

Chicago Public Schools
Student Science Fair, Inc.

69th Annual Chicago Public Schools Student STEM Exposition

Exploring the Unexplored through



2018

Organizational Handbook

A Planning Guide for Teachers,
School STEM Exhibition Coordinators,
and Area STEM Exhibition Chairpersons

Chicago Public Schools Student STEM Exhibition
Office of Science
Office of the Chief Executive Officer
Office of the Chief Education Officer

This book can be found on the following website:
<http://www.cpsscifair.org>

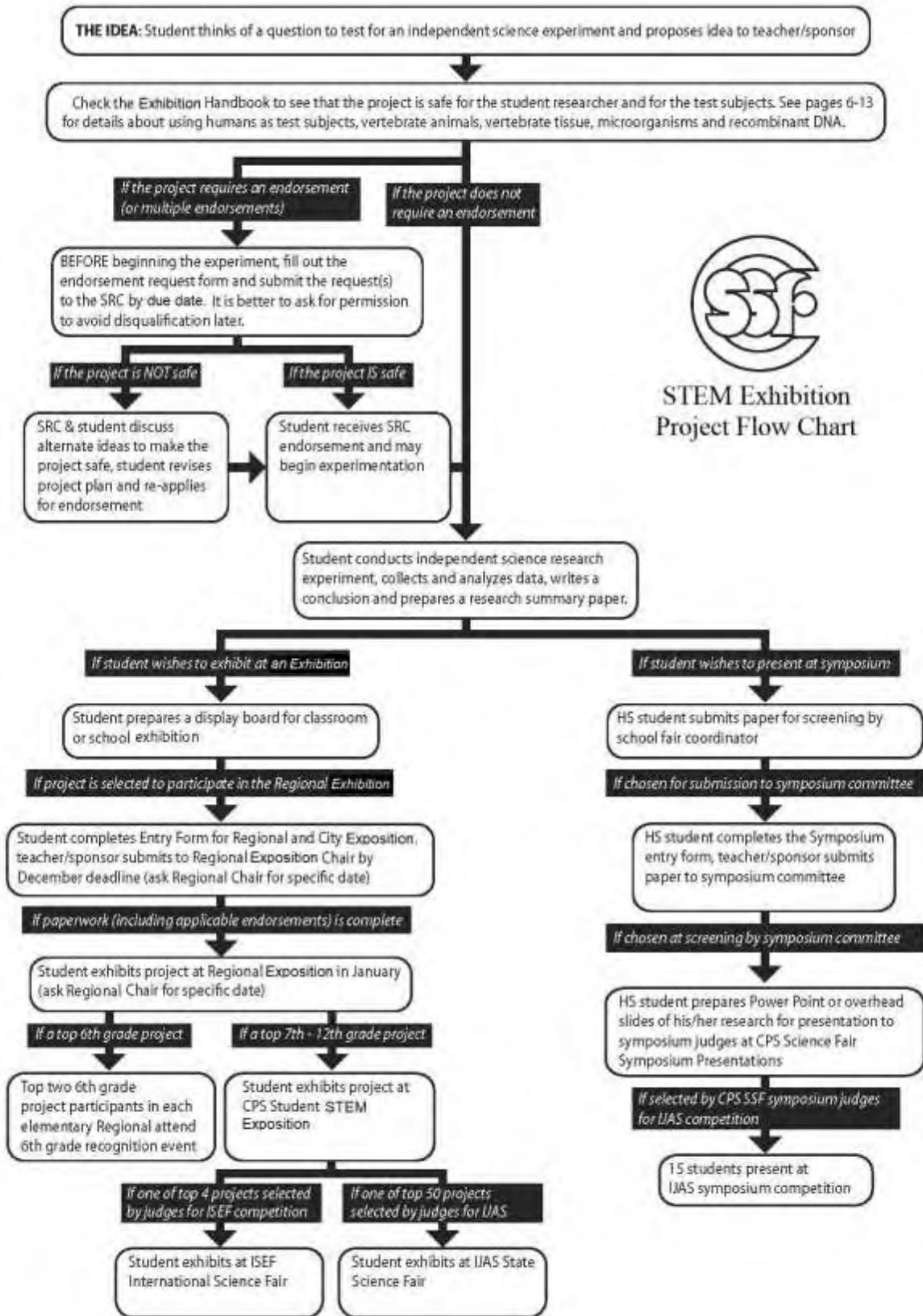
In order to give proper guidance and direction to students, it is highly recommended that teachers, school STEM Exhibition coordinators, and area STEM Exhibition chairpersons familiarize themselves with the details and the contents of this *2018 Organizational Handbook* and the *Science STEM Exhibition Handbook*. The *Calendar of Events*, highlighting the major activities and corresponding deadline dates, serves as a guide for effective administration of the STEM Exhibition program.

Questions concerning a specific aspect of the CPS Student STEM Exhibition Program should be referred to the appropriate committee chairperson listed in the directory (Part Six: City STEM Exhibition Officers and Operating Committee Chairpersons) of this handbook.

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**STEM Exhibition
Project Flow Chart**

Preface

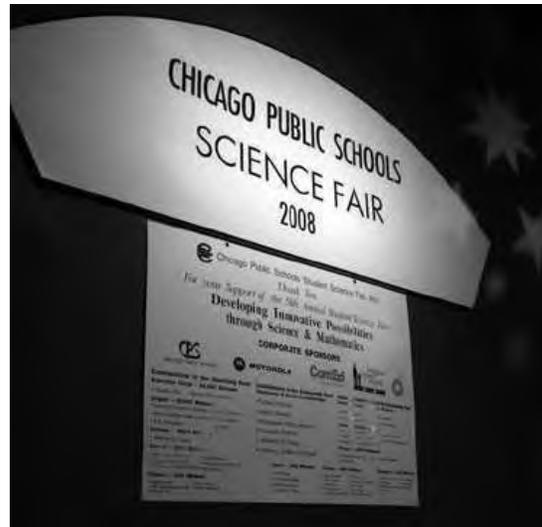
The *2018 Organizational Handbook – A Planning Guide for Classroom Teachers, School STEM Exhibition Coordinators, and Area STEM Exhibition Chairpersons* has been prepared to present specific information about the organizational structure, function, and operation of the STEM exhibition as an educational program. The STEM exhibition program is designed to encourage and support students who wish to extend their classroom learning experiences and become exhibitors of science projects and/or participants in the symposium/essay contests in the Chicago Public Schools Student STEM Exhibition.

Science and mathematics curricula recommended by the Chicago Math and Science Initiative (CMSI) support inquiry-based learning. Students learn science as they seek to develop the habits of mind that characterize scientific inquiry – making observations, posing questions, designing experiments, collecting data, analyzing results, drawing conclusions, and reporting findings in both oral and written formats.

In 1950, a group of physics teachers founded the Chicago Public Schools Student Science Fair. The purpose of the fair was to serve as a vehicle to encourage independent research and to offer the opportunity for students to have their research projects evaluated by university and industrial scientists. The activities of this educational program came to the attention of the business community and the officials of the Museum of Science and Industry. As a result, technical assistance and financial support were offered, and incorporation of the organization followed. The organization was chartered in the state of Illinois as a not-for-profit corporation.

The Chicago Public Schools Student Science Fair, Inc. is financially supported by the Chicago Public Schools and two or more corporate co-sponsors. Numerous business organizations, educational institutions, and professional organizations make contributions to the operating fund and scholarship fund, and/or provide prizes and cash as special awards.

Over the years the Chicago Public Schools Student Science Fair, Inc. has diversified its operation and developed a variety of specialized programs to better serve the students of the Chicago Public Schools. Teachers and principals, together with their counterparts from the business community, serve as coordinators and chairpersons of numerous committees at various levels of activity.



A Message to Principals

Your school is unique. What does the STEM Exhibition have to offer?

A STEM Exhibition Program can accommodate the diversity that exists among Chicago Public Schools. From schools with a vast majority of students struggling with reading and mathematics and just beginning to learn inquiry-based science, to high-performing schools, the STEM Exhibition has a place in the academic extra-curriculum program for everyone.

What are the benefits for students?

The STEM Exhibition offers students an opportunity to explore their world, and build scientific knowledge and skills. All CPS students deserve the opportunity to develop the habits of mind acquired by conducting inquiry – questioning their environment, forming hypotheses, designing experiments to test hypotheses, collecting and analyzing data, and sharing the results with other students. For many students, the additional after-school endeavor provides an exciting alternative to sports and playground games that can be both emotionally and academically fulfilling.

