commit to completing the program in its entirety and will fully participate in the culminating activities at annual convention.

**Team Registration:**
- Each team must be a combination of students in grades 6-8 or 9-12
- Each team can have a maximum of 15 students
- Teams must be comprised of active NSBE Jr. members
- Attendance at the 43rd Annual Convention in Kansas City, MO is required

**Ten80 STEM Initiative™ Competition Components**

**Student Racing Challenge Competition & Categories**

Students own a sports team and their ultimate goal is to engineer performance. This includes personal performance, team performance and of course, race performance. The base technology for Student Racing Challenge teams is a 1:10 scale electric radio-controlled (RC) car that can be setup in over 4 million ways before re-engineering a single part. Curriculum can be implemented as a 6-10 week unit or a core.

Racing teams compete online in an annual points race and face-to-face at Open Invitationals across the country. Points leaders and Invitational winners are invited to the National STEM League Finals in May 2017.
• Head-to-Head Races on road & oval courses
• MODS! Modify the stock car for …
  • Autonomous driving (robotics!)
  • Drag racing
• Data-Driven Design Project
• Enterprise
  • Pitches and Presentations
  • Business Modeling
  • Project Planning
  • Marketing & Public Relations
  • Graphic Design
• Community Leadership

Application Procedure

Ten80 STEM Initiative™ registration is completed via an online application through NSBE Connect. Each team interested in participating for the 2016-2017 program year must submit an application for the program and meet all of the team requirements. Completing all of the information in the application is vital.

Critical 2016-2017 Dates

For quick reference, the following target dates are listed to ensure your participation in Ten80 STEM Initiative™. For further information on the upcoming NSBE conferences, please visit nsbe.org

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<tr>
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<tr>
<td>Ten80 STEM Initiative™</td>
<td>Final submission deadline is Saturday, October 1, 2016. Participation confirmation will be sent out by Friday, October 7, 2016</td>
</tr>
<tr>
<td>Ten80 STEM Initiative™ 2016-17 Registration</td>
<td>Teams must register through Ten80 STEM Initiative™ website and new teams must participate Ten80 team training offered September 2016 through April 2017</td>
</tr>
<tr>
<td>Ten80 STEM Initiative™</td>
<td>The NSBE Ten80 STEM Initiative™ Points Race will begin October 1, 2016.</td>
</tr>
<tr>
<td>National Competition</td>
<td>Held at NSBE’s Annual Convention March 29, 2016 – April 2, 2017 in Kansas City, MO</td>
</tr>
</tbody>
</table>
The KidWind Challenge is the ultimate wind energy learning experience for students. High school students around the country are exploring wind energy through the hands-on, investigative, and exciting KidWind Challenge!

When students participate in a KidWind Challenge they will:

- Discover the promise and limitations of wind energy technology
- Design, build, and test a functional creative wind turbine
- Compete with their peers in a supportive environment

**KidWind Competition Components**

Each team that registers must build and design their own turbine. You will not be allowed to modify another team’s turbine and use it for testing. You cannot have one turbine shared between teams and simply change blades or other parts for each team.

Your team’s turbine must be able to fit inside the wind tunnel and must be able to operate within the 48” × 48” internal dimensions of the wind tunnel. It is highly recommended that you design your turbine to fit with plenty of room within these dimensions. Sand bags or other weights will be available to hold the turbine in place in the tunnel if required. There are no budgetary restrictions for your turbine design, but it is important to keep in mind that part of the judging process is the economical use of resources. Please use materials responsibly.

There are two divisions teams can participate in for the competition. Teams must choose which division they will be competing in prior to the Annual Convention.
KidWind Generator Division

- Your turbine must use the generator provided by KidWind as the sole power generator for your wind turbine. The judges must be able to verify that the correct generator is being used on your turbine. If the judges cannot verify that the generator is the correct one, your team may participate but will be unable to win prizes.
- Your turbine can have only one of these generators.
- Power must be generated solely by wind generated by the wind tunnel.
- Your turbine can either be on a vertical or horizontal axis.
- You may attach whatever you want to the generator to increase how fast or hard it spins (e.g. gears, bearings, supports, etc.).
- Your wind turbine must be free standing. A tower/stand will not be provided.
- You cannot use premade gearboxes, airfoils or blades.

