Exhibition of Student STEM Research 2026

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Brought to you by Chicago Public Schools Student Science Fair, Inc.
Academic and Exhibition Site Supporters: Chicago Public Schools - Department of STEM

2026 School Affiliation

Teachers/Administrators contact CPS stemexhibition for the link to the 2026 School Affiliation
Needs to be completed by Friday, 10/10/2025

2026 CPS STEM Exhibition 101

CPS STEM Exhibition 101

Calendar of Events

Google Calendar of Events Link

Schools by Network

Find Your School's Network

CPS STEM Exhibition Website

https://cpsstemfair.org/

Important Dates

Activity/Event	Due Date
School Affiliation	**Friday, October 10, 2025**
School Level STEM Exhibition (Science Fairs)	**At anytime during the Fall Semester**
Regional STEM Exhibition and Symposium Registration Only Abstracts/Safety Sheet (signed by student(s) and sponsor) Endorsements (if needed) will be required for registration. Students will bring full paper with them to their Regionals STEM Exhibition	**November 7, 2025 - December 24, 2025**
Northside/Central Schools Regional STEM Exhibition with Awards Ceremony at Von Steuben	**Saturday, January 10, 2026**
Southside/Central Schools Regional STEM Exhibition with Awards Ceremony at Carver Military Academy	**Saturday, January 17, 2026**
Essay/Paper Submissions Due Electronically (The Essay Competition is open to Grades 7-12; however, Symposium is only open for High School Grades 9-12)	**Friday, January 9, 2026**
Essay/Symposium Paper Reading (virtual)	**Saturday, January 10 - Friday, January 23, 2026**
City STEM Exhibition Finalist Registration	**Friday, January 23, 2026**
Symposium Presentations at Griffin Museum of Science and Industry	**Thursday, February 5, 2026**
In Person CPS STEM Exhibition Setup Student In Morning with Judging in Afternoon at Griffin Museum of Science and Industry	**Friday, February 6, 2026**
In Person Special Awards/ISEF Judging and the 6th Grade Luncheon at Griffin Museum of Science and Industry	**Saturday, February 7, 2026**
In Person Awards Ceremony Griffin Museum of Science and Industry	**Sunday, February 8, 2026**
In Person Illinois Junior Academy of Science (IJAS) State Exposition at University of Southern Illinois Carbondale, Carbondale IL	**Friday, April 24 - Saturday, April 25, 2026**
In Person International Science and Engineering Fair (ISEF) in	**Sunday, May 10 - Friday, May 15, 2026**

Phoenix, Arizona (High School Only) We are USIL01.	

Information with Number of Projects

Grade	Number of Projects
6th Grade	5 Projects per school (Team projects allowed, 2 People MAX)
7th & 8th Grades	5 Projects per school (Team projects allowed, 2 People MAX)
9th - 12th Grades	15 Projects per school (No team projects)

Frequently Asked Questions

Frequently Asked Questions

Why participate in Exhibitions of Student STEM Research?

It is a chance to learn about something you are interested in and discuss your work with professional scientists. You show your teacher you know how to ‘do science, technology, engineering and mathematics’ (authentic assessment) according to state and national goals for learning. Also, when you are a senior, you may qualify for scholarships for college.

When is the city exhibition?

The opening ceremony and judging will be on Friday, February 6, 2025 at the Griffin Museum of Science and Industry. Other important dates are listed on the Calendar of Events.

How do I know if I need an endorsement?

If your project could harm you, or your test subject(s), you may need an endorsement. Look at the Endorsement Flow Chart to see if the Scientific Review Committee needs to check whether the plan for your experiment is safe. If it is safe your project will receive an endorsement, so you can go ahead and do the experiment. If your project needs an endorsement and does not have one, it will not be allowed to participate in any Exhibitions. Should an unendorsed project mistakenly progress through a school exhibition or Regional Network STEM Exhibition, it will not be allowed to be exhibited at the City Exhibition of Student STEM Research.

When are the endorsement requests due?

Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – must be received by November 21, 2025. All other endorsements must be received by November 21, 2025, but if you want to start your experiment sooner you should send in your request earlier, so you have it before you start your experiment.

How many students can work on a research project?

High school students must work individually. Elementary students may work in pairs.

Do I have to personally collect data for my project?

No. There is no fundamental problem with using existing data for a project. It’s not better or worse than a project that involves data collection - it is just different. Data mining is particularly advisable when a student does not have the means to collect the data to their own research question, as with some aerospace projects. NASA may have collected data that a student can filter to find the information that addresses the research question. OSHA has a great deal of data that is in the public domain.

What is APA format and how do I use it?

APA is a particular format for research papers that helps the reader identify the sources of information. examples and on-line tools to cite your references and format your reference list.

Can I bring my experiment materials to display at the exhibition?

Experimental and Design projects MAY NOT exhibit any experimental materials or prototypes. Only a display board and computer may be on top of the table. The computer must be battery operated, no electricity will be supplied. NO microorganism cultures, glassware, chemicals, hazardous substances, fire hazards, etc. may be displayed on the table or on the display boards. See the Safety Guideline for Project Display for further information.

My experiment was safe. Do I have to fill out a safety sheet?

Yes. Your statement on the safety sheet shows that you have considered all possible safety hazards. ANY potential and actual hazards must be specified as well as the safety measures you took. Safety Sheet must be signed by the exhibitor and by sponsor.

How will my project be judged at the city exhibition?

CPS City Exhibition uses the same criteria as at the state science exhibition. Use these as you develop your project, as well as, when you get ready for the exhibition.

What is the symposium and how is it different from the exhibits competition?

Symposium is an alternate way a high school student may present research projects. The school STEM exhibition coordinator can send 30 papers from their school to be read by several science professionals, instead of the project being presented at a Regional Network STEM Exhibition. The best papers are selected to be presented to a panel of judges once at the City Exhibition Symposium session rather than presenting several times for individual judges.

I need help! Can I get a mentor?

Can I get money to pay for my experiment supplies? The Alumni Mentor Program pairs students up with scientists to talk or email about student projects. The Research Grant program reimburses students with qualified projects. Keep your receipts!

Part One: Projects

Part One: Projects

Project Process Flowchart

START: Project Planning & Selection

- Choosing the Correct Research – Experimental vs. Design
- 2026 STEM Exhibition Categories

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Safety & Endorsement Review

- Safety in Experimentation
- Endorsement Flow Chart

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Does your project involve any of the following?

- Use of Humans in Experimentation
- Use of Animals in Experimentation
- Use of Microorganisms
- Use of Human or Vertebrate Tissue
- Use of Recombinant DNA
- Use of Hazardous Equipment
    - **YES** → Must follow specific safety protocols and obtain endorsements before proceeding.
    - **NO** → Proceed to research.

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Conducting Research

- Required Experimental Research **OR** Required Design Research
- Estimating Experimental Error
- Correct SI Metric System Usage

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Documentation & Reporting

- Reference List Format

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Preparing for Presentation

- Exhibit Guidelines
- Safety Guidelines for Project Display

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END: Project Ready for Exhibition

Project Rules and Regulations

Project Rules and Regulations

Introduction

The STEM Exhibition Handbook is designed to assist the student in the development of a research project,a symposium paper or an essay, in the areas of science, technology, engineering and mathematics. The information contained in this handbook should be read carefully and thoroughly by the student and the teacher. Planning and selection of a research project, the method of developing a scientific paper, and the adherence to safety requirements are explained in depth in this handbook.

If significant progress has been made on a project, the participant may exhibit their project at the local
school STEM exhibition. If successful, the participant may move on to a Chicago Public Schools Regional
Network STEM Exhibition. From this level, the project may be chosen for exhibit at the City Chicago
Public Schools Exhibition of Student STEM Research held at the Griffin Museum of Science and Industry.

A student researcher at the high school level may also submit a research paper for evaluation and possible presentation in the City Exhibition Symposium. To participate in the Symposium, a student is not required to have an exhibit on display at the fair, but he/she must conduct primary research as a basis for the paper.

At the City Exhibition, a student may be selected to represent the Chicago Public Schools at the IJAS Exposition held at the University of Southern Illinois Carbondale, Carbondale IL. The student, if in high school, may also be selected to represent the Chicago Public Schools at ISEF in Phoenix, Arizona (The flow chart on the preceding page highlights the steps followed by a student as they proceed from the school level to regional, city, state and international competition.)

CPSSSF Rules and Regulations

The following rules apply to all Chicago public school students participating in the Chicago Northside/Southside Regional STEM Exhibitions and the City Exhibition of Student STEM Research at the Griffin Museum of Science and Industry.

- Students in sixth grade are restricted in the STEM exhibitions program to participation at the local and Regional Network levels. Only students in the seventh through twelfth grades attending a Chicago public school (including CPS charter schools) may participate in the City Exhibition at the Griffin Museum of Science and Industry.