Before a student can form a hypothesis or design an experiment, library research must be done. This is an example of how the STEM Exhibition connects with the ***Chicago Reading Initiative*** and the ***Reading Instruction Framework***. Students read various sources for specific types of information which enables them to better *comprehend* a science topic of interest. As they read, students acquire new science *vocabulary* and develop a deeper understanding as they build on prior knowledge. Over the course of developing a STEM exhibition project, *fluency* in reading advanced materials is improved. And, of course, the primary mechanism of the STEM Exhibition is communication, so students will receive experience *writing* and orally presenting scientific information.

Independent research (the prelude to a STEM Exhibition project) is enhanced by the challenge of competition. It is an observable consequence that competition breeds champions. The STEM Exhibition encourages students to strive for their personal best by providing a venue for students to share their efforts, discoveries, creations, and inventions with others and compare the outcome of their research among other students.

This sharing is validated by scientists, researchers, and other science, mathematics, or computer science career personnel who serve as judges. Constructive feedback from judges reassures students that they are on the right track; it helps them to look at their findings in a different perspective; it corrects misconceptions; and it stimulates them to continue researching. The STEM Exhibition presents a wonderful opportunity to invite community members into your school and provide concentrated, academic support. It's a great vehicle to foster and crystallize relationships with parents, business leaders, and other community members.

Every student in every school has an equal opportunity to participate. As the STEM Exhibition competition advances from the classroom level – to the school exhibition – to the area exposition – to the city exposition – to the state exposition – and finally to the International Fair – better and better student performance is recognized. The research endeavors at the International Fair come from the very top projects at our Chicago city STEM exhibition; the projects at the Illinois state fair come from the best at our Chicago STEM exhibition; the exhibits at the city exposition come from the best from Area expositions; the projects at Area expositions come from the best at the school STEM exhibitions; and the exhibits at the school expositions come from students presenting the best work in their classrooms.

What are the benefits for teachers?

Science teaching instruction that is inquiry-based promotes more meaningful content for students. Instruction is enriched when teachers allow students to select a science topic for conducting research – giving each student time to explore a personal fascination. Teachers can exercise their understanding of student development and learning by guiding student research. They come to realize that as each student conducts independent research, each student has an opportunity to individually grow, develop and learn. The additional time working on science and literacy skills after-school can only help with students' in-classroom academic achievement.

STEM Exhibition projects are conducted over time and in various stages. Therefore, both formative and summative assessment strategies can be used to provide constructive feedback to students as well as serve as an authentic assessment of a student's attainment of the Illinois Learning Standards in English, science, mathematics, and fine arts.

The planning of a school STEM exhibition enables teachers to work on teams and build collaborative relationships with colleagues, community members, and parents/guardians. The entire school and community share in the pursuit of students' academic achievement. Teachers can implement effective instruction across an integrated curriculum. English teachers can help students develop their scientific writing skills; teachers of mathematics can help students use appropriate measurement skills in their science experiments and analyze data; social studies teachers can expose students to societal issues appropriate for scientific investigation; and art teachers can help students with composition and design of a STEM exhibition display board. As principal, a school STEM exhibition presents a tremendous organizing opportunity to enhance the communication and collaboration with the science department and between all faculty members at your school.

What are the benefits for schools?

In addition to individual benefits for students and teachers, there are collective benefits for the entire school when students conduct STEM exhibition research. The school builds partnerships with community businesses, organizations, and other entities to enhance student learning and highlight academic successes. Resources in the community can be used to extend student learning. An open-forum of communication between the school and the entire community can continually share the good news of what is happening in the school. Curriculum adaptations to the changing needs of society become apparent at a faster pace. Stakeholders in the community are able to feel empowered to affect change and experience a greater sense of responsibility for the success of community schools. Schools are able to exhibit the exceptional talents of their students and have a means of comparing their level of success with other schools.

Part One: STEM Exhibition Objectives and Standards

Objectives of Independent Research and Development of STEM Exhibition Projects

At the classroom and school levels, assigning students to conduct long-term independent science research that could be developed into STEM Exhibition projects meets the following objectives:

- Apply and extend classroom learning
- Connect classroom learning with the science world and everyday life
- Pursue individual scientific interests
- Develop science research skills
- Construct graphs, charts, and informative display boards
- Practice and develop knowledge and skills associated with Illinois Learning Standards in English Language Arts, Mathematics, Science, and Fine Arts
- Provide opportunities for interdisciplinary skill development
- Reinforce the Chicago Reading Initiative goals
- Encourage and support student work over time – from one school year to the next – throughout their public school experience
- Provide experience in peer evaluation and peer coaching
- Develop oral and written communication skills
- Enable students to appreciate the scientific work of their classmates

The School, Area, and City STEM Exhibitions support the following objectives:

- Allow students to share research findings with other students from their school and with students from other area and city schools
- Showcase the outstanding research skills of students within the school, area, and city
- Provide an opportunity for community resource persons to serve as judges and mentors

Illinois Learning Goals and Standards Related to a STEM Exhibition

The development of a STEM exhibition project serves as an authentic assessment of a student's attainment of the Illinois Learning Standards. These standards are important because scientific reading is essential. It is the method by which students acquire information and ideas from books, journals magazines, newspapers, manuals, letters, and other sources of information. Students who read a wide variety of scientific material build a strong foundation for learning in all areas of science and of life.

The ability to write clearly is essential to students' effective communication about his or her research efforts. Students with high-level writing skills can produce a research summary, symposium paper, or essay that reflects planning and organization and effectively conveys the results of their research findings.

Good listening and speaking skills are essential in exchanging ideas with teachers, parents, mentors, other students, and judges. Effective oral communication is a necessity in presenting a STEM exhibition project and is recognized as a fundamental indicator of a student's knowledge and credibility.

Measurement skill is an indispensable part of scientific research. All students must be able to choose an appropriate level of accuracy for measurement, select what measuring instruments to use, and correctly determine measures of objects, space, and time.

Students must be able to organize data, make sense of variables and patterns, and judge the reasonableness of any claims and interpretations made as a result of their experimentation. All students need to understand the role probability plays in data collection and apply it in decision making.

Independent research and the inquiry process prepare students to explore science and apply methods of technological design. This process enables students to pose questions, carry out library research, make predictions, gather and work with data, use appropriate measurement techniques, analyze data,

draw conclusions based on evidence, communicate their methods and results, and think about the implications of scientific research and problem solving.

Students use the sensory elements, organizational principles, and expressive qualities of the arts when they construct a display board to represent their research findings. Appropriate use of these elements can be organized to convey visual representation and meaning of research findings.

The development of a STEM exhibition project provides an opportunity for interdisciplinary connections among English language arts, mathematics, science, and fine arts learning standards. The specific Illinois Learning Goals and Standards that relate to STEM exhibitions are listed below.

English Language Arts Goals

- Goal 1: Read with understanding and fluency.
 - A. Apply word analysis and vocabulary skills to comprehend selections.
 - B. Apply reading strategies to improve understanding and fluency.
 - C. Comprehend a broad range of reading materials.

- Goal 3: Write to communicate for a variety of purposes.
 - A. Use correct grammar, spelling, punctuation, capitalization, and structure.
 - B. Compose well-organized and coherent writing for specific purposes and audiences.
 - C. Communicate ideas in writing to accomplish a variety of purposes.

- Goal 4: Listen and speak effectively in a variety of situations.
 - A. Listen effectively in formal and informal situations.
 - B. Speak effectively using language appropriate to the situation and audience.

- Goal 5: Use the Language Arts to acquire, assess and communicate information.
 - A. Locate, organize, and use information from various sources to answer questions, solve problems, and communicate ideas.
 - B. Apply acquired information, concepts, and ideas to communicate in a variety of formats.

Mathematics Goals

- Goal 7: Estimate, make, and use measurements of objects, quantities, and relationships and determine acceptable levels of accuracy.
 - A. Measure and compare quantities using appropriate units, instruments, and methods.
 - B. Estimate measurements and determine acceptable levels of accuracy.
 - C. Select and use appropriate technology, instruments, and formulas to solve problems, interpret results, and communicate findings.

- Goal 8: Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems, and predict results.
 - A. Describe numerical relationships using variables and patterns.
 - B. Interpret and describe numerical relationships using tables, graphs, and symbols.
 - C. Solve problems using systems of numbers and their properties.
 - D. Use algebraic concepts and procedures to represent and solve problems.

- Goal 10: Collect, organize, and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability.
 - A. Organize, describe, and make predictions from existing data.
 - B. Formulate questions, design data collection methods, gather and analyze data, and communicate findings.
 - C. Determine, describe, and apply the probabilities of events.