Open Generator Division

- The basic rule of this division is: If it fits in the tunnel, AND you built it, AND the judges think it is safe, we will run it!
- You can build your own generator based on plans you find from any source. You can use other generators that you purchase (e.g. the KidWind SimpleGen, the KidWind GenPack, Jameco, etc).
- Power must be generated solely by wind from the wind tunnel.
- Your turbine can either be vertical or horizontal axis.
- You may attach whatever you want to the generator (e.g. gears, bearings, supports, etc.).
- You can use a premade gearbox or a generator with a gearbox built in.
- You cannot use premade blades or airfoils.
- Your wind turbine must be free standing. A tower/stand will not be provided.
- You must rectify AC output to DC output for KidWind to use with our testing equipment.

Judging and Awards

Your team’s turbine will be assessed by four categories, each weighted differently as shown in the diagram below. So brush up on your turbine knowledge, find the best materials and parts you can get your hands on, and have some fun along the way.
Turbine Judging Rubric

- 35% Energy Produced in Tunnel
- 30% Turbine design
- 10% Blades
- 10% Drivetrain
- 10% Innovation
- 20% Report/Engineer's Notebook/Documentation
- 15% Knowledge of Wind Energy Subject Matter

1. Energy Produced
   The judges will use data logging software to record the total energy output of each turbine over a 60-second trial period. They collect this data in milliwatt-seconds or joules. Your team's energy output will be ranked relative to other competing teams and you'll receive points corresponding to this rank.

2. Turbine Design
   Judges will inspect the parts of your wind turbine closely. They will also conduct a brief interview with your entire team to understand why you chose the parts you did and why you think they work.

   A panel of judges will examine your wind turbine design before testing it in the wind tunnel. You must be prepared to discuss/defend the choices you incorporated into the design. The design criteria you will be judged on include:

   - The choices and mechanisms by which you maximized power output
   - Craftsmanship of your design, creativity, and environmental decisions (e.g., Did you use recyclable materials? Can you take your turbine apart after the competition and reuse the parts?).

   The judges will be very interested in how you developed and constructed specific parts of your turbine. Make sure you understand the decisions you made when constructed the following components.

   - 10% Blades
   - 10% Drivetrain
   - 10% Innovation

3. Documentation of Design
   You must produce some type of documentation that reflects your design process and your knowledge of wind energy science. It's up to each team to determine how to document this part of your project. Documentation has ranged from short reports, engineer's notebooks, videos, Powerpoints, posters, and so on.
4. Knowledge of Subject Matter
Throughout the Challenge Event, the judges will come around to each team to ask some general questions about wind and renewable energy. They are doing this to see if your team has gained some real wind energy knowledge while you created your wind turbine.

The top three places will be awarded in each division. However, each team must receive greater than 85% by all judges to receive an award. In some cases, all awards might not be given if the minimum scoring is not achieved.

An overall winner will be picked by the judges to represent NSBE at the National KidWind Challenge.

Application Procedure
KidWind registration is completed via an online application through NSBE Connect. Each team interested in participating for the 2016-2017 program year must submit an application for the program and meet all of the team requirements. Completing all of the information in the application is vital.

KidWind Registration Information
Team Requirements
Every KidWind team must:
- Consist of a minimum of two and up to a maximum of four participants
- Consist of a combination of students in grades 9-12
- Attend the 43rd Annual Convention in Kansas City, MO
- Consist of active NSBE Jr. members
- Complete the application request before the deadline

Critical 2016-2017 Dates
For quick reference, the following target dates are listed to ensure your participation in NSBE KidWind. For further information on the upcoming NSBE conferences, please visit nsbe.org