- All high school projects must be done on an individual basis. The maximum number of 6th - 8th grade students who may work together on a project is two.
- The students of two projects from the sixth grade will be selected from each Regional Network STEM Exhibition to attend the 6th Grade Recognition Luncheon during the City Exhibition.The participants will not exhibit projects at the City Exhibition.
- All exhibitors must have physically entered the Northside/Southside Regional STEM Exhibitions. Top exhibitors will be selected to participate in the City Exhibition.
- Students will be judged only on the most recent year's research. This project year includes research conducted over a maximum of 12 continuous months from January of last school year to May of the current school year. Any project in the same field of study from a previous year's project is considered a continuation. These projects must document that the additional research is new and different from prior work (e.g., testing a new variable or new line of investigation, etc.). Examples of unacceptable continuation are repetition of previous experimentation and increasing sample size.
- If a project needs an endorsement and does not have one it will not be allowed to participate in STEM Exhibitions. Should an unendorsed project mistakenly progress through a school exhibition or Northside/Southside Regional STEM Exhibition, it will not be allowed to be exhibited at the City Exhibition of Student STEM Research.

Experimental vs Design Projects

Experimental vs Design Projects

Most projects will be experimental in nature using the scientific method and will fall into the experimental category. However, if the objective of your project is to invent a new device, procedure, computer program, or algorithm, then your project may fall into the design category.

Scientific Method	**Design Process**
Identify and write a testable question	**Define a need or real world problem**
Decide what question you want to answer or what problem you want to solve. A testable hypothesis is answered through observations or experiments that provide evidence. Be sure to have adequate technical and financial resources available to conduct your research. State your objective clearly in writing.	Instead of stating a question, state a need. Can you describe in detail a problem that your design will solve? Does your research relate to a real world need?
Perform background research	**Perform background research**
Before you begin your project, you must become as knowledgeable as you can about your topic and about other research that has been done on that topic. You may use books, scientific literature, the Internet, or interviews with scientists or other knowledgeable people. This research not only helps you get ready to conduct your experiment, but will form the background for the Background Research required in your report.	For a design project, the background research may include: ● A complete description of your target user(s) ● Information about the science behind your design area ● Answers to research questions about user needs ● Information about products that meet similar needs ● Research about design criteria ● What existing solutions are out there already, and how well do they solve the problem? You may use books, scientific literature, the Internet, or interviews with scientists or other knowledgeable people. This research not only helps you get ready to conduct your experiment, but will form the background for the Background Research required in your report
Formulate a hypothesis and identify variables	**Establish design criteria**
Based on the background research, write a statement that predicts the outcome of the experiment. Many hypotheses are stated in an “If... then” statement where the “If” statement pertains to the independent variable, and the “then” statement pertains to the dependent variable. For example: ‘**If** plants are grown under various colors of light, **then** the plants grown under the blue and red lights will show the greatest increase in biomass.’	**Engineering Projects:** Decide what features your design must have, for example: size, weight, cost, performance, power, etc. Perhaps include a table showing how each design criterion will be addressed by the features of the product being designed. **Computer Science Projects:** Creating or writing a new algorithm to solve a problem or improve on an existing algorithm. Discuss the criteria of the algorithm. **Mathematics Projects:** Proofs, development of a new model or explanation, concept formation or mathematical model design.
Design an experiment, establish procedure	**Prepare preliminary design(s)**
Decide what data you need to meet your research objective and how you will collect it. Be sure to consider possible hazards	Engineering projects should have a materials list, programming and mathematical projects do not

Scientific Method	Design Process
in your experimental approach and decide how you can conduct your research safely. In addition, there are special rules concerning the use of human and non-human vertebrates in your research. Be sure to consult these rules before finalizing your experimental design. In order to obtain valid experimental results, consider the following items when designing the experiment: Make sure the quantity and quality of data you collect provides a reasonable assurance that your research objectives will be met. Identify all significant variables that could affect your results. To the best of your ability, control any significant variables not manipulated in your experiment. Include a control or comparison group in your experimental design. Be sure to establish deadlines for completing the different phases of your research. These phases might include building equipment, collecting data, analyzing the results, writing the report and constructing your display board. Remember to use metric measurements whenever possible.	need a materials list. Projects should include a block diagram, flowchart or sketch of the design that shows all of the parts or subsystems of the design. Describe how all of the parts of the design will work together.
Test the hypothesis by conducting the experiment	**Build and test a prototype**
Follow your experimental design to collect data and make observations. Be sure to keep a log as you conduct the experiment to record your data, any problems you encounter, how you addressed them, and how these problems might have affected your data. This log will be used when you write your report. Keep these points in mind when conducting your experiment: ● If you get results that seem wrong or inconsistent, do not just throw them out. Try to figure out what happened. Maybe the data is correct and your hypothesis is flawed. Try to explain these “outliers” in your Data, Analysis, and Discussion section. ● Don’t get discouraged when you encounter problems. Scientists often have to repeat experiments to get good, reproducible results. Sometimes you can learn more from a failure than you can from a success.	(Programs, algorithms, and mathematical models may be considered prototypes) When others are conducting their experiment, investigators doing an engineering, computer programming, or mathematics project should be constructing and testing a prototype of their best design. For example, you may involve targeted users in your testing to get feedback on your design; or some projects may analyze data sets.
Analyze the results and draw a conclusion(s)	**Test and redesign as necessary**
Make sufficient calculations, comparisons and/or graphs to ensure the reliability and repeatability of your experiment. In what way does this analysis confirm or refutes) your hypothesis. What	Evidence that changes in design were made to better meet the performance criteria established at the beginning of the project. Test results may be included in tables, if applicable. Data analysis/validation may

Scientific Method	Design Process
conclusion(s) can you draw from this analysis?	also be a part of this step.
Present results	**Present results**
Your report should provide all the information necessary for someone who is unfamiliar with your project to understand what you were trying to accomplish, how you did it, and whether you succeeded. It should be detailed enough to allow someone else to duplicate your experiment exactly. Be sure to include charts and graphs to summarize your data. The report should not only talk about your successful experimental attempts, but also the problems you encountered and how you solved them. Be sure to explain what new knowledge has been gained and how it leads to further questions.	Your report should provide all the information necessary for someone who is unfamiliar with your project to understand what you were trying to accomplish, how you did it, and whether you succeeded. The report should not only talk about your successful design attempts, but also the problems you encountered and how you solved them. Be sure to explain what new knowledge has been gained and how it leads to further questions.

Project Planning and Selection

Project Preparation Timeline & Steps

The following basic steps and suggested timeline are provided by the SMILE program at IIT. Teachers should adjust this to meet their students' and school needs. For more detailed help, visit: **www.cpsscifair.org**

WEEKS 1–2: Identify Your Topic

- **Select a topic of interest.** Consider what materials are available, how you can change variables, how you can measure changes, and if you have enough time.
- **Look at past projects for inspiration.** Altering a previous experiment is encouraged, but repeating it is not.
- **Write a testable question or define a design problem.** A testable question includes the manipulated/independent variable (what you change) and the responding/dependent variable (what you measure).
    - *Example:* How does changing the *(independent variable)* affect *(dependent variable)*?

WEEKS 3–4: Research and Plan

- **Research your subject.** Use books, magazines, and the internet to find background information. This will help you develop a strong hypothesis and avoid common mistakes.
- **Write a hypothesis or develop design criteria.** Predict the effect of your changes. Make sure your prediction is measurable and addresses your original question.
- **Write a step-by-step procedure.** Be detailed enough for someone else to repeat your experiment. Ensure results are measurable (using metric units), there is only one manipulated variable, and all other conditions are constant. Include a control group if possible.
- **Prepare a preliminary design (for engineering projects).** Include a materials list and a diagram/flowchart showing how the parts work together.
- **Check for endorsements.** Before experimenting, check the rules and submit any required endorsement requests to the Scientific Review Committee. **Do not begin experimenting until approved.**
- **Gather materials.** Make sure you have enough to repeat your experiment if needed.

WEEKS 5–6: Experiment and Collect Data

- **GT5** Prepare a data table beforehand and follow your procedure exactly. Note any changes you make.
- **Record all data and observations in a journal.** Be careful, consistent, and accurate. Take pictures for your display board.

WEEK 7: Analyze and Conclude

- **Analyze the results.** Use tables, charts, and graphs to represent your data. Determine if your results are statistically significant and consider any experimental errors.
- **Draw a conclusion.** State whether your results support or contradict your hypothesis/design criteria. Explain the relationship between your variables and summarize the effectiveness of your procedure. Suggest improvements or new questions for future study.

WEEK 8: Write Your Papers

- Write your research summary report and abstract.
- Complete all other required paperwork for the STEM Exhibition.

WEEKS 9–10: Prepare to Present

- **Prepare your display board.** Organize it to give a complete and clear explanation of your project, using charts, graphs, and photos.
- **Prepare an oral presentation.** Summarize your project concisely. Speak clearly, make eye contact, and show enthusiasm for your work.

Need Help?

- **Alumni Mentor Program:** Pairs students with professional scientists and engineers for guidance.
- **Research Grants:** May reimburse students for project-related expenses.