Science Goals

- Goal 11: Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments, and solve problems.
 - A. Know and apply the concepts, principles, and processes of scientific inquiry.
 - B. Know and apply the concepts, principles, and processes of technological design.

Goal 12: Understand the fundamental concepts, principles, and interconnections of life, physical, and earth/space sciences.

- A. Know and apply concepts that explain how living things function, adapt, and change.
- B. Know and apply concepts that describe how living things interact with each other and with their environment.
- C. Know and apply concepts that describe properties of matter and energy and the interactions between them.
- D. Know and apply concepts that describe force and motion and the principles that explain them.
- E. Know and apply concepts that describe the features and processes of the Earth and its resources.
- F. Know and apply concepts that explain the composition and structure of the universe and Earth's place in it.

Goal 13: Understand the relationships among science, technology, and society in historical and contemporary contexts.

- A. Know and apply the accepted practices of science.
- B. Know and apply concepts that describe the interactions among science, technology and society.

Fine Arts Goal

Goal 25: Know the language of the arts.

- A. Understand the sensory elements, organizational principles, and expressive qualities of the arts.

Example benchmark: 25. A. 3e

Analyze how the elements and principles can be organized to convey meaning through a variety of media and technology.

The Illinois Learning Standards were taken from the Illinois State Board of Education Website: <http://www.isbe.net/ils>. Teachers are encouraged to visit this Website for details about the benchmarks and performance descriptors.

Illinois Professional Teaching Standards

Teaching by inquiry and guiding the development of students' independent research skills enables science teachers to practice and develop the professional teaching standards listed below.

Standard	Description
1. Content Knowledge	The teacher understands the central concepts, methods of inquiry, and structures of the discipline(s) and creates learning experiences that make the content meaningful to all students.
2. Human Development and Learning	The teacher understands how individuals grow, develop, and learn and provides learning opportunities that support the intellectual, social, and personal development of all students.
3. Diversity	The teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners. The teacher understands instructional planning and designs instruction based upon knowledge of the discipline, students, the community, and curriculum goals.
4. Planning for Instruction	The teacher understands instructional planning and designs instruction based upon knowledge of the discipline, students, the community, and curriculum goals.
5. Learning Environment	The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.
6. Instructional Delivery	The teacher understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills.
7. Communication	The teacher uses knowledge of effective written, verbal, and visual communication techniques to interaction in the classroom, foster active inquiry, collaboration, and supportive classroom interactions.
8. Assessment	The teacher understands various formal and informal assessment strategies and uses them to support the continuous development of all students.
9. Collaborative Relationships	The teacher understands the role of the community in education and develops and maintains collaborative relationships with colleagues, parents/guardians, and the community to support student learning and well-being.
10. Reflection & Professional Growth	The teacher is a reflective practitioner who continually evaluates how choices and actions affect students, parents, and other professionals in the learning community and actively seeks opportunities to grow professionally.
11. Professional Conduct	The teacher understands education as a profession, maintains standards of professional conduct, and provides leadership to improve student learning and well-being.

Taken from *Content-Area Standards for Educators*, Illinois State Board of Education, Division of Professional Preparation, January 2001

Part Two: Scope of City STEM Exhibition Programs

Responsibilities of the City STEM Exhibition Council

The City STEM Exhibition Council is composed of Area STEM Exhibition Chairpersons approved by the Area Instruction Officers (AIOs) within each Area of the Chicago Public Schools, the Executive Committee of the City STEM Exhibition, and the chairpersons of the City STEM Exhibition Operating Committees. The general duty of the Area STEM exhibition chairpersons is to coordinate the activities of the preliminary Area exhibitions leading up to the City STEM Exhibition. A Chairperson presides over the council for a term of two years.

Specific duties and responsibilities of the City STEM Exhibition Council are to:

- Conduct the annual Chicago Public Schools Student STEM Exhibition, the Student Science Symposium, the Essay Contests, the Research Grant Program, the Advise-a-Student Program, and the annual Scholarship Program.
- Maintain communication with the Chief Education Officer of the Chicago Public Schools, the corporate sponsors for the current school year, and the host institution.

Recommendations of the City STEM Exhibition Council are submitted to the Chairperson for policy decisions affecting the operation of the activities of the corporation.

A Board of Directors, representing the business, industry, and academic community; the school district administration; and the host institution work with the Executive Committee to develop policy and to raise funds for the activities of the Student STEM Exhibition.

Research Grant Program

The purpose of the *Research Grant Program* is to financially assist students beyond the resources of their classroom teachers and their schools. Additional information about the *Research Grant Program* and the applications for both the *Mini* and *Maxi Research Grants* are found in the *STEM Exhibition Handbook*. Suggested submission dates and the final due date are announced on the *Calendar of Events* at the back of this handbook.

The *Mini Research Grant Program* allows students to apply for research grants not to exceed \$100 per semester. Students may apply for and receive a maximum of two grants, not to exceed \$200 per school year.

The *Maxi Research Grant Program* allows students to apply for a one-time-only cash grant of up to \$500. A detailed proposal must be submitted for consideration to the Research Grant Committee. If the student's application passes the initial screening, he/she must present his/her proposal in person to the Research Grant Committee.

Funds are awarded directly to the student, not to the school. Research funds are for the purchase of materials that are consumable or are not normally available in the school. The student is responsible for keeping a careful record of expenditures. The student is also responsible for forwarding receipts and a written report to the Research Grant Committee Chairperson. All non-consumable, serviceable materials must be returned to the student's school upon completion of the research project.

Applications for the research grants are found in the *Appendix* of the *STEM Exhibition Handbook*.

Advise-A-Student Program

The *Advise-A-Student Program* is designed to provide expert help from professionals at universities and in industry. Students who have started a project, completed preliminary library research, and exhausted the expertise of local personnel for assistance may apply for the assistance of an advisor in their field of research. The job of the advisor is to answer questions and make suggestions regarding the student's research. The advisor is not expected to provide equipment, supplies, or laboratory facilities.

Students are permitted to apply for an advisor only after they have decided on a project and have done the library research. A copy of the Advise-A-Student Program Advisor Request Application is found in the *Appendix* of the *STEM Exhibition Handbook*.

Symposium Program

Grades 9–12 high school students' research papers, processed through the high school STEM exhibition coordinator and accepted by the City Symposium Committee, are presented by the selected students on Thursday of the week of the City STEM Exhibition. Each high school is allowed to submit a maximum of 30 symposium papers. The total of 30 papers includes both symposium papers and essay papers. The deadline for submitting an essay or symposium paper is on the calendar at the end of this document. This deadline for submission of papers is firm and will not be extended.

State Essay Contest

Students in Grades 7 through 12 may compete with a library research paper in the Essay Only segment of the Illinois Junior Academy of Science (IJAS) Paper Session Competition. The topics for the Essay can be found at www.cpsscifair.org.

Chicago BP Essay Contest

This is a Chicago-based competition (in two divisions) sponsored by BP America, Inc. and an opportunity for Chicago Public School students to win monetary prizes for writing exceptional essays. The Elementary Division is for students in grades 7 & 8. The High School Division is for students in grades 9 - 12. The due date for all essays is on the calendar below. See the *STEM Exhibition Handbook* for additional information about the essay entry procedures, official entry form, essay cover sheet, and essay checklist.

City STEM Exhibition

Winning projects selected at the Area STEM Exhibitions are exhibited at the host institution during a three-day exhibition.

Each exhibitor at the City STEM Exhibition must be currently enrolled in a Grades 7-12 Chicago public school. Seventh- or eighth-grade students may have one partner with their exhibit. High school students may not have a partner.

Approximately 300 exhibits from all the Instructional Areas of the Chicago Public Schools are evaluated by university and industrial judges. Awards given are *Gold*, *Silver*, and *Bronze*. Many companies and organizations present special awards and tours to selected students. A separate group of judges makes these selections based upon their own criteria.

Four students are chosen to represent the Chicago Public Schools at the International Science and Engineering Fair (ISEF). Approximately 65 students are selected to participate in the exposition and paper sessions at the Illinois Junior Academy of Science (IJAS). Participants in this state STEM Exhibition must meet any and all requirements determined by the IJAS rules. International Science and Engineering Fair (ISEF) participants are bound by all published ISEF rules.