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<td>KidWind Team Application</td>
<td>Final submission deadline is Saturday, October 1, 2016. Participation confirmation will be sent out by Friday, October 7, 2016</td>
</tr>
<tr>
<td>KidWind 2016-17 Challenge</td>
<td>Teams will receive their kit on a rolling basis as their application is accepted, and a formal invitation for participation is received. Returning teams will not receive a new kit.</td>
</tr>
</tbody>
</table>
| National Competition            | Held at NSBE’s Annual Convention  
March 29, 2016 – April 2, 2017 in Kansas City, MO |
Try-Math-A-Lon (TMAL)

Try-Math-A-Lon (TMAL) is a tutoring program meant to foster good study habits for minority students, help prepare for standardized test exams such as the ACT and SAT, and promote competition and good sportsmanship. The TMAL competition is held between teams composed of high school students in grades 9-12. The purpose of the competition is to help groom TMAL team members for success in STEM courses and prepare them for standardized SAT/ACT testing.

TMAL consists of three components: Mathletics preparation during the year, in person testing as a team, and a quiz bowl. The rules for TMAL have changed for this year. Please read thoroughly to have a good understanding.

The TMAL rules should be used to guide TMAL coaches/advisors in preparation for the national competition. TMAL coaches/advisors are encouraged to prepare their teams as early as possible, and share TMAL preparatory materials with other math, science, or technology professionals who may be able to assist TMAL teams with competition preparation. TMAL coaching can begin as early as the summer through March of the next year.

Team Registration:

- Each team will consist of four students and a mandatory alternate
- Teams can be a combination of students in 9th-10th grade for lower division, and 11th-12th grade for upper division
- TMAL teams can consist of students from the same grade level (e.g., 4 seniors or 4 sophomores)
- Each team will be given access to Mathletics, an online mathematics tutorial program
- Incentives will be awarded to teams and individual students based off points and earned using the Mathletics program
- Teams must be comprised of active NSBE Jr. members
- Attendance at the 43rd Annual Convention in Kansas City, MO is required

TMAL Competition Components

All teams have the opportunity to compete at the TMAL national competition to be held at the NSBE National Convention.

TMAL Points Race Challenge
The TMAL Points Race Challenge using Mathletics.com is designed to measure excellence in all TMAL teams. It was created to ensure that all students receive year round tutoring and training.

TMAL Points Race Challenge Awards are listed below.

1. Points Total Winner (most points earned November-March) - Individuals
2. Points Total Winner (most points earned November-March) - Teams
Awards, Trophies, and Scholarships

Recognition will be given to individuals and teams who excel quarterly (October – March). In addition the overall highest points by teams and individuals will be recognized at the national convention as listed below.

TRY-MATH-A-LON COMPETITION CURRICULUM

TMAL questions are written with the curricula for grades 9th -10th, and 11th-12 grade in mind. In addition, many problems are designed to challenge and accelerate student learning, and questions become progressively more difficult at each level of the TMAL competition. Math topics include:

**Lower Division - 9th -10th grade Topics**
- Algebra and Functions
- Data Analysis, Statistics and Probability
- Geometry and Measurements
- Numbers and Operations
- Pre-Calculus
- Problem Solving

**Upper Division - 11th – 12th grade Topics**
- Algebra and Functions
- Data Analysis, Statistics and Probability
- Geometry and Measurements
- Calculus
- Trigonometry
- Numbers and Operations
- Problem Solving

**Event 1: The Mathletics Points Race**

The Progress Assessment Test (PAT) has been eliminated from the competition in favor of participation in Mathletics from October to March. Mathletics is an online mathematics tool at Mathletics.com, which allows students to test their comprehension of mathematical concepts at their own pace. Mathletics is used by 10,000 schools and over 3.5 million students. It covers all aspects of mathematics and contains over 1000 learning activities for students aged 5 through 18. It responds to individual strengths and weaknesses. It lets students know if they are on the right track so they can improve at their own pace with step-by-step animated support. Students can also challenge each other with real-time games. Students are encouraged to use Mathletics 3-5 times a week to develop and hone math skills as well as accumulate individual and team points. All teams will be ranked based on points earned before convention and awarded from 0-100 points based on their rankings.
Event 2: The Engineering Contest (TEC) - On Site - 1 hour