2026 STEM Exhibition Categories

2026 STEM Exhibition Categories

Aerospace Science**	... is the science of the study and investigation of the earth's atmosphere and outer space. In the wide sense, it would include the design, manufacture, and operation of aircraft. Some topics that fall within this division are the operation of rockets, guided missiles, anything related to space travel, operation, and/or construction of satellites, observations of airflow patterns within tunnels, and the use of navigational equipment. **For IJAS ONLY: Astronomy**** ...is the science dealing with all of the celestial bodies in the universe, including the planets and their satellites, comets and meteors, the stars and interstellar matter, the star systems known as galaxies, and clusters of galaxies. Modern astronomy is divided into several branches: astrometry, the observational study of the position and motions of these bodies; celestial mechanics, the mathematical study of their chemical composition and physical condition from spectrum analysis and the laws of physics; and cosmology, the study of the universe as a whole.
Agriculture	... investigation and research encompasses a wide range of activities aimed at understanding, improving, and sustaining agricultural practices. These efforts are crucial for addressing challenges such as food security, environmental sustainability, and economic viability.
Behavioral Science*	... is the science that studies the demeanor or deportment of humans and other animals by means of observable response and the interpretation of the same as offered by the social sciences, sociology, psychology, etc. Some topics that fall within this division are the effect of stimuli on organisms and their responses, learning, motivation, emotion, perception, thinking, individuality, personality, and adjustment.
Biochemistry*	... is the branch of chemistry relating to the processes and physical properties of living organisms. Topics that fall within the biochemistry division are the properties and reaction of carbohydrates, lipids, proteins, enzymes, blood, urine, vitamins, hormones, poisons, and drugs. The chemistry of absorption, digestion, metabolism, respiration, and photosynthesis as organic processes also belong in this category.
Botany	... is the division of biology that deals with plant structure, reproduction, physiology, growth, classification, and disease. Some topics included in this category are specialization in plants, functions of various plant structures, reproduction, and heredity.
Chemistry	... is the science that deals with the structure, composition, and properties of substances and of their transformations. Some topics included in this category are the composition of various compounds, the formulation of various compounds, the study of gas laws, atomic theory, ionization theory, and the analysis of organic and inorganic products.
Computer Science**	... includes the study and development of computer hardware, software engineering, Internet networking and communications, graphics (including human interface), simulations/virtual reality or computational science (including data structures,

	encryption, coding, and information theory). Topics in this category may include writing an original program and comparing it to an existing one, developing a new language and comparing it to an existing one, etc.
Earth Science	... is the science concerned with the origin, structure, composition and other physical features of the earth. Some topics that fall within this division are geology (earth composition, rock formation, fossils, minerals, and fossil fuel); geography (landforms, soils, classification of streams, erosion, and sedimentation); oceanography (ocean waves, ocean currents, composition of ocean water and coastal zone management); seismology; geophysics; and meteorology.
Electronics	... is the branch of engineering and technology that deals with the manufacture of devices such as radios, television sets, and computers that contain electron tubes, transistors, chips, or related components. Topics in this category are circuits (electrical, electric digital and analog) for communication such as radio, radar, laser, transistor, television, and integrated circuits; electricity; electric motors; solar cells and amplifiers.
Engineering Science*	... is concerned with the practical application of scientific knowledge in the design, construction, and operation of roads, bridges, harbors, buildings, and machinery, lighting, heating, and communication systems. Some topics in this category are stress testing of building materials, strength composition of building materials, collection of data from operating systems to compare and contrast their effectiveness.
Environmental Science	**...** is the study of the protection and care of natural resources. Topics included in this category are solar energy and its uses, water purification and usage, pollution control, soil chemistry, and insecticides. Within this area is ecology, which is the study of ecological systems, and ecological population studies.
Health Science*	**...** is that science concerned with the study of the human body and good health practices. Topics to be found under this category are proper diet, care of the teeth, care of the eyes, and hygiene.
Materials Science	... is the study of materials, nonmetallic as well as metallic, and how they can be adapted and fabricated to meet the needs of modern technology. Using the laboratory techniques and research tools of physics, chemistry, and metallurgy, science is finding new ways of using plastics, ceramics, and other nonmetals in applications formerly reserved for metals. **For IJAS ONLY: Product/Consumer Science***... is the study of comparisons and evaluations of manufactured or commercial products. Topics included in this category are taste tests, color preferences, quality control, and product efficiency.
Mathematics**	... is the science dealing with the measurement, properties, and relationships of quantities as expressed in numbers or symbols whether in the abstract or in their practical connections. Some topics included under mathematics are arithmetic (use of numbers, symbols, and numerical systems); algebra (probability, theory of equations, progressions, permutations and combinations); geometry (topology, study of geometric figures, similar figures, and scale drawings); calculus; trigonometry, statistics and graphing.

Microbiology*	… is the branch of biology concerned with the study of microorganisms. Topics to be found in this category are the structure and physiology of bacteria, viruses, yeasts, fungi, and protozoa, and studies involving cells or tissues in cultures. **For IJAS ONLY: Cellular & Molecular Biology*** ... is the study of the organization and functioning of the individual cell; molecular genetics focusing on the structure and function of genes at a molecular level. Other topics may include the structure and function of the immune system, innate and acquired immunity, and the interaction of antigens with antibodies. Molecular biology concerns itself with understanding the interactions between the various systems of a cell, including the interrelationships of DNA, RNA and protein synthesis and learning how these interactions are regulated.
Physics	…is the science that deals with the laws governing motion, matter, and energy under conditions susceptible to precise observation as distinct from chemistry or sciences dealing with living mailers. Topics found in the category of physics are hydrostatic force and pressure, gravity, Newton's Laws, relativity, kinetic theory, motion forces, work, energy, sound, light, and magnetism.
Zoology*	... is the science that deals with animals with reference to their structure, functions, development, evolution, and classification. Some topics that fall within this category are structural and functional studies of vertebrates and invertebrates, physiology, reproduction, heredity, and embryology.

*** Projects in these categories may need an endorsement(s).** See the appropriate sections of this site for clarification.

**** When a control group is not possible, a comparison among trials is acceptable.**

Endorsement requests MUST be made PRIOR to experimentation in order to ensure the safety of the test subject(s) and/or the scientist. The project plans are reviewed by the Scientific Review Committee and, if safe, the endorsement is granted and the experiment may be carried out. Permission to carry out an
experiment CANNOT be given to one that has already been completed.

Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – must be received by November 21, 2025.

Projects which include the use of firearms and must be conducted by a police officer or IDFPR-licensed professional must submit an endorsement with all required documents for approval prior to beginning – must be received by November 21, 2025.

Endorsement requests must be received by November 21, 2025.

Safety in Experimentation

Safety in Experimentation

The safety of the student researcher, the test subjects (in cases of humans and vertebrate animals) and of the publicare of paramount concern to Chicago Public Schools Student Science Fair, Inc. Projects using humans, vertebrates or potentially hazardous biological agents (including microorganisms, recombinant DNA, and human or vertebrate tissue) raise the greatest risks. For this reason, the plans for such projects must be reviewed by a team of qualified scientists and science teachers before experimentation or design construction begins. The Scientific Review Committee (SRC) serves this purpose. Projects that violate any of the rules for use of humans, vertebrates, microorganisms, recombinant DNA, human or vertebrate tissue, will be disqualified from the CPS Exhibition ofStudent STEM Research.

The Endorsement Process

1. Plan the project, check the rules

It is the responsibility of the teacher/sponsor working with the student to evaluate the research plan for any possible risks involved in order to ensure the health and safety of the student researcher, the test subjects and the public. The rules and guidelines on the following pages guide the student's project planning to produce a safe procedure for all concerned. These guidelines also help the student decide whether the project needs to be checked and approved (or endorsed) by the SRC. Projects (including use of humans, vertebrates, microorganisms, recombinant DNA, human or vertebrate tissue) most likely require an endorsement.

2. Request an endorsement = Ask for permission

To make sure the proposed project using humans, vertebrates or potentially hazardous biological agents is safe, the SRC needs to review the project details that pertain to safety risks and precautions BEFORE the student begins the experiment or design construction. On the endorsement request form the student explains the potentially hazardous aspects of the proposed project and what precautions are in place to prevent harm. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – must be received by SCR by November 21, 2025. All endorsement requests which do not fall under the exception rule must be received by the SCR by November 21, 2025. If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature and stamp, the request form then becomes the endorsement. This endorsement must accompany the student's Research Summary at all STEM exhibitions.

3. Review of the project plan

The SRC reviews the procedures and precautions on the request form. If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature, the request form then becomes the endorsement. If the project is not safe the SRC will contact the student to notify him/her of the problem and that the project is not approved to begin experimentation or design construction. At this time the student and SRC can discuss safe alternatives. The student may then submit a new request for endorsement with the necessary revisions. The SRC will send back to the teacher/sponsor via GSR one of the two endorsements. The signed and stamped (in blue) endorsement must accompany the student's Research Summary at all STEM exhibitions. The other copy will be kept in SRC records.

4. Endorsement, then experiment

When the student has the SRC's signed and stamped endorsement the student may then begin the experiment or design construction as it has been assured to be safe for the student, the test subjects and the public.

Disqualification

Projects that violate any of the rules for use of humans, vertebrates, microorganisms, recombinant DNA, human or vertebrate tissue, will be disqualified from the CPS Exhibition of Student STEM Research. The purpose of the endorsement process is to detect and resolve unsafe projects and rule violations BEFORE a student puts anyone at risk. **If your project needs an endorsement and does not have one it will not be allowed to participate in STEM Exhibitions. Should an unendorsed project mistakenly progress through a school exhibition or Regional Network STEM Exhibition, it will not be allowed to be exhibited at the City Exhibition of Student STEM Research.**

Endorsement Flow Chart

Endorsement Flow Chart

This guide outlines the necessary endorsements and specific conditions required for conducting various types of projects, based on the materials and subjects involved. Follow the questions sequentially to determine the requirements for your project.