College Scholarships for Graduating Seniors

Seniors who are prospective graduates of Chicago public high schools and who are participating in or who have participated in Chicago Public Schools Student STEM Exhibition activities at the area/regional or city level are eligible to apply for scholarships. STEM Exhibition activities include exhibit of projects, symposium presentations, and/or submissions to the essay contests. Students who meet these initial criteria are urged to file an application for a scholarship. To qualify for a scholarship, a candidate must submit to the Scholarship Committee, by the deadline date on the calendar below, a completed application with supporting documents. The scholarship application is found in the *Appendix* of the *STEM Exposition Handbook*. Scholarship applications are sent to current seniors who participated in the previous year's City STEM Exhibition. Students should seek the assistance of their high school counselors in the processing of the application.

The Scholarship Committee, representing the business and education communities, screens all applications and chooses a number of students for interviews. After these interviews, the committee

selects the scholarship recipients on the basis of the following:

- Amount of STEM exhibition participation and levels of achievement
- Academic profile: types of courses and grades, class rank, and standardized test results
- Career objectives
- Extracurricular (school and community) activities
- Personal and leadership characteristics
- Letters of recommendations
- Written personal essay

Some monetary, college, and university scholarships are awarded directly to the student. Near the end of the school year, education and business leaders present the scholarships at an awards reception.

A list of university scholarships made available to Chicago Public Schools Student Science Fair, Inc. for seniors graduating from Chicago public high schools in in June of this school year appears in the *STEM Exhibition Handbook*.

Part Three: Classroom STEM Exhibitions

Local School Evaluation

The *STEM Exhibition Handbook* is the key source of guidelines and directions for students interested in doing research. The principal, the school STEM exhibition coordinator, and classroom teachers determine the methods used in directing student investigations and in selecting these students to enter an Area STEM Exhibition. It is recommended that the school STEM exhibitions serve as a community building event and persons with a science and/or mathematics background be selected to judge local school projects. The guidelines for judging provided in the *STEM Exposition Handbook* should be used as the criteria for selecting students to represent the local school at the area STEM exhibition. Projects that show evidence of independent research (not demonstrations) should be selected for the area STEM exhibition.

The trend in recent years has been to budget time in favor of working with interested students to develop meaningful research projects rather than in requiring all students to generate projects for a large school exhibition.

Students at the high school level are given the opportunity to submit their scientific research papers directly to the City Symposium Committee. Participation in the Symposium is not contingent upon the entry of an exhibit, but the project must include primary research conducted by the student. The research paper requirements are identical in both the project competition and the Symposium. The difference is that students in the Symposium make their presentation to a panel of judges without the advantage of a display.

Vertical Planning

Coherence is a driving factor in the Chicago Math & Science Initiative, and instructional coherence plays a pivotal role in designing middle-school and high-school science programs. A high-functioning science program has a complete storyline from grade to grade, so that the science a student learns, say, as a freshman, is the foundation for his or her sophomore, junior, and senior years. The involvement of students in the STEM Exhibition Program should play a central role in their overall development.

Students who are successful in a STEM exhibition generally work on their projects for several years, refining their experimental methods and honing their arguments. [See information about external university partners.] Schools with strong STEM exhibition programs have a clear plan that is sequential and cumulative for each semester of a student's STEM exhibition career. This work is often called *vertical teaming*, as teams form vertically within the school's science department to ensure coordination from year to year.

One area that is particularly important to STEM exhibitions is fostering students' ability to design and conduct experiments. Over the course of their educational experience at a school, students should progressively design and conduct more complicated and more elaborate experiments. In some cases, this means adding new techniques or tools—for instance, many students learn about uncertainty analysis for the first time in a junior- or senior-level physics class.

In other cases, this means gradually removing the intellectual scaffolding that surrounds laboratory investigations—moving from more structured laboratories and procedures in the beginning to more open-ended research as the student becomes more proficient. Science departments should discuss and establish concrete plans within all science courses to ensure that students develop their ability to design and conduct experiments each year.

Another area that is important to STEM exhibitions is teaching students how to communicate scientific information. Building on the work of the Chicago Reading Initiative, this can involve teaching students such basic skills as how to make their scientific arguments verbally, graphically, and in a variety of written formats to much more sophisticated skills such as refining their ability to create arguments and tradeoffs based on evidence. Science departments should discuss and establish plans within all science courses so that, year after year, students have the opportunity to communicate scientific information to a variety of audiences and in a variety of formats.

Responsibilities of the Classroom Science Teacher

Special note: The following timelines are suggested guidelines for an ideal teaching environment. The main goal is to stimulate students to use the scientific process to produce quality STEM investigations and exhibition projects. You may modify these steps to accommodate your particular circumstances.

- Instill in students an interest in research and indicate the intrinsic values that can be derived from independent investigations.
- Explain and reinforce that the STEM exhibition, the Science Symposium, and the Essay Contests present opportunities for further student independent study.
- Explain that the sharing of ideas with other students and leading scientists at school, area, city, and international levels is the cornerstone of these programs.
- Assist students in selecting and developing ideas for research projects and/or scientific papers. Where possible, make available resource information in the form of books, periodicals, and physical equipment.
- Discuss with students how to develop a project and show results of past research projects.
- Distribute a *STEM Exhibition Handbook* to those who show promise.
- Assist students with research grant applications and *Advise-A-Student* applications when projects meet the criteria.
- Arrange periodic small-group discussions on progress of projects and provide opportunities to analyze and solve problems related to individual projects.
- Help students obtain and share equipment and supplies.
- Determine that each project meets the safety requirements as outlined in the *STEM Exhibition Handbook*.

Suggested Calendar

September

- Send a letter to parents/guardians describing the kinds of learning activities scheduled for the school year. Inform them that students will be assigned a long-term independent science investigation that will take approximately six weeks to complete. Indicate how progress will be monitored and provide guidance during this period of time.
- Discuss safety guidelines involved in conducting experimentation. Display posters depicting safety rules and regulations. Make the practice of appropriate safety procedures an integral part of daily classes involving activities with manipulatives and equipment used for experimentation.
- Use the inquiry approach in daily science lessons. Provide various opportunities for students to conduct short-term science investigations in class and as homework assignments.
- Have students write lab reports to show evidence of knowledge gained from daily/weekly experimentation. Provide a handout listing the parts of a lab report.
- Connect independent research assignments to the practice and development of Illinois Learning Standards in English Language Arts, Mathematics, Science, and the Fine Arts.
- Connect independent research assignments with the Chicago Reading Initiative Reading - Instruction Framework components.
- Display STEM exhibition project boards completed by students in the past at a *Parent Night* event or have a sample project board on display.
- Collect resource materials that can be used by students to generate ideas.
- Plan to attend a STEM exhibition workshop sponsored by Chicago State University, Northeastern Illinois University, or the CPS Student Science Fair, Inc.
- Assist with the planning of the school STEM exhibition.
- Provide the names of potential judges for the school exhibition.

October

- Distribute information to students about the Essay Contests topics and guidelines for writing an essay. Indicate when the first draft of the essay is due and when the final essay is due.

- Provide students with a timeline for completing the long-term research assignment. A typical six- week plan follows:

- Week 1: Introduce the long-term independent science assignment. Have students select a topic and begin library research. (Library research should continue throughout the six weeks and beyond if a student is selected to participate in the school, area, city, state, or international exhibitions.)
- Week 2: Survey students to determine who will need to apply for special endorsements. Have students write a purpose and hypothesis, design an experiment to test the hypothesis, and list materials needed. Review safety guidelines for experimentation.
- Week 3: Instruct students to obtain materials needed to conduct their experiments. (Help students apply for a research grant if appropriate.) Have students begin experimenting and instruct them to maintain careful and complete records of observations and data collected. Suggest that students keep all data in a bound notebook or journal. Encourage students to take pictures during the various stages of development. (Pictures will serve as evidence of equipment and materials used in the experiment, as well as verify changes over time.)
- Week 4: Have students continue conducting experiments, consulting with mentors and other persons who are providing guidance, collecting data, taking pictures, collecting library references, and thinking about observations made.
- Week 5: Have students analyze data, construct graphs, draw conclusions, and write the research summary.