The Engineering Contest promotes math and science critical thinking skills and encourages teamwork. TEC is timed and measures teams’ ability to solve problems using science concepts. The TEC will be given on Wednesday of National Convention. One calculator is provided to each team and each team will have one hour to complete the test. The content of TEC will be ACT Science based questions include biology, chemistry, physics, and the earth/space sciences (e.g., geology, astronomy, and meteorology). Advanced knowledge in these subjects is not required, but background knowledge acquired in general, introductory science courses is needed to answer some of the questions. The test emphasizes scientific reasoning skills over recall of scientific content, skill in mathematics, or reading ability. The TEC is not required for entrance into the final Quiz Bowl.

THE ENGINEERING CONTEST (TEC) GUIDELINES & RULES

CONTEST BASICS

TEC will test the team’s ability to work together and use mathematics and science to solve a problem. Each team will be given the same set of problems. The teams are given 60 minutes to complete the test. The time will be the same, for each team, depending on the number of questions on the exam. At the end of the allotted time, each team’s work is collected and given to the judges for scoring.

FORMAT

Each team will be separated to maximize privacy. Teammates are strongly encouraged to discuss and work with one another to formulate a solution. Each team must do its work independent of the other teams in the competition. Scratch paper, pencils and one calculator will be provided to each team. All teams will have the exact same calculator. All work must be shown on either the TEC paper or numbered on the scratch paper supplied. Each sheet of scratch paper must be numbered and include the team name. For clarification, all final answers must be circled. At the end of the allotted time each team will immediately cease work on the problem. All TEC papers, scratch paper and calculators will be collected.

SCORING

Some problems may rely on the correct answer to a previous question, thus, partial credit will be given. The scores assigned by the judges are the team’s final score in the competition. Each test is graded by a group of judges. Taking the TEC is optional but teams will be given 0-50 points based on their TEC score, which will be a part of their initial points during the Quiz Bowl. All scores are final.
Application Procedure

TMAL registration is completed via an online application through NSBE Connect. Each team interested in participating for the 2016-2017 program year must submit an application for the program and meet all of the team requirements. Completing all of the information in the application is vital.

Critical 2016-2017 Dates

For quick reference, the following target dates are listed to ensure your participation in TMAL For further information on the upcoming NSBE conferences, please visit nsbe.org

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<td>Final submission deadline is Saturday, October 1, 2016. Participation confirmation will be sent out by Friday, October 7, 2016</td>
</tr>
<tr>
<td><strong>TMAL 2016-17 Challenge</strong></td>
<td>Teams must submit a list of (4) participating students and an alternate to <a href="mailto:pci@nsbe.org">pci@nsbe.org</a> by Friday, October 14, 2016. Student transcripts must be submitted to <a href="mailto:pci@nsbe.org">pci@nsbe.org</a> by Sunday, January 15, 2017 to be eligible to compete at convention</td>
</tr>
<tr>
<td><strong>National Competition</strong></td>
<td>Held at NSBE’s Annual Convention March 29, 2016 – April 2, 2017 in Kansas City, MO</td>
</tr>
</tbody>
</table>
The Robotics Education & Competition (REC) Foundation and NSBE developed a partnership to establish VEX Robotics Competition teams through NSBE’s Pre-College Initiative (PCI) program to encourage interest in science, technology, engineering and mathematics as academic subjects and as future career paths.

Each year, an exciting engineering challenge is presented in the form of a game. Students, with guidance from their teachers and mentors, build innovative robots and compete year-round in a variety of matches. In addition to learning valuable engineering skills, students gain life skills such as teamwork, perseverance, communication, collaboration, project management, and critical thinking. The VEX Robotics Competition prepares students to become future innovators with 95% of participants reporting an increased interest in STEM subject areas and pursuing STEM related careers. This 2016-17 competition is called Starstruck.