1. Human Subjects or Test Subjects

Question: Does your project involve human subjects, surveys, other people questions, experiments on yourself, or experiments on live humans in any way?

- **YES: YOU MUST REQUEST A HUMANS AND TEST SUBJECTS ENDORSEMENT.** (Use of Humans in Experimentation)
  - **Condition:** If subjects will be subjected to physical activity, stress, or invasion of physical privacy, they will need evidence of a physical examination from a school nurse. Informed consent forms will also be needed from these test subjects.
  - **Condition:** If your project involves physical activity that does **not** cause any stress or involve exercise or physical activity on the part of the subject, you will likely **not** need to get informed consent from your test subjects. The SRC will inform you of this on your endorsement.
- **NO:** Proceed to the next section.

2. Non-Human Vertebrate Animals (Live)

Question: Does your project involve using any LIVE animals that have backbones (vertebrates), except people?

- **YES: YOU MUST REQUEST A NON-HUMAN VERTEBRATE ENDORSEMENT.** (Use of Animals in Experimentation)
  - **Follow-up Question:** Does your project involve **ONLY** non-manipulative observation of these LIVE animals?
    - **YES:** You must work with, and get the endorsement request signed by, a veterinarian, medical doctor, or Ph.D. in the field of biological research (biomedical scientist).
    - **NO:** You do **NOT** need the supervision of a veterinarian, medical doctor, or Ph.D. in the field of biological research related to your project.
- **NO:** Proceed to the next section.

3. Microorganisms (Bacteria, Viruses, Fungi)

Question: Does your project involve bacteria, viruses, or any fungus?

- **YES:**
    - **Follow-up Question:** Does your project involve collecting microorganism samples from countertops, doorknobs, eating utensils, etc.?
        - **YES:**
            - **Condition:** You must work in a biosafety level 1 environment, such as most school laboratories, under the supervision of a licensed scientist.
            - **Follow-up Question:** Does your project involve any microorganisms listed on Approved Microorganisms for Science Research?
                - **YES: YOU MUST REQUEST A MICROORGANISM ENDORSEMENT.** (Use of Microorganisms). You will need this endorsement to participate in the school, regional, or city science fair.
                - **NO:** You must get the signature and proper forms from your consultant scientist.
        - **NO: YOU MAY NOT CONDUCT THIS EXPERIMENT.** Cultures of unknown bacteria, viruses, or fungi may be very dangerous.
- **NO:** Proceed to the next section.

4. Recombinant DNA (rDNA)

Question: Does your project involve cutting and pasting or recombining DNA segments that would not normally occur together?

- **YES: YOU MUST REQUEST A RECOMBINANT DNA ENDORSEMENT.** (Use of Recombinant DNA)
    - **Follow-up Question:** Are you working in a registered research laboratory under the guidance of a biomedical scientist trained in this field?
        - **YES:** You must get the signature and proper forms from your consultant scientist.
        - **NO:**
            - **Follow-up Question:** Are you using viruses or oncogenes or other genes toxic to plants or animals, including humans?
                - **YES: YOU MAY NOT CONDUCT THIS EXPERIMENT.** All rDNA work must be done under scientist supervision and must not produce toxic genes.
                - **NO:** Proceed to the next section (as this path is equivalent to not using rDNA).

- **NO:** You do **not** need a recombinant DNA endorsement to simply extract DNA from plant or animal sources. Proceed to the next section.

5. Human or Vertebrate Tissues

Question: Does your project involve using vertebrate tissues (e.g., skin, teeth, muscle, meat, bone, blood, milk, urine)?

- **YES:**
    - **Follow-up Question:** Is the tissue you will use one of the following: Meat, eggs, or meat products from a store/restaurant (and treated to kill); hair that has been naturally shed or cut; fossilized tissue; or an archaeological specimen?
        - **YES:** You do **not** need a vertebrate tissue endorsement.
        - **NO:**
            - **Follow-up Question:** Is the tissue from a biological supply house/catalog, hospital, or laboratory? If using blood, is it from a certified blood bank, hospital, or laboratory? If using teeth, are they sterilized by a dentist?
                - **YES: YOU MUST REQUEST A HUMAN OR VERTEBRATE TISSUE ENDORSEMENT.** (Use of Human or Vertebrate Tissue)
                - **NO: YOU MAY NOT CONDUCT THIS EXPERIMENT.** Only tissues that are certified to not carry infectious agents may be used.
- **NO:** You do **not** need any endorsements to conduct your project.

Endorsements Google Doc Links

Endorsements

Submit Endorsement(s) to the Scientific Review Committee (SRC)

We are a small team, so please be patient and give us up to two weeks to get a response on your endorsement(s) application once submitted.

Submit Completed Endorsement Form

Endorsements

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Endorsement requests must be received by the SRC by November 21, 2025. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – must be received by the SCR by November 21, 2025. If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature and stamp, the request form then becomes the endorsement. This endorsement must accompany the student's Research Summary at all STEM exhibitions.

Humans as Test Subjects Endorsement

Non-Human Vertebrate Animal Endorsement

Human or Vertebrate Tissue Endorsement

Microorganism Endorsement

Recombinant DNA Endorsement

Use of Humans in Experimentation

Use of Humans in Experimentation

Endorsement requirements

Rules and regulations exist to govern research that involves humans to ensure the rights and welfare of the individuals who participate as research subjects. **All human test subject projects, in which a variable is manipulated, including surveys, require a Humans as Test Subjects Endorsement.**

Observational research projects are strongly encouraged. Observational research projects are those in
which the researcher 1) has no interaction with the individuals being observed, 2) does not manipulate
the environment in any way and 3) does not record any personally identifiable data. No endorsement
form is required for such projects.

Informed Consent

In some cases, experiments that test the effect of a stressor such as exercise, loud music or personal questions about one's habits or thoughts may cause discomfort to the test subject. In such cases when the experiment causes the test subject(s) stress, discomfort or risk (physical, psychological, social, and/or legal), the student researcher must obtain the written consent of the person(s) involved. This consent means that the participant has been informed of the experimental procedure, understands the possible discomforts he/she may expect, and agrees to participate in the experiment. If the test subject is under 18 years of age, their legal guardian(s) must provide the informed consent, as the test subject is not of legal age to do so. The SRC reviews all these endorsement requests to determine whether the test subjects will encounter stress. One completed Informed Consent Certification is to be submitted with the Humans as Test Subject Endorsement. The SRC will determine whether the Informed Consent Certification includes all needed information before it is given out for consent signature. Completed Informed Consent Certification forms should be kept on file with the sponsoring teacher and not sent to the SRC.

Rules

1. Humans must not be subjected to treatments that are considered hazardous and/or that could result in undue stress, injury or death to the subject.
2. Projects that involve exercise and its effect on pulse, respiration rate, blood pressure, etc., of humans may be approved if a valid, normal, physical examination report of the participants being studied is on file at the school and if that exercise is not carried to the extreme. **Electrical stimulation is not permitted.** A valid, normal physical examination must be on file for each test subject. A letter from authorized school personnel, such as a school nurse, stating that all of the participating students have a physical examination on file indicating that they are physically able to participate, must be attached to the Human as Test Subjects Endorsement form.

3. Projects that involve color, texture, or any other choice are limited to preference only.
4. Quantities of food and non-alcoholic beverages are limited to normal serving amounts or less and must be consumed in a reasonable amount of time. Potential test subjects who have food allergies that may be triggered should not be tested. **Normal serving amounts must be substantiated with reliable documentation, such as a food label.** This documentation must be attached to the endorsement request form. No project may use over-the-counter drugs, prescription drugs, illegal drugs, or alcohol in order to measure the effect on a person.
5. **It is illegal to publish a report containing information that identifies the subject(s) directly or through identifiers linked to the subject(s) unless prior permission has been obtained.**
6. Projects that involve learning, ESP, motivation, hearing, vision, and surveys require the Humans as Test Subjects Endorsement Form

Endorsement

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Endorsement requests must be received by the SRC by November 21, 2025. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – must be received by SRC by November 21, 2025. If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature and stamp, the request form then becomes the endorsement. This endorsement must accompany the student's Research Summary and must be displayed on board at all STEM Exhibitions.

Humans as Test Subjects Endorsement

Submit Endorsement to the Scientific Review Committee (SRC)

We are a small team, so please be patient and give us up to two weeks to get a response on your endorsement(s) application once submitted.

Submit Endorsement(s) Application

Use of Animals in Experimentation

Use of Animals in Experimentation

The basic aims of experiments involving animals are to achieve an understanding of life processes and to further human knowledge. When students conduct research with animal subjects, the health and well-being of the animal subjects must be considered. Such experiments must be conducted with a respect for life and an appreciation of the humane considerations that must be afforded both vertebrates and invertebrates. Good experimental design involves using the least number of animals and causing the least sum total of distress to produce significant results of value to the scientific community.