November

- Week 6: Review with students the guidelines and restrictions that must be followed when creating a display board. Instruct students to prepare a display board of results with tables, graphs, and pictures. (Have recycled display boards available for students to use – just to present their research findings to the class. If the materials are stapled to the display board, they can easily be removed for use by another student.) Have students prepare and practice an oral report of research findings.
- Organize a schedule allowing each student 5 minutes to give an oral presentation of his/her independent science investigation to the science class.
 - Prepare a rubric for evaluating the oral presentation and the display board.
 - Discuss how students will engage in peer evaluation of each classmate’s oral presentation and display board.
 - Establish a procedure to select the best projects for participation in the school STEM exhibition.
 - Send a notice to parents/guardians indicating the date, time, and location of the school STEM Exhibition.
 - Work with students who have been selected to participate in the school STEM exhibition. Determine if these students need to apply for a STEM exhibition *Mini* or *Maxi Research Grant*; submit an application to the *Advise-A-Student Program*; request a human, non-human vertebrate, human or vertebrate animal tissue, microbiology, or recombinant DNA endorsement.

December

- Review student symposium papers and essays. Make arrangements for submission to the City Symposium Committee.
- Provide an opportunity for those students selected to participate in the school STEM exhibition to practice their oral presentation in front of a class. Encourage listeners to give constructive feedback for improvements.
- Encourage all students to continue working on their independent research projects. Work with students who express an interest in preparing for next year’s STEM exhibition.
- Assist with the operation of the school STEM Exhibition.
- Take science classes to visit the school STEM Exhibition.
- Assist students attending the Area exhibition with proper completion of required documents, i.e., *Student STEM Exhibition Official Entry Form for Area* and *City STEM Exhibitions, Abstract, Safety Sheet, Research Summary*, and any applicable endorsements.

January

- Review the *Research Summary* written by students who have been selected to represent the school at the Area STEM Exhibition. Provide suggestions for improvements.
- Encourage students advancing to the Area STEM Exhibition to continue performing experiments and collecting data. Also, suggest that these students continue to locate information for the *Review of Literature* section of the *Research Summary*.
- Send information to the parents of those students selected to participate in the Area STEM Exhibition about the date, time, and location of the Area exposition. Inform parents that they will need to arrange transportation for these students. Seek the assistance of the administrative staff in solving transportation problems.
- Visit the Area STEM Exhibition. Talk with students from various schools about their projects. Offer encouragement to all students. Take pictures of project display boards as examples of layout and design.
- Assist graduating seniors who qualify with the scholarship application. See the *STEM Exhibition Handbook* for details.

February

- Assist students with completing and submitting a *Mini or Maxi Research Grant application*.
- Provide suggestions for project improvement to students who are advancing to the City STEM Exhibition.
- Review the *Exhibitor Bulletin* with students selected to attend the City STEM Exhibition. Work with students to complete required documents, i.e., *Abstract*, *Safety Sheet*, *Research Summary*, and any applicable endorsement(s).
- Send a notice to parents/guardians explaining the project setup procedures and schedule for the City STEM Exhibition.
- Encourage all students to visit the City STEM Exhibition. The exhibition is open to the public on Saturday and Sunday of the STEM Exhibition week. Check the dates and times listed in the *Calendar of Events* at the back of this handbook.

March

- Make and confirm arrangements with students and their parents/guardians for transportation and setup of projects at the City STEM Exhibition.
- Review all required documentation for students attending the City STEM Exhibition. Sign the appropriate documents, i.e., *Safety Sheet*, and *Title Page* of the *Research Summary*.
- Assist student exhibitors with making the required nine copies of the entire research document.
- Assist student exhibitors with the final development of their project display board. Check the dimensions allowed for project boards described in the *STEM Exposition Handbook*.
- Notify other teachers of students participating in the City STEM Exhibition that these students will need to leave school to set up their projects. Also announce that the students will exhibit their projects from Friday to Sunday of the STEM Exhibition week. Refer to the *Calendar of Events* printed in the back of this handbook for specific dates and times.
- Attend the City STEM Exhibition. Visit with students from your school and listen to the oral presentation of different students, asking appropriate questions, and giving encouragement. Take pictures of various project display boards to use as examples in the future.

April

- Prepare an announcement/press release for the school newsletter and for local newspapers about the experience and awards students won at the City STEM Exhibition.
- Follow up on any special awards and tours that students received.
- Discuss with City STEM Exhibition exhibitors comments about strengths and weaknesses provided by judges. Make recommendations for future science research.

May – August

- Encourage students to continue working on their project – suggest that they find a different hypothesis to test. Inform them that collecting more of the same kind of data is an unacceptable form of project continuation.
- Reflect on the entire process of developing a STEM exhibition project – from assigning independent science investigations to the development of full-scale STEM exhibition projects. Make modifications in procedures where necessary.
- Collect resources for project ideas and other reference materials that can provide background information.

Additional materials and suggestions can be found at <https://sites.google.com/iit.edu/smile/home>.

Part Four: School STEM Exhibitions

Responsibilities of the School STEM Exhibition Coordinator

Special note: The following timelines are suggested guidelines for an ideal teaching environment. The main goal is to stimulate students to use the scientific process to produce quality STEM investigations and exhibition projects. You may modify these steps to accommodate your particular circumstances.

Principals are to designate a school STEM exhibition coordinator to represent the school at Area STEM exhibition meetings and coordinate the school science exhibition.

- Instill in students an interest in research and indicate the intrinsic values that can be derived from independent investigations.
- Point out that the STEM exhibition, the science symposium, and the essay contests present opportunities for further student independent study.
- Explain that the sharing of ideas with other students and leading scientists at area, city, state, and international STEM exhibitions is the highlight of these programs.
- Assist students in selecting and developing their ideas for research projects and/or scientific papers. Where possible, make available resource information in the form of books, periodicals, and physical equipment.
- Discuss with students how to develop a project and show results of past research projects.
- Distribute a STEM Exhibition handbook to those students who show promise.
- Assist students with research grant applications and *Advise-A-Student* applications when projects meet the criteria.
- Arrange periodic small-group discussions on progress of projects and provide opportunities to analyze and solve problems related to individual projects.
- Help students obtain and share equipment and supplies while determining that each project meet the safety requirements as outlined in the *STEM Exhibition Handbook*.
- Solicit the cooperation of other faculty members for facilities and services helpful in the guidance of students in their research and in the writing of their research papers.
- Determine, together with the principal, teachers, and students, the method of selecting projects for advancement to the Area STEM Exhibition, using the guidelines of the City STEM Exhibition found in the *STEM Exhibition Handbook*.
- Collaborate with the principal, parents, other teachers, and staff members to plan a local school STEM Exhibition.
- Cooperate with the Area STEM Exhibition Committee. See that students are prepared and that current student entry forms are completely filled out and submitted on time.
- Review with students the requirements for the Area and City STEM Exhibitions.
- Inform high school seniors of the scholarship program.
- Encourage participation of younger students by explaining the program and the eligibility requirements.

Suggested Calendar

September

- Accept the role as the school STEM exhibition coordinator. Notify the Area STEM Exhibition chairperson of this role.
- Schedule a STEM exhibition planning meeting. Invite the principal, librarian, art, science, mathematics, computer, and language arts teachers to the meeting.
- Describe how each of these teachers can provide guidance and support to students working on STEM exhibition projects, symposium papers, or essays.

- Form working committees such as credentials, exhibit set-up, hospitality, judging, and safety. Establish a time line for each committee to complete assigned tasks.
- Determine the date and location for the school STEM exhibition.
- Establish guidelines for the school STEM exhibition. Include topics such as (1) restricting projects to inquiry-based investigations and not allowing demonstrations; (2) safety during experimentation and safety guidelines for displaying a project at the school STEM exhibition; (3) required project components; (4) grade levels to participate in the school exhibition; (5) number of students/projects to participate in the school exhibition; (6) programs/resources available to students; (7) required endorsements; and (8) determine the awards (such as certificates, ribbons, and trophies) that will be presented to students.
- Set the dates, times, location, and agenda items for future STEM exhibition meetings.

October

- Represent the school at the Area STEM exhibition meeting. Share information obtained from the Area STEM exhibition meeting with other teachers.
- Communicate to parents and guardians the date, location, and guidelines for the school STEM exhibition.
- Send invitations to potential judges. After judges accept the invitation, send information about the judging process and a copy of the scoring rubric.
- Seek the involvement of the community and businesses in planning the school STEM exhibition.
- Notify local newspapers about the school STEM exhibition. Prepare articles featuring the scientific research work of students who will participate.
- Become familiar with the information contained in the *STEM Exhibition Handbook* and distribute a copy to teachers working with students.
- Plan a meeting so that committee members can report on the progress of assigned tasks.
- Ask teachers to survey their students to determine which students will need to apply for endorsements.
- Work with teachers and students to complete and submit any requests for endorsements by the due date. Refer to the *Calendar of Events* in the back of this handbook.
- Encourage teachers to have students apply for the *Advise-A-Student* program and the *Mini* or *Maxi Research Grant*.
- Plan classroom STEM exhibitions. Suggest that all teachers allow peers to evaluate each other and use the same judging rubric.