Team Registration:
- Each team must be a combination of students in grades 9th-12th
- Each team can have a minimum of 4 students and a maximum of 10 students
- Teams must be comprised of active NSBE Jr. members
- Attendance at the 43rd Annual Convention in Kansas City, MO is required

VEX Robotics Competition Components

The VEX Robotics Competition Starstruck is played on a 12’x12’ square field. Two alliances – one “red” and one “blue” – composed of two teams each, compete in matches consisting of a fifteen second autonomous period followed by one minute and forty-five seconds of driver-controlled play.

The object of the game is to attain a higher score than the opposing Alliance by Scoring your Stars and Cubes in your Zones and by Hanging Robots on your Hanging Bar.

There are twenty-four (24) Stars and four (4) Cubes, available in Match. Some begin in designated locations on the field, while others are available to be entered into the field during the Match.

Each Robot (smaller than 18”x18”x18”) begins a match on one of their Alliance Starting Tiles. Each Alliance has two Zones across the Fence to Score into. Alliances also earn points for having one Robot Hanging at the end of the Match from their Hanging Bar. A bonus is awarded to the Alliance that has the most total points at the end of the Autonomous Period.
Scoring
Each Star Scored in the Near Zone  1 point
Each Star Scored in the Far Zone  2 points
Each Cube Scored in a Near Zone  2 points
Each Cube Scored in a Far Zone      4 points
A Robot that is Low Hanging       4 points
A Robot that is High Hanging      12 points
Alliance with the most points at the end of Autonomous  4 points

- The Starstruck game video and manual can be found on the VEX Robotics website.

Application Procedure

VEX Robotics Competition registration is completed via an online application through NSBE Connect. Each team interested in participating for the 2016-2017 program year must submit an application for the program and meet all of the team requirements. Completing all of the information in the application is vital.

Critical 2016-2017 Dates

For quick reference, the following target dates are listed to ensure your participation in VEX Robotics Competition. For further information on the upcoming NSBE conferences, please visit nsbe.org

<table>
<thead>
<tr>
<th>Team Responsibility &amp; Events</th>
<th>Target Timeframe (No later than)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEX Robotics Competition Team Application</td>
<td>Final submission deadline is Saturday, October 1, 2016. Participation confirmation will be sent out by Friday, October 7, 2016</td>
</tr>
<tr>
<td>VEX Robotics Competition 2016-17 Registration</td>
<td>All teams need to register through the VEX Robotics website by October 1, 2016. The Starstruck details can be found on the VEX Robotics Competition website.</td>
</tr>
<tr>
<td>National Competition</td>
<td>Held at NSBE's Annual Convention March 29, 2016 – April 2, 2017 in Kansas City, MO</td>
</tr>
</tbody>
</table>
PRE-COLLEGE INITIATIVE ANNUAL EVENTS

FALL REGIONAL CONFERENCES
Fall Regional Conferences (FRCs) provide a forum for discussion and information exchange between pre-college, collegiate, professionals, and corporate representatives at the regional level. Within the three-day weekend each region encourages academic excellence and leadership development through various technical, cultural, workshops and competitions (e.g., Try-Math-A-Lon), and Career and Graduate School Fairs.

All regions will host workshops and competitions. Regional Pre-College Initiative Chairs will notify active chapters in their region about specific events taking place during FRC.

2016 FALL REGIONAL CONFERENCES

REGION 1
Niagara Falls, NY
November 17th-20th

REGION 2
Norfolk, Virginia
November 4th-6th

REGION 3
Atlanta, Georgia
November 4th-6th

REGION 4
Chicago, Illinois
November 18th-20th

REGION 5
Houston, Texas
November 10th-13th

REGION 6
Denver, Colorado
November 4th-6th

ANNUAL CONVENTION
NSBE’s Annual Convention provides inspiration, education and connections to pre-college, collegiate, and professionals attendees alike. Through inspiring keynotes, innovative discussions, educational workshops, hands-on opportunities, competitions, and much more, students will learn how to engage in NSBE’s mission to increase the number of culturally responsible Black Engineers who excel academically, succeed professionally and positively impact the community.

2017 Annual Convention
Kansas City, Missouri
March 29th-April 2nd
2016-2017
NSBE Jr.
Rule Book