It is strongly recommended that certain living organisms, such as plants, baker's yeast, protozoans, planaria, daphnia, rotifera, paramecia, earthworms, snails, insects, and other invertebrates, be used. The wide variety, ready availability, simplicity of care, and subsequent disposal of such organisms make them well suited for student study. Be aware, however, that there are hazards involved in using some microorganisms and that there are special rules governing their use. **See the Safety in Experimentation and Use of Microorganisms of this handbook for further information. The use of organisms listed on Approved Microorganisms for Science Research in the appendix requires an endorsement.**

Observational research projects are those in which the researcher **1)** has no interaction with the animals being observed, **2)** does not manipulate the environment in any way and **3)** is at no time responsible for the care of the animals involved. Observational research projects (observations of normal living patterns in unrestricted, public settings such as zoos, public parks, neighborhood trees, animal shelters, etc.) are strongly encouraged. **No endorsement form is required for such projects.**

Use of Non-Human Vertebrate Animals in Experimentation

Endorsement requirements

Rules and regulations exist to govern vertebrate animal research to protect the welfare of both the animal subjects and student researchers.

All vertebrate animal projects, in which a variable is manipulated, require a Non-Human Vertebrate Animal Endorsement. Endorsement requests must be received by the SRC by November 21, 2025. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – must be received by the SCR by November 21, 2025.

If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature and stamp, the request form then becomes the endorsement. This

endorsement must accompany the student's Research Summary at all STEM exhibitions. For some types of research, Illinois Junior Academy of Science (IJAS) approval will be required. The Scientific Review Committee will make this determination before issuing the vertebrate animal endorsement.

Rules

1. Animals should be obtained from a reputable, certified animal supplier.
2. To provide for humane treatment of animals, a qualified adult supervisor trained in the care and use of laboratory animals must assume primary responsibility for any vertebrate experiment. This person must hold either an M.D. degree, a Ph.D. degree in a field of biological research, or a D.V.M. degree.
3. Normal living conditions must be maintained for the animal's comfort. A clean, ventilated comfortable environment and continuous, uncontaminated water and food supply must be provided at all times, including during weekends and vacation periods. Animals must be maintained at a location approved by the Scientific Review Committee. A maze may be used for short periods of testing but the animal must be kept as specified above at all other times.
4. No experimental procedures that cause the animal pain or distinct discomfort or that interfere with its health shall be attempted on vertebrates. No changes may be made in an organism's environment that could result in undue stress, injury or death to the animal, without prior approval.
5. No intrusive or pain-producing techniques may be used. Included in intrusive techniques are surgery, injections, taking/giving blood, burning, electrical stimulation, altering a normal diet, and administering drugs or other chemical agents to measure their effect.
6. Vertebrate animals may not be killed no matter how humane the method.
7. In projects involving the incubation of bird, reptile, and amphibian embryos, the manipulated variable (experimental treatment) must be discontinued 72 hours prior to the expected hatch or birth time. Continued exposure of the manipulated variable (experimental treatment) beyond this time will result in the project being disqualified.

Exceptions to Non-Human Vertebrate and Humans as Test Subjects Rules

Exceptions to the rules governing the use of nonhuman and human vertebrates will not be granted except in the circumstance that a student works with a university or research facility on a research project approved by an official review board of that institution. Approval for this exception will be granted only if the following conditions are met:

The student must seek approval for the project before experimentation begins and must be received by November 21, 2025 of the academic year in which he/she wishes to enter the Regional or State exposition. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – must be received by the SCR by November 21, 2025. Requests for approval will not be accepted after experimentation has started.

The student must have a Request for Non-Human Vertebrate Endorsement or a Request for Humans as Test Subjects Endorsement signed by the director of the research institution indicating that the project has the approval of the local Institutional Review Board (IRB) when using humans as test subjects or the Institutional Animal Care and Use Committee (IACUC) when using vertebrate animals.

Students performing an experiment and are supervised in a university lab, research facility, or professional facility must have a letter, on the organization/research facility's letterhead, from the supervisor stating that the student worked under constant supervision and that all rules and regulations were followed. This original letter should directly follow the required endorsement form in the student's original written paper. A copy of this letter must be displayed on the front of the display board with the other endorsement sheets.

These rules will be strictly enforced at the city and state expositions. The Chicago Public Schools Student Science Fair, Inc. is a member of IJAS and ISEF, and as such agrees to follow the rules of these organizations as well as formulating its own.

Endorsement

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Endorsement requests must be received by the SRC by November 21, 2025. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – must be received by the SCR by November 21, 2025. If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature and stamp, the request form then becomes the endorsement. This endorsement must accompany the student's Research Summary at all STEM exhibitions.

Non-Human Vertebrate Animal Endorsement

Submit Endorsement to the Scientific Review Committee (SRC)

We are a small team, so please be patient and give us up to two weeks to get a response on your endorsement(s) application once submitted.

Submit Endorsement(s) Application

Use of Microorganisms

Potentially Hazardous Biological Agents

Endorsement requirements

Rules and regulations exist to govern research that involves potentially hazardous biological agents to ensure the health and well-being of the student researcher and of the public. In most cases, projects involving microorganisms, recombinant DNA or vertebrate tissue require an endorsement. Endorsement requests must be received by the SRC by November 21, 2025. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – must be received by the SCR by November 21, 2025. If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature and stamp, the request form then becomes the endorsement. This endorsement must accompany the student's Research Summary at all STEM exhibitions.

Use of Microorganisms

Bacteria and fungi spores are all around us. Some are beneficial, some have no effect and some can be quite harmful, or pathogenic. We come in contact with them every day without becoming ill. Practicing good hygiene eliminates most of those that could invade our bodies and make us sick. A healthy immune system can defeat very small numbers of pathogenic microbes before one feels symptoms of illness.
For science experiments it is preferred to work with many microbes at one time (colony) so they are more easily visible and more easily manipulated. A single visible colony is tens of thousands of bacteria. This quantity of pathogenic bacteria is quite dangerous to a person if handled incorrectly. For CPS Student STEM Exhibition projects it is imperative that students not be exposed to any pathogenic bacteria; for this reason, all projects using microorganisms must be screened by the Scientific Review Committee prior to beginning the experiment.

Rules about microorganism sources

1. **No primary or secondary cultures taken from humans or other warm-blooded animals may be used. This includes, but is not limited to, those taken directly from the skin, throat, mouth, urine, etc. or indirectly – eating utensils, doorknobs, toilets, counter tops, etc.** Microbes taken from any of these sources cannot easily be identified as pathogenic or not. Culturing large quantities (colonies) of these wild microorganisms may produce a serious hazard to the student researcher and so this is not allowed.
2. Wild cultures of fungi (limited to types of bread mold) may be used if incubated at or below room temperature. (NEXT YEAR MOLD GROWTH WILL NOT BE PERMITTED)
3. Pure cultures of microorganisms known to inhabit vertebrate animals must be supplied by a reputable, certified biological supplier. Microorganisms available to schools from such sources are generally non-pathogenic when used under proper lab conditions.

4. Projects involving viruses should be done with the help of a professional and should comply with the National Institutes of Health Guidelines unless the project is limited to a kit obtained from a legitimate supply house.
5. The guidance and assistance of a science teacher should be obtained when ordering known fungi cultures from a biological supply company.
6. All microorganisms including the list of Microorganisms for Science Projects (Approved Microorganisms for Science Research) require an endorsement for participation in any of the CPS STEM exhibitions.

Rules about experimental practices with microorganisms

7. Sterile technique should be learned under proper guidance of a supervisor trained in this field of research before beginning any project involving microorganisms. Sterile technique is the greatest safe-guard when working with microorganisms. Cultures of known bacteria, while they may be considered as nonpathogenic, must be treated in such a way that no bacterial contamination of the environment around the project work area can occur.
8. All research involving potentially hazardous biological agents must be done in an appropriate laboratory (either at school or at a research facility) with a trained supervisor under Biosafety level 1 conditions; For a complete explanation of Biosafety level 1 go to Section IV of the Center for Disease Control's Biosafety in Microbiological and Biomedical Laboratories
9. Only research on Saccharomyces cerevisiae (Baker's Yeast) may be done in a student's home environment and these cultures must be incubated at or below room temperature.
10. Any project involving growth of mold or rotting of organic material must be done in a science classroom or professional research facility and may NOT be done at home. (NEXT YEAR MOLD GROWTH WILL NOT BE PERMITTED)
11. All cultures must be destroyed by methods such as autoclaving or using a suitable 10% bleach solution before disposal.
12. All proper safety methods and aseptic techniques must be adhered to during experimentation. Students must wear safety goggles, gloves and wash hands after each experiment.

For more information about the safe use of microorganisms go to the Society For Society Potentially Hazardous Biological Agents

Endorsement

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November 21, 2025. If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature and stamp, the request form then becomes the endorsement. This endorsement must accompany the student's Research Summary at all STEM exhibitions.

Microorganism Endorsement

Submit Endorsement to the Scientific Review Committee (SRC)

We are a small team, so please be patient and give us up to two weeks to get a response on your endorsement(s) application once submitted.

Submit Endorsement(s) Application

Use of Human or Vertebrate Tissue

Use of Human or Vertebrate Tissue

The use of human or vertebrate tissue poses a danger to the student researcher because these tissues may contain pathogenic strains of microorganisms. For the purpose of student research, all body fluids (including blood, saliva, & urine), bone, hair, and teeth, are considered tissues.