November

- Hold classroom STEM exhibitions.
- Attend the Area STEM exhibition meeting. Share information with other teachers.
- Convene a meeting of STEM exhibition committee members and finalize the procedures for the school STEM exhibition.
- Have each STEM exhibition committee report on progress. By this time the exhibits committee has secure tables and chairs; the judging committee should have confirmed that a sufficient number of judges have responded; the hospitality committee should have determined the breakfast and lunch menu, serving procedures, a student lunch schedule, and procedures for tour guides; the credentials committee should have prepared a bulletin for students attending the school exhibition; the safety committee should have reviewed the projects of all students attending the Area STEM exhibition.
- Have classroom teachers provide the name, grade level, category, and project title for each student selected to present at the school STEM exhibition.
- Seek permission of parents/guardians for students to participate in the school STEM exhibition. Have parents/guardians sign a *Media Consent and Release Form* so that students can be photographed, videotaped, or interviewed.
- Ask local newspapers to advertise the exhibition, attend the exhibition, take pictures, write articles about students, and list the winners.
- Invite parents and community members to attend the school STEM exhibition.

December

- Host the school STEM exhibition. Collect data about the number of participants and the number of judges. Send this data to your Area STEM Exhibition Chairperson and to the Area Math/Science coach.
- Collect required documents for students selected to attend the Area STEM Exhibition.
- Sign the cover page of the *Research Summary* and the official entry form for each student advancing to the Area STEM exhibition.
- Announce the school winners in a school newsletter or prepare a press release for local newspapers.
- Submit required documents to the Area Credentials Committee so that they arrive on time.

January

- Serve on an Area STEM Exhibition Committee – and complete assigned tasks in a timely manner.
- Chaperone students from your school who are attending the Area STEM exhibition from your school.
- Visit with various exhibitors and take pictures.
- Inform the school of the results of the Area STEM exhibition. Send congratulatory letters to the homes of students participating in the Area STEM exhibition and especially acknowledge any student advancing to the City STEM Exhibition.

February

- Help students make improvements to their research projects based on the recommendations from Area STEM exhibition judges.
- Assist students with completing the *Advise-A-Student* application and/or the *Mini/Maxi Research Grant application*.

March

- Work with the sponsoring teachers of students advancing to the City STEM Exhibition to arrange transportation to the Citywide STEM Exhibition.
- Visit the City STEM Exhibition and talk with students from various schools and in various categories.
- Take pictures of students' projects to use as examples.

April

- Announce the results of students from your school who participated in the City STEM Exhibition.
- Follow up on any special award or tour that students received.

May – August

- Plan a reflection meeting with members of the school STEM exhibition committee. Make notes of areas that need to be changed next year.
- Begin planning for next year's school STEM exhibition.
- Work with the school librarian to order additional STEM exhibition resource materials.

Part Five: Area STEM Exhibitions

Winning projects selected at the school level advance to the Area STEM exhibition for further judging. All phases of these exhibitions are under the direction of the Area committees. Area STEM exhibition committees determine the locations, dates, hours, number of exhibits, judges, and supervision of Area STEM exhibition. These exhibitions are scheduled during the months of December and January and must be concluded prior to the first weekday of February.

Area STEM exhibition chairpersons receive quotas governing the number of projects that they may send to the City STEM exhibition. The Area committees should seek qualified judges from universities, industry, or secondary schools. Judges should be given careful instructions and they should follow the guidelines listed in the *STEM Exhibition Handbook*. It is also recommended that Areas have judges use the *Chicago Public Schools Student STEM Exhibition Judging Score Sheet*. The judging should emphasize originality and research. Demonstration projects should not ordinarily receive *Gold* and should not be sent to the City STEM Exhibition. It is suggested that, after the judging is completed, students be given comment cards on which recommended improvements to their project and/or oral presentation are written prior to the City STEM Exhibition.

Responsibilities of the Area STEM Exhibition Committee

Under the guidance of Area STEM exhibition chairpersons, approved by the AIOs, a selected group of school administrators and teachers determine the STEM exhibition program in each Area. All policies and procedures that are developed must be compatible with the City STEM Exhibition guidelines. Students who compete at the City STEM Exhibition must have previously participated in a Chicago public school Area STEM exhibition.

Specific duties and responsibilities of the Area STEM exhibition chairperson and committee are to:

- Use the *STEM Exhibition Handbook* to determine categories, physical requirements, safety regulations, and performance procedures.
- Enforce the ruling that all high school exhibits are individual projects.
- Enforce the ruling that elementary school projects may have no more than two students per project and encourage individual projects.
- Limit elementary school participation at the Area STEM exhibition to students in Grades 6–8. Students in Grades 4 and 5 should only exhibit if space is available. When space is limited, priority should be given to students in Grades 7 and 8 because they have an opportunity to compete at the City STEM Exhibition.
- Limit selection for entry to the City STEM Exhibition to students in Grades 7–12.
- Select no more than a total of two Outstanding projects from the Grade 6 participants in each Area to attend a special program to be held on Saturday during the City STEM Exhibition. Submit a *Student STEM Exhibition Official Entry Form for Areas and City STEM Expositions* and a *Consent Form and Release* for the Grade 6 Outstanding projects. Be sure to check the box, 6th Grade Recognition Event Only. **Sixth-grade students will not exhibit their projects at the City STEM Exhibition.**
- Obtain from the Citywide STEM Exhibition Coordinator the Area quota of projects that may be sent to the City STEM Exhibition.
- Cooperate with the other Area committees concerning the scheduling of STEM exhibition. Submit an early decision of STEM exposition dates to the Citywide STEM Exhibition Coordinator.
- **The last date to hold an Area STEM exhibition is listed on the calendar at the end of this document.**

Obtain from the Citywide STEM Exhibition Coordinator the following supplies:

- Copies of the *STEM Exhibition Handbook*
- STEM exhibition posters
- Award certificates for each participant
- Ribbons and seals (*Gold, Silver and Bronze*)
- *Recap Sheet*
- *STEM Exhibition Data Reporting Form*

The following forms are in the STEM Exhibition Handbook

- *Student STEM Exhibition Official Entry Form for Area and City STEM Exhibitions*
- *Request For Non-Human Vertebrate Animal Endorsement*
- *Request For Humans at Test Subjects Endorsement*
- *Request for Human or Vertebrate Animal Tissue Endorsement*
- *Request For Microorganism Endorsement*
- *Request For Recombinant DNA Endorsement*
- *Scholarship Application Form*

Entry Forms. There is only one official entry form. (Use the *Student STEM Exhibition Official Entry Form for Area and City STEM Exhibitions*.) This form must be used for the Area and the City STEM Exhibitions. If the project is selected to go to the City STEM Exhibition, the official entry form must be submitted at the close of the Area STEM exhibition.

Recap Sheets. A *Recap Sheet* will be sent to each Area STEM exhibition chairperson along with other information about procedures for submitting the names of the STEM exhibition winners from the Area. This summary sheet listing the winners of the Area STEM exhibition is to be completed in duplicate. Complete all requested information and send the original *Recap Sheet* with the official entry forms. Attach a copy of each student's *Abstract*, endorsement(s) (if applicable), and *Consent Form and Release* to each separate entry form. A copy of these forms is to be retained by the Area STEM exhibition chairperson. Mail the original entry forms and the *Recap Sheet* via the General Service Route (GSR), formerly Mail Run, or hand-deliver these to:

CPS Student Science Fair, Inc.
Dore Elementary School
6108 S. Natoma,
Chicago, IL 60638
GSR #44

Handbooks. Quantities of the *STEM Exhibition Handbook* have been allocated for each school and sent directly to the School STEM Exhibition Coordinator. This *Organizational Handbook* will be available on line only at www.cssf.org as printing costs have made producing this book prohibitive. The *Calendar of Events* for the entire year is included in both handbooks. Each student selected to participate in the City STEM Exhibition should be given a *STEM Exhibition Handbook*. Students selected to participate in the Illinois Junior Academy of Science (IJAS) State Science Fair and the International Science and Engineering Fair (ISEF) will receive those respective handbooks upon selection.

Posters. An attractive poster has been designed for display in schools, classrooms, study halls, libraries, and science laboratories. The graphics appearing on the poster are intended to encourage students who are interested in science and mathematics to enter their research work in one or more of the STEM exhibition programs.