Rules about tissue sources

1. The following types of tissue do not need to be treated as potentially hazardous biological agents provided procedures are followed to inhibit bacterial growth: plant tissues; eggs, meat or meat products including bones obtained from food stores, restaurants, or packing houses; hair that has been naturally shed or clipped; fossilized tissue or archeological specimens.
2. Students using teeth in a research project must use only sterilized teeth. A written statement to this effect, from a dentist, must accompany the request for the tissue endorsement.
3. The only human blood that may be used is that which is purchased or obtained from a blood bank, hospital, or laboratory. No blood may be drawn by or from any person specifically for a science fair project.
4. Human tissue studies where the tissue samples can be identified with a specific person must have Institutional Review Board review and informed consent.

Rules about experimental practices

5. All tissue studies must be conducted under adult supervision. ISEF requires that all tissue studies be conducted under the supervision of a Designated Supervisor.
6. All human and vertebrate tissue should be handled as though it were potentially infectious. Universal precautions must be used to prevent contact with blood or other potentially infectious materials in human and animal tissues. Lab coats, gloves, and other appropriate protective items must be worn and the worksite maintained in a clean and sanitary condition.
7. Any tissue or instruments with the potential of containing blood borne pathogens (e.g., blood, blood products, tissues which would release blood when compressed, blood-contaminated instruments) must be incinerated or autoclaved after use in order to effectively destroy blood borne pathogens.

Endorsement

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November 21, 2025. If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature and stamp, the request form then becomes the endorsement. This endorsement must accompany the student's Research Summary at all STEM exhibitions.

Human or Vertebrate Tissue Endorsement

Submit Endorsement to the Scientific Review Committee (SRC)

We are a small team, so please be patient and give us up to two weeks to get a response on your endorsement(s) application once submitted.

Submit Endorsement(s) Application

Use of Recombinant DNA

Use of Recombinant DNA

The use of recombinant DNA techniques may pose a danger less to the student researcher than to the public at large.The practice of recombining genes, or inserting a foreign gene into a new host organism imbues it with new traits.These traits are sometimes unpredictable and potentially dangerous to the other organisms. Specific rules exist to prevent the release of the genes and altered organisms outside the lab.

Rules

1. All research involving recombinant DNA techniques must meet requirements of the National Institute of Health
   Guidelines for Research Involving Recombinant DNA Molecules. For more information about these guidelines see:
   https://osp.od.nih.gov/wp-content/uploads/NIH_Guidelines.pdf
2. The study must only be conducted in a registered research laboratory under the guidance of a biomedical scientist, approved by an appropriately constituted and registered biosafety committee to conduct such work.
3. The study must have the approval of a biomedical scientist or the laboratory's IBC when necessary.
4. Propagation of recombinants containing DNA coding for oncogenes or other human, plant or animal toxins(including viruses) are prohibited.

Endorsement

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Recombinant DNA Endorsement

Submit Endorsement to the Scientific Review Committee (SRC)

We are a small team, so please be patient and give us up to two weeks to get a response on your endorsement(s) application once submitted.

Submit Endorsement(s) Application

Safety Use of Hazardous Equipment

Safety of the Student Researcher Use of Hazardous Equipment

Safety is the watchword when developing a science fair project. Without exception, the highest standards of safety are required. All projects should be conducted with proper adult supervision. The following are safety measures of particular importance but do not require the approval of the Scientific Review Committee before you may conduct your experiment; with the exception of conducting a demonstration or experiment using firearms or explosives, and the production of alcohol, which will require prior approval from the Scientific Review Committee.

Chemical Hazards

Any chemical can be dangerous when used improperly. Refer to the Merck Index and/or The Handbook of Chemistry and Physics http://www.chemnetbase.com/ to determine potential hazards of any chemicals that are to be studied. Refer to the Materials Safety Data Sheet (MSDS) for additional safety information. https://www.flinnsci.com/safety/

- Students should always wear eye protection when working with any chemical.
- All chemicals must be disposed of in accordance with State and Federal Environmental Rules http://www.epa.gov/chemfact/
- If possible, the student should work under the supervision of a responsible chemist.

Drone Hazards

Drones may be used in a science project PROVIDED the use complies with all Federal, State and community rules, regulations and ordinances. In addition, the use of a drone for a science project may not infringe on anyone's privacy or air space.

Electrical Hazards

All electrical equipment must be constructed according to standard electrical safety codes. If there is doubt, consult with an electric shop teacher or an electrician. The city of Chicago's electrical code for public exhibits requires all electrical devices connected to the circuits within the building to be grounded using type SO three-wire conductors.

All wiring, switches, and metal parts carrying current must be completely enclosed by barriers on all sides to absolutely prevent observers from reaching into the mechanism where they might receive an electrical shock.

Doorbell push buttons must not be used to control 110 volt apparatus. Use toggle or push-button switches designed for proper load. Non-insulated switches, such as knife switches, will not be permitted. All electrical joints must be properly secured and insulated. All electrical joints must be permanent and soldered.

Federal Communications Commission (FCC) regulations are specific with regard to spark-discharge equipment. If equipment containing such devices is used, the machine must be operated so that it does not cause harmful interference to normal channels of communication.

Fire Hazards

Open flames, torches, burners, and electrical units should be used only with proper adult supervision and safety equipment. Any student working with burning materials should perform the experiment under a fume or chemical hood or in an open air environment.

Glassware Hazards

Care should be taken when using glassware. Broken glass should be disposed of in proper containers. Whenever possible, plastic lab ware should be substituted for glass.

Hazardous Materials

Explosive, flammable, corrosive, or highly poisonous substances should be used with proper adult supervision and safety equipment. Examples of such substances are gasoline, alcohol, lighter fluids, armed rockets, cylinders of compressed gas, aerosol cans, and automobile storage batteries containing sulfuric acid.

Laser Hazards

Any laser used in an experimental or design project must be no greater than Class 2 (visible-light continuous wave lasers under 1 mW such as red laser pointers) without special registration from the State of Illinois. In general the lowest class laser possible should be used for a given project. The revised laser classification system along with associated hazards and safety precautions are reviewed at: https://www.osha.gov/laser-hazards and https://ors.od.nih.gov/sr/dohs/Documents/laser-safety-program.pdf. Each experiment using lasers should clearly state the safety precautions taken. Under special circumstances, where the use of such a laser is absolutely critical to the success of a project, Class 3R lasers (also labeled as Class 3A for older lasers) may be used. These lasers require written documentation of registration from the State of Illinois and need to follow all applicable safety precautions required by the State (https://iemaohs.illinois.gov/nrs/radsafety/laser.html). The scientific justification for using a 3R / 3A laser must be explained, and incorporation of these extra safety precautions must be written into the experimental procedures. Among other practices, we require that 3A lasers use a protective housing or barricade which, when in place, prevents human access to the beam during operation. Under no circumstances may lasers above Class 3R / 3A be used in any project.

Mechanical Hazards

Materials and construction must be durable. All parts must be firmly attached. Power-driven parts must
be protected with guards.

Radiation Hazards

Projects dealing with radiation from cathode rays, X-rays, or radioactive materials must present no hazard to the public or the student exhibitor.

Ultraviolet Light Sources/Radiation

Students using ultraviolet light sources must be adequately shielded from these sources. Many experiments using these sources should not be undertaken unless under the direct supervision of an adult familiar with the equipment and hazards involved. No student may work with any radioactive materials unless the work is conducted in a licensed laboratory under the direct supervision of a licensed individual.

Resources More Information on Experiment Safety

Resources More Information on Experiment Safety

Humans as Test Subjects

Code of Federal Regulation (CFR), Title 45 (Public Welfare), Part 46- Protection of Human Subjects
(45CFR46)
https://www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/index.html

Penslar, R.L., Institutional Review Board (IRB) Guidebook. (1993). Washington, DC: ORRP-NIH
https://www.hhs.gov/ohrp/education-and-outreach/archived-materials/index.html

Animals as Test Subjects

Animal Welfare Act and Animal Welfare Regulations
chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.aphis.usda.gov/sites/default/files/ac_bluebook_awa_508_comp_version.pdf

The Guide for the Care and Use of Laboratory Animals, Institute of Laboratory Animal Research (ILAR), Commission on Life Sciences, National Research.
https://grants.nih.gov/grants/olaw/guide-for-the-care-and-use-of-laboratory-animals.pdf

Johns Hopkins Center for Alternatives to Animal Testing (CAAT) http://caat.jhsph.edu/

Biosafety Hazards

Biosafety in Microbiological and Biomedical Laboratories (BMBL) – 6th Edition
https://www.cdc.gov/labs/bmbl/index.html

NIH Guidelines for Research Involving Recombinant DNA Molecules
Published by National Institutes of Health
https://osp.od.nih.gov/wp-content/uploads/NIH_Guidelines.pdf

General Lab Safety

Centers for Disease Control and Prevention
Guidelines for Biosafety Laboratory Competency
http://www.cdc.gov/mmwr/pdf/other/su6002.pdf

Centers for Disease Control and Prevention
School Chemistry Laboratory Safety Guide

http://www.cdc.gov/niosh/docs/2007-107/pdfs/2007-107.pdf

Safety in Academic Chemistry Laboratories
https://www.acs.org/content/dam/pldp/center/lab-safety/publications/safety-in-academic-chemistry-laboratories-students.pdf

Flinn Scientific Safety Data Sheets (SDS)
https://www.flinnsci.com/search-results/?type=All&query=material+safety

Drug Enforcement Agency list of controlled substances
https://www.deadiversion.usdoj.gov/schedules/orangebook/c_cs_alpha.pdf

Bureau of Alcohol, Tobacco, Firearms and Explosives
http:www.atf.gov

Sources for Animal Tissue and Microorganism Cultures

Carolina Biological Supply Company
Phone: (800) 335-5551
Website: http://www.carolina.com

American Type Culture Collection
Phone: (703) 365-2700 or (800) 638-6597
Website: http://www.atcc.org

Estimating Experimental Error

Estimating Experimental Error

Estimating Experimental Error

Science is all about measurement. In fact, you could define science as a system for measuring the world around you and drawing conclusions from those measurements. It is a fundamental scientific truth that no measurement is ever 100% accurate. There is always some error. When designing an experiment, it is important to understand where measurement errors are likely to occur and how to reduce them as much as possible. Measurement errors may come from the person doing the measuring, from variables, or from unidentifiable random error. In order to draw valid conclusions from measurement data, a scientist must understand how measurement error affects those conclusions.

Here's a simple example:

You are trying to determine whether two metal rods expand by different amounts when heated. You design an experiment to measure the expansion of these rods. You take three measurements and calculate the average expansion for each rod. Here is the data (in micrometers):

	M1	M2	M3	AVG
Metal Rod #1	558	542	658	556
Metal Rod #2	543	551	556	550

After looking at this data, you might be tempted to conclude that Rod #1 expands more than Rod #2. Would your conclusion change if you knew that your measurement error for the experiment was +/-5 micrometers? Let's take a look... If that error (+/-5) is applied to the two averages, you would have a range instead of a single value. These ranges would be:

Metal Rod #1 Average: 556 +/-5 → Range: 551– 561
Metal Rod #1 Average: 550 +/-5 → Range: 545– 555

If you were to plot these ranges on a number line, you would see that they overlap... the "true" expansion of Rod #1 could be as low as 551 while the "true" expansion of Rod #2 could be as high as 555. In other words, you cannot conclude, based on the data you collected, that there is any difference in the expansion of the two rods. The difference that you do see in the data is due to chance, not to any real difference in the metals.

What if the measurement error for the experiment was +/-2 micrometers? The ranges would then be:

Metal Rod #1 Average: 556 +/-2 → Range: 554– 558
Metal Rod #1 Average: 550 +/-2 → Range: 548– 552

In this case, the ranges do not overlap. You can conclude with some confidence that the two metal rods do, in fact, expand differently when heated.
Here are some questions you may wish to consider when designing your science fair project:

- How can I improve the precision of my data?
- How can I improve the accuracy of my data?
- Is there too much variability in my data?
- Can I reduce my measurement error by: Collecting more data? Exercising better control of the measurement process?
- Exercising better control of the experimental variables?

The following websites provide more information on estimating experimental error

Science Buddies - summarizing your data
http://www.sciencebuddies.org/science-fair-projects/project_data_analysis_summarizing_data.shtml

Science Buddies - variation and standard deviation
http://www.sciencebuddies.org/science-fair-projects/project_data_analysis_variance_std_deviation.shtml

Correct SI Metric System Usage

Correct SI Metric System Usage

SI is the symbol for the Système International d'Unités, the modernized version of the metric system
that the USA and other nations have agreed to use. (Do not abbreviate it as S.I.)

This list is provided to point out the correct way to use the metric system and to show many of the incorrect examples of its usage that may be given on package labels and in other printed matter. These
correct ways to use SI are set by the international standards that define the SI.

General Guidelines

1. The short forms for SI units (such as mm for millimeter) are called symbols, not abbreviations.
2. SI symbols never end with a period unless they are the last word in a sentence.
    - **RIGHT:** 20 mm, 10 kg
    - **WRONG:** 20 mm., 10 kg.
3. SI symbols should be preceded by digits and a space must separate the digits from the symbol.
    - **RIGHT:** It was 300 mm wide.The millimeter width was given.
    - **WRONG:** It was 300mm wide. The mm width was given.
4. Symbols always are written in the singular form (even when more than one is meant).
    - **RIGHT:** 1 mm, 500 mm, 1 kg, 36 kg
    - **WRONG:** 500 mms, 36 kgs
    - **BUT:** It is correct to pluralize written-out metric unit names: 25 kilograms, 250 milliliters
5. The symbol for a compound unit that is a quotient of two units is indicated by a solidus or by a negative exponent.
    - **RIGHT:** km/h or km·h-1 (for kilometers per hour)
    - **WRONG:** kmph or kph (do not use p as a symbol for "per")
    - **BUT:** It is correct to say or write "kilometers per hour".
6. The meaning of an SI symbol can be changed when substituting a capital letter for a lower case letter.
    - **RIGHT:** mm (for millimeter, which means 1/1000 of a meter)
    - **WRONG:** MM or Mm (M is the prefix for mega, which means one million; a megameter is a million meters)

    Note: A 5K race would be a five Kelvin race, while a 5k race would be a five kilo race, neither of which would be accurate. Kilometer should be pronounced KILL-oh-meet-ur, not kill-AHM- it-ur.

The information above was adapted from the U.S. Metric Association Website, http://www.metric.org. Students are encouraged to visit this Website for more information.

Examples of Correct and Incorrect Usage		
For	**Correct Usage**	**Incorrect Usage**
kilometer	km	Km, km., KM, kms, K, k
meter	m	M, m.
millimeter	mm	Mm, mm., MM
liter	L or l	L., l.
millimeter	mL or ml	ML, Ml, mL., ml., mls
kilogram	kg	KG, KG., Kg, Kg., kgr, kgs, kilo
gram	g	G, G., g., gr, GR, GRM, grms
microgram	µg	mcg
hour	h	hr, hrs, HR, h., HR., HRS.
second	s	sec, S, SEC, sec., s., S.
cubic centimeter	cm^3	cc
kilometer per hour	km/h	KPH, kph, kmph, km/hr
kilohertz	kHz	KHz, KHZ, Khz
megahertz	MHz	MHZ, Mhz
hectopascal	hPa	HPa, HPA, Hpa, mb
kilopascal	kPa	KPa, KPA, Kpa
degree Celsius	°C	C, deg CS
kelvin	K	°K, deg K

Required Experimental Research

Required Experimental Research

1. Experimental Research Document

The Experimental Research Document is the grouping of all data pertinent to the investigation. It should include graphs, charts, a log of experiments, interviews with authorities, and an extensive explanation of the investigation. This document, which may number many pages, is the personal property of the researcher. This compilation of personal records is the source from which the Abstract and the Research Summary are developed

The design and arrangement of this document are left to the discretion of the researcher. Since this is a “one-of-akind” document, extreme care should be used in handling. It should be exhibited only when the researcher is present at their project.

2. Experimental Research Paper

The Experimental Research Paper must be typed, it is to have no binder or protective cover and must be securely stapled in the upper left corner. Students selected to participate in the City STEM Exhibition will be assigned an exhibit number. The exhibit number must be written in the upper left corner of each copy of the Abstract, Safety Sheet, and Title Page, The Experimental Research Paper must be no longer than 30 pages (up to 33 pages only if an endorsement is included). The page total includes Abstract, Safety Sheet, endorsement (if required), and the Research Summary (title page, table of contents, body of paper, reference list of literature cited, and appendixes of data, graphs, photos, and other items). The page limit and other criteria will be strictly enforced. Papers submitted with excess pages will have the excess pages removed and returned to the author. The student’s last name is in the upper right-hand corner of all pages after the Table of Contents. All of the following sections should be included and in the order listed below.

a. Abstract

The Abstract is a concise, one-page abbreviation of the Research Summary. It should contain only information or statements that are an inherent part of the Research Summary. Must be the Official IJAS 2024-2026 Abstract.The Abstract consists of three paragraphs (purpose, procedure, and conclusions) having a total of 250 words or fewer. The Abstract is required for all projects. Words and phrases should be carefully chosen so that the full impact of the research is conveyed in the minimum number of words. The limit of three paragraphs consisting of 250 words or fewer will be strictly enforced. The Abstract must be displayed on the front of the exhibitor’s display board.

b. Safety Sheet

The purpose of the Safety Sheet is to keep students aware of all actual and potential safety hazards. Describing hazards involved with the project on the Safety Sheet does not mean the project will be disqualified. The important issue is how the potential hazards were handled.

A statement of the hazards encountered and precautions taken in the project is to be prepared by the student and signed by both the student and the sponsoring teacher. Must be the Official IJAS 2024-2026 Safety Sheet. The Safety Sheet is required for all projects and must be displayed on the front of the exhibitor's display board.

c. Endorsement

Projects using humans, vertebrates, or potentially hazardous biological agents often pose risks to the student researcher or the test subjects. For this reason, the plans for such projects must be reviewed by a team of qualified scientists and science teachers before experimentation begins. When permission is granted, the student is provided with a document called an endorsement. Endorsements are required for research on vertebrate animals (including humans), human or vertebrate tissue, recombinant DNA, for some projects involving microorganisms, and for use of firearms. See the Endorsement Flow Chart to determine whether a project requires an endorsement. A copy of the endorsement(s) must be displayed on the front of the exhibitor's display board.

d. Research Summary

The Research Summary is a condensation of the Research Document. It should be an accurate summary of the research done by the student and should reveal the experimentation and/or observations which have been made. Specific criteria have been established for the preparation of this report. Details for writing this paper follow.