Award Certificates, Ribbons, Seals. An ample quantity of these awards is made available so that every STEM exhibition participant at the Area STEM exhibition is awarded one of the following ribbon designations: Outstanding, Excellent and Honorable Mention. The number of Outstanding ribbons supplied cannot exceed the Area quota of projects allowed to advance to the City STEM exhibition.

Humans as Test Subjects and Non-Human Vertebrate Animal Endorsement Requests. Projects that utilize humans or vertebrate animals must complete the *Request for Humans as Test Subjects Endorsement* or *Request for Non-Human Vertebrate Animal Endorsement*. These forms must be completed according to the directives contained in the *STEM Exhibition Handbook* and must follow all rules. The Scientific Review Committee will approve or disapprove all requests for permission to participate in human or vertebrate animal research. If a *Humans as Test Subjects* or *Non-Human Vertebrate Animal Endorsement* was issued, the original must accompany the official entry and a copy must be included in the student's research paper.

Human or Vertebrate Animal Tissue Endorsement Requests. All projects involving human or vertebrate animal tissue (all body fluids, including blood, saliva, and urine, as well as hair, bone, and teeth) require a *Human or Vertebrate Animal Tissue Endorsement*. The student must obtain the endorsement from the Scientific Review Committee before beginning the experiment. See the *STEM Exhibition Handbook* for examples of sources of vertebrate animal tissue and proper handling. No fresh or preserved human or vertebrate animal tissue may be displayed. However, sterilized hair and teeth may be displayed if sealed.

Microorganism Endorsement Requests. Projects which utilize microorganisms not on the approved list must include a *Microorganism Endorsement*. A form to request this endorsement is found in the *STEM Exhibition Handbook*. It should be completed according to the directives contain in the handbook, and must adhere to all safety rules. This endorsement must accompany the official entry form. The student will have to submit documentation that the microorganism is rated as a Biosafety Level 1 organism. All research involving potentially hazardous biological agents must be done in an appropriate school laboratory with a trained supervisor. Only research on bread mold and yeast may be done in a student's home.

Recombinant DNA Endorsement Requests. All research involving recombinant DNA techniques must meet the requirements of the National Institute of Health guidelines for research involving recombinant DNA molecules. Such studies must only be conducted in a regulated research laboratory under the guidance of a biomedical scientist who is approved to conduct such studies by an appropriately constituted and registered Biosafety Committee and who is approved by the Scientific Review Committee of CPS Student Science Fair, Inc. A form to request this endorsement is found in the *STEM Exhibition Handbook*. This endorsement must accompany the official entry form.

All requests for endorsements are to be submitted by **the date listed in the calendar at the end of this handbook**.

Laser Registration Form. All lasers at the school, area, and City STEM Exhibition levels must be registered and comply with the requirements listed in the *STEM Exhibition Handbook*. Obtain a registration form from:

CPS Student Science Fair, Inc.
Dore Elementary School
6108 S. Natoma,
Chicago, IL 60638
GSR #44

Selection of Exhibits for the City STEM Exhibition. Projects chosen at the Area STEM exhibition should be selected from the projects that were rated as Outstanding. Only projects that exhibit independent research should be sent to the City STEM Exhibition. The projects should involve a controlled experiment and not simply be a demonstration type of display.

Each Area exhibition is encouraged to send the best representative exhibitors to the City STEM Exhibition. The quota of projects received from the Citywide STEM Exhibition Coordinator is the only limiting factor. No consideration should be given to the distribution of the exhibitors among the categories. In all cases, the best projects should be selected regardless of the category, grade, or school of the students.

If an Area STEM exhibition does not use its entire quota, or if an Area STEM exhibition needs more than the assigned quota because of the number of Outstanding projects, the Area STEM exhibition chairperson should contact the Citywide STEM Exhibition Coordinator.

Suggested Calendar

August

- Approval of an Area STEM exhibition chairperson by the AIO.
- Submit name of the appointed Area STEM exhibition chairperson to the Citywide STEM Exhibition Coordinator.
- Select a date for the first meeting of STEM exhibition coordinators from each school.
- Announce at a principals' meeting that an Area STEM exposition chairperson has been appointed and that each principal is to identify a school STEM exposition coordinator.
- Provide the date, time, and location for the first Area STEM exhibition meeting.

September

- Send a notice to each school STEM exposition coordinator indicating the date, time, and location for the first Area STEM exposition meeting.
- Use the first Area STEM exposition meeting to discuss the connection among the Illinois Learning Goals in English/Language Arts, Mathematics, Science and Fine Arts and the development of a STEM exposition project, a symposium paper or an essay. Describe the connection between STEM exposition activities and the Chicago Reading Initiative.
- Have each school STEM exposition coordinator select an Area STEM exhibition committee on which to serve.

Description of Area Committees

Credentials Committee This committee receives and reviews the required documents for entry in the Area STEM exposition (*Student STEM Exposition Official Entry Form for Area and City STEM Expositions, Abstract, Safety Sheet, Consent Form and Release*, and any applicable endorsement(s)). Each project should be screened to determine if an endorsement was required. This committee prepares and submits the *Recap Sheet* listing the winners of the Area STEM exposition and completes the *Area STEM Exposition Data Reporting Form*.

Exhibits Committee This committee prepares the exhibit area for students' display boards. Tables and chairs may need to be borrowed or rented for the Area STEM exposition. Each project needs to be numbered or identified so that STEM exposition judges will easily locate assigned projects. Upon conclusion of the exhibition, this committee returns the tables and chairs and cleans the exhibit area.

Hospitality Committee This committee arranges for refreshments at each Area STEM exposition meeting and for breakfast and lunch of the judges, teachers, and students attending the Area STEM exposition. This committee decides on decorations for the Area STEM exposition and establishes procedures for tour guides during the exhibition.

Judging Committee This committee secures a sufficient number of judges for the Area STEM exposition; sends letters inviting judges and receives confirmations from judges who can participate. This committee is also responsible for providing judges with an orientation and procedures for evaluating the exhibitors. Committee members assign projects to judges, check the judging scoring rubric, confirm the score, compute results and prepare a list of the winning projects.

Safety Committee This committee reviews the *Safety Sheet* submitted by each student. As each student sets up his/her project, a member of this committee inspects the project for compliance with safety guidelines for display. If possible, and violation is corrected or the committee may decide to disqualify the project.

- Establish a timeline for completing various tasks in preparation for the Area STEM exposition. Determine the date, time, and location of the Area STEM exposition.
- Assign tasks to each committee. Allow committee members time to meet and discuss assigned tasks. Have each committee select a leader or spokesperson to give a progress report. Set dates for

future Area STEM exposition meetings. Ask all members to give the names of potential Area STEM exposition judges to the judging committee.

- Create an Excel file listing the name of each school STEM exposition coordinator, the name of the school, and the GSR number. Submit this list to the City STEM Exposition Coordinator. (This list will be used to mail the handbooks and poster to each school.)

October

- Schedule an Area STEM exposition committee meeting. Discuss the new or changes in rules and regulations provided in the *STEM Exposition Handbook*. Review safety guidelines for experimentation and safety guidelines for display. Point out that some projects may require an endorsement. Review the requirements for various kinds of endorsements (Humans as Test Subjects, Non-Human Vertebrate Animal, Human or Vertebrate Animal Tissue, Microorganism, and Recombinant DNA). Have each committee spokesperson give a progress report.
- Summarize the progress reports from each committee. Provide information to the school STEM exposition coordinators about the established procedures for the Area STEM exposition. Send a copy of the established Area STEM exposition procedures to the principal of school.
- Assist the judging committee with composing a letter to potential judges. Have the letter signed by the AIO. Mail the letters to potential STEM exposition judges.

November

- Establish an Internal Account for the Area STEM exposition operating funds.
- Provide the City STEM Exposition Coordinator with the account name and location to send the check for the allocated Area STEM exposition operating funds.
- Create a budget for conducting the Area STEM exposition.
- Order certificates, ribbons (Outstanding, Excellent and Honorable Mention) and seals from the City STEM Exposition Coordinator. The number of Outstanding ribbons cannot exceed the quota of projects that can be sent the City STEM Exposition. (The quota of projects that can be sent to the City STEM Exposition will be provided to each Area STEM exposition chairperson.)
- Hold an Area STEM exposition committee meeting. Have each committee give a progress report. Determine the number of projects that each area school can send to the Area STEM exposition. Prepare an Area STEM exposition bulletin describing final procedures for participation at the Area STEM exposition. Indicate the due date for required documents to be sent to the Area credentials committee. Distribute the bulletin to each Area school.

December

- Hold an Area STEM exposition meeting on or after the due date for submitting required documentation for each student participating in the Area STEM exposition. Provide time for Area STEM exposition committee members to meet and work. Have the credentials committee point out any problems with required documentation. Ask the credentials committee to confirm the number of STEM exposition entries from each school and to work with any STEM exposition school coordinator who has problems with required documentation. Make sure that all projects have any appropriate endorsement(s).
- Finalize the plans for the Area STEM exposition. Have each committee give a progress report.

January

- Host the Area STEM exposition. Collect data about the number of Area STEM exposition participants and the number of judges.
- Distribute certificates with ribbons and seals to student participants.
- Collect and review documents of projects selected to participate at the City STEM Exposition.
- Sign the *Student STEM Exposition Official Entry Form for Area and City STEM Expositions*.

February

- Submit required documents to the City STEM Exposition Coordinator. See the *Calendar of Events* for the due date.
- Announce the Area STEM exposition winners in an Area newsletter and/or prepare a press release for local newspapers.
- Prepare a list of the Area STEM exposition committee members for publication in the *City STEM Exposition Program Book*.

March

- Attend the *Opening Ceremony* and *Recognition Luncheon* for chairpersons, judges, and corporate sponsors as posted on the *Calendar of Events*.
- Visit the City STEM Exposition and talk with students from various schools and in various categories.

April – June

- Plan a reflection meeting with members of the Area STEM exposition committee. Make note of suggested changes for next year.
- Begin planning for next year's Area STEM exposition.

Part Six: Officers and Chairperson

Please visit www.cpsscifair.org for the current listing of officers and chairpersons.

Calendar of Events:

Student STEM Exhibition Calendar of Events: 2018-2019

SEPTEMBER 2018

- 9/15 QED Math Symposium pre-registration. Registration forms accessible on-line at <http://www.mathcirclesofchicago.org/qed>
- 9/17 Board of Directors meeting
- 9/19 **DUE DATE** for **PEOPLES GAS MIDDLE SCHOOL STEM CLUB** applications to be received.
- 9/26 City STEM Exhibition Council Meeting (Network Exhibition Chairpersons & Operating Committee Chairpersons), 4:00 pm – 6:30 pm.
- 9/28 Board of Directors meeting, if needed.
- 9/29 **DUE DATE** for **COMED HIGH SCHOOL SCIENCE CLUB** – visit our website at www.cpsscifair.org for updated information.
- 9/29 STEM Exhibition Central for students, parents & teachers at Chicago State University (CSU) – CSU will host STEM Exhibition Central from 9 AM to 12:00 PM in the Williams Science Center, Rooms 106 and 108, or write Asst. Prof. J. Archibald Peters at jpeter24@csu.edu
- 9/29 STEM Exhibition Central for students, parents & teachers at Northeastern Illinois University (NEIU) - see <http://www.neiu.edu/~sfc/> or write Dr. Huseyin Colak at h-colak@neiu.edu for details.

OCTOBER 2018

- 10/1 City STEM Exhibition Council Meeting (Network Exhibition Chairpersons. & Operating Committee Chairpersons), if needed.
- 10/15 Board of Directors meeting.
- 10/26 **DUE DATE** for **ENDORSEMENT REQUESTS** for Projects conducted in a university, hospital or research facility under the supervision of a professor or scientist must submit endorsement documents prior to beginning their project. Appropriate endorsement form with supporting documents must be sent to the Scientific Review Committee member listed on the appropriate forms.
- 10/31 **DUE DATE** for **REQUEST FOR USE OF FIREARMS ENDORSEMENT** to be received by the safety review committee on the appropriate form with all documents attached.

NOVEMBER 2018

- 11/9 QED MATH SYMPOSIUM REGISTRATION DUE. REGISTRATION ACCESSIBLE AFTER SEPTEMBER 1ST ONLINE AT [HTTP://WWW.MATHCIRCLESOFCHICAGO.ORG/QED](http://www.mathcirclesofchicago.org/qed)
- 11/17 Board of Directors meeting.
- 11/19 **DUE DATE for ENDORSEMENT REQUESTS** for human, vertebrate, human and vertebrate tissue, microbiology, and DNA to be received by the Scientific Review committee member listed on the appropriate form. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning project.
- 11/19 **DUE DATE** for RESEARCH GRANT APPLICATIONS PRE-APPROVA.
CPS Student Science Fair, Inc., Dore Elementary School, 6108 S. Natoma, Chicago, IL 60638; GSR #44.
- 11/11-12/14 Suggested dates for local school STEM exhibitions.

DECEMBER 2018

- 12/01 QED Math Symposium held at Walter Payton High School from 8:30 a.m. to 2:15 p.m.
For more information contact Doug Rak at doug@mathcirclesofchicago.org
- 12/03 **Back of Directors Meeting**
- 12/14 **DUE DATE for IJAS COVER DESIGNS** sent to IJAS Cover Design c/o CPS Student Science Fair, Inc., P.O. Box 803945, Chicago, IL 60680-3945

JANUARY 2019

- 1/11 **DUE DATE for SYMPOSIUM PAPERS & ESSAYS** – Symposium and Essay Entry Forms, along with Research Papers and all required documents must be sent as one PDF file via email to cpssciencefair@gmail.com Attention – Jennifer Patush
- 1/11-2/01 Suggested dates for Regional Networks STEM Exhibitions
- 1/16 Operating Committee Chairpersons Meeting, 4:00 p.m. to 6:30 p.m.
- 1/26 Symposium and essay paper reading. Contact Jennifer Patush at cpssciencefair@gmail.com

FEBRUARY 2019

- 2/04 **Back of Directors Meeting**
- 2/13 Operating Committee Chairpersons Meeting, 4:30 p.m. to 6:30 p.m.
- 2/15 Notification of students selected to present high school research papers at the STEM Exhibition Symposium
- 2/20 Operating Committee Chairpersons Meeting, 4:00 p.m, if needed
- 2/22 **DUE DATE for MINI & MAXI RESEARCH GRANT APPLICATIONS** to CPS Student Science Fair, Inc., Dore Elementary School, 6108 S. Natoma, Chicago, IL 60638; GSR #44.

MARCH 2019

- 3/04 Board of Directors Meeting
- 3/06 Operating Committee Chairpersons Meeting, 4:00 p.m. to 6:30 p.m.
- 3/19 CPS 7th and 8th grade exhibitors set up projects at the Illinois Institute of Technology, Hermann Hall, 9:30 a.m. – 1 p.m. ([See Map](#))
- 3/20 CPS High School exhibitors & symposium participants set up at the Illinois Institute of Technology, Hermann Hall, 9:30 a.m. – 1 p.m. ([See Map](#))
- 3/21 **DUE DATE for CPS SSF SCHOLARSHIP APPLICATIONS**; all necessary documents to be received by Jenny Sarna, Scholarship Chairperson, CPS Bridgeport Office, Teaching & Learning – Science, GSR# 39
- 3/21 STEM Exhibition Symposium Presentations, 9 a.m. – 3 p.m.
- 3/22 City Exhibition of Student STEM Research - Exhibit Judging 8 a.m. – 1 p.m.
Opening Ceremony 11 a.m.
STEM Exhibition open to the public at 1-3:15 p.m.
- 3/23 International Science and Engineering Fair Judging^[11]_[SEP]
Sixth-Grade Recognition Event (by invitation only)
STEM Exhibition open to the public from 9:30 to 3:15 p.m..
- 3/24 Awards Program 1:00 – 3:00 p.m. ([by invitation only](#))

APRIL 2019

- 4/11 STEM Exhibition Scholarship Oral Interviews (by invitation only), location to be announced

MAY 2019

- 5/3-4 Illinois Junior Academy of Science Exposition (IJAS State Science Fair); Southern Illinois University, Carbondale, Illinois
- 5/12-17 International Science and Engineering Fair, Phoenix, Arizona
- 5/21 Board of Directors Meeting, 2:00 p.m.
- 5/21 Scholarship Awards Reception, [by invitation only](#), location to be announced.
- 5/22 City STEM Exhibition Council Meeting (Network Exhibition Chairpersons & Operating Committee Chairpersons), 4:00 p.m. – 6:30 p.m.
- 5/24 **DUE DATE for FINAL MINI AND MAXI RESEARCH GRANT** reports to CPS Student Science Fair, Inc. Dore Elementary School, 6108 S. Natoma, Chicago, IL 60638; GSR #44.

JUNE 2019

- 6/03 ~~Board of Directors Meeting~~

Please visit www.cssf.org for the most current calendar.