The components of the format of the Research Summary are as follows:

i. **Title Page:** Sample of Title Page
ii. **Table of Contents:** The list of topics or matters contained in the paper, including page numbers.
iii. **Acknowledgements:** A listing of persons or agencies that gave the student guidance and helped with this research. It may include a single individual, an organization, a hospital, or some other agency.
iv. **Purpose and Hypothesis:** An explanation of what is to be accomplished by doing this research. A description of the expected outcome should be included.

v. **Background Research:** A discussion of the background information that helps establish the hypothesis and explains procedures adapted for the experiment where necessary. Also any similar research that helps establish the hypothesis or procedure. Other background information about the topic that may help the reader understand the project should also be included. Paraphrased information should be cited as such. No references to the literature are to be placed in footnotes. Citation to particular pages in the text should be in the form (Smith, 2010, p. 10); for a general citation in the text (Smith, 2002). This citation should be placed at the end of the sentence to which it refers. The style for citations is based on the Publication Manual of the American Psychological Association, 7th ed., (APA style) which is the official style manual for the Illinois Junior Academy of Science. Use Purdue Owl as a resource for APA formatting. Materials with a copyright date within the last seven years should be used whenever possible.

vi. **Materials and Methods of Procedure:** A listing of the materials used in the research. How the materials in the research problem were used should be included. The method used in research should be described in sufficient detail so that others may duplicate this work. Drawings and/or photographs are appropriate if they enhance or clarify the explanation.

vii. **Results:** A clear, concise presentation of all the data accumulated as a result of the procedure, including data inconsistent with the hypothesis. All data is valuable. Drawings, charts, graphs, and other items pertinent to the project are important in conveying results and should be included. Caption all photographs. Label all drawings, charts, graphs. Include units of measurement. Always label axes of the graphs.

viii. **Conclusions:** A concise evaluation and interpretation of the data and results. Opinions of the results may be expressed in this section. The conclusions should be limited to results of the investigation and should refer to the stated purpose and hypothesis. The effects of experimental error should be estimated and considered while drawing conclusions.

ix. **Reference List:** A list of at least 12 published articles, books, and other communications, including works either quoted or paraphrased that are actually cited in the Review of Literature. Use the format described in the Publication Manual of the American Psychological Association, 7th ed. (APA style). The reference list should be presented alphabetically by the author's last name and should be placed at the end of the paper. Use Purdue Owl as a resource for APA formatting.

Required Design Research

Required Design Research

3. Design Research Document

The Design Research Document is the grouping of all data pertinent to the investigation. It should include graphs, charts, a log of the work done, interviews with authorities, and an extensive explanation of the investigation. This document, which may number many pages, is the personal property of the researcher. This compilation of personal records is the source from which the Abstract and the Research Summary are developed.

The design and arrangement of this document is left to the discretion of the researcher. Since this

is a “one-of-a-kind” document, extreme care should be used in handling. It should be exhibited only when the researcher is present at their project.

4. Experimental Research Paper

The Design Research Paper must be typed, it is to have no binder or protective cover and must be securely stapled in the upper left corner. Students selected to participate in the City STEM Exhibition will be assigned an exhibit number. The exhibit number must be written in the upper left corner of each copy of the Abstract, Safety Sheet, and Title Page, The Experimental Research Paper must be no longer than 30 pages (up to 33 pages only if an endorsement is included). The page total includes Abstract, Safety Sheet, endorsement (if required), and the Research Summary
(title page, table of contents, body of paper, reference list of literature cited, and appendixes of data, graphs, photos, and other items). The page limit and other criteria will be strictly enforced. Papers submitted with excess pages will have the excess pages removed and returned to the author. The student’s last name is in the upper right-hand corner of all pages after the Table of Contents. All of the following sections should be included and in the order listed below.

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The Abstract is a concise, one-page abbreviation of the Research Summary. It should contain only information or statements that are an inherent part of the Research Summary. Must be the Official IJAS 2024-2026 Abstract.The Abstract consists of three paragraphs (purpose, procedure, and conclusions) having a total of 250 words or fewer. The Abstract is required for all projects. Words and phrases should be carefully chosen so that the full impact of the research is conveyed in the minimum number of words. The limit of three paragraphs consisting of 250 words or fewer will be strictly enforced. The Abstract must be displayed on the front of the exhibitor’s display board.

f. Safety Sheet

The purpose of the Safety Sheet is to keep students aware of all actual and potential safety hazards. Describing hazards involved with the project on the Safety Sheet does not mean the project will be disqualified. The important issue is how the potential hazards were handled.

A statement of the hazards encountered and precautions taken in the project is to be prepared by the student and signed by both the student and the sponsoring teacher. Must be the Official IJAS 2024-2026 Safety Sheet. The Safety Sheet is required for all projects and must be displayed on the front of the exhibitor's display board.

g. Endorsement

Projects using humans, vertebrates, or potentially hazardous biological agents often pose risks to the student researcher or the test subjects. For this reason, the plans for such projects must be reviewed by a team of qualified scientists and science teachers before experimentation begins. When permission is granted, the student is provided with a document called an endorsement. Endorsements are required for research on vertebrate animals (including humans), human or vertebrate tissue, recombinant DNA, for some projects involving microorganisms, and for use of firearms. See the Endorsement Flow Chart to determine whether a project requires an endorsement. A copy of the endorsement(s) must be displayed on the front of the exhibitor's display board.

h. Research Summary

The Research Summary is a condensation of the Research Document. It should be an accurate summary of the research done by the student and should reveal the experimentation and/or observations which have been made. Specific criteria have been established for the preparation of this report. Details for writing this paper follow.

The components of the format of the Research Summary are as follows:

x. **Title Page:** Sample of Title Page
xi. **Table of Contents:** The list of topics or matters contained in the paper, including page numbers.
xii. **Acknowledgements:** A listing of persons or agencies that gave the student guidance and helped with this research. It may include a single individual, an organization, a hospital, or some other agency.
xiii. **Define a need:** Instead of stating a question, state a need. Can you describe in detail a problem that your design will solve?

xiv. **Background Research:** A discussion of the background information that helps establish the need and explains procedures adapted for the testing of the prototype or algorithm. Also any similar research that helps establish the above. Also any similar research that helps establish the hypothesis or procedure. Other background information about the topic that may help the reader understand the project should also be included. Paraphrased information should be cited as such. No references to the literature are to be placed in footnotes. Citation to particular pages in the text should be in the form (Smith, 2010, p. 10); for a general citation in the text (Smith, 2002). This citation should be placed at the end of the sentence to which it refers. The style for citations is based on the Publication Manual of the American Psychological Association, 7th ed., (APA style) which is the official style manual for the Illinois Junior Academy of Science. Use Purdue Owl as a resource for APA formatting. Materials with a copyright date within the last seven years should be used whenever possible.

   a. **For a design project, the Background Research may include:**
      i. The definition of your target user
      ii. Information about the STEM behind your design area
      iii. Answers to research questions about user needs
      iv. Information about products that meet similar needs
      v. Research about design criteria
      vi. What existing solutions are out there already, and how well do they solve the problem?

xv. **Materials and Methods of Procedure**: A listing of the materials used in the research. How the materials in the research problem were used should be included. The method used in research should be described in sufficient detail so that others may duplicate this work. Drawings and/or photographs are appropriate if they enhance or clarify the explanation.

   a. **Establish Design Criteria**
      i. Engineering Projects: Decide what features your design must have, for example: size, weight, cost, performance, power, etc. Perhaps include a table showing how each design criterion will be addressed by a feature of the product being designed.
      ii. Computer STEM Projects: Creating or writing a new algorithm to solve a problem or improve on an existing algorithm. Discuss the criteria of the algorithm.

iii. Mathematics Projects: Proofs, solving equations, development of a new theory or explanation, concept formation or mathematical model design.

b. Prepare a Preliminary Design

i. Engineering projects should have a materials list, programming and mathematical projects do not need a materials list. Engineering projects should include a block diagram or sketch of the design that shows all of the parts or subsystems of the design. Describe how all of the parts of the design will need to work together. Computer science and mathematics projects should list a specific goal or solution that the researcher is trying to attain.

ii. Build and Test a Prototype. When others are conducting their experiment, investigators doing engineering, computer programming, or mathematics projects should be building and/or testing a prototype of their best design. You should involve targeted users in your testing to get feedback on your design, if possible.

iii. Demonstrate that the design meets each of the design criteria established at the beginning of the project. What needs to be changed and retested? Test results may be included in tables, if applicable. Data analysis may also be a part of this step.

iv. **Results:** Your report should provide all the information necessary for someone who is unfamiliar with your project to understand what you were trying to accomplish, how you did it, and whether you succeeded. The report should not only talk about your successful design attempts, but also the problems you encountered and how you solved them. Be sure to explain what new knowledge has been gained and how it leads to further questions. A clear, concise presentation of all the data accumulated as a result of the procedure, including data inconsistent with the design. All data is valuable. Drawings, charts, graphs, and other items pertinent to the project are important in conveying results and should be included. Caption all photographs. Label all drawings, charts, graphs. Include units of measurement. Always label axes of the graphs.

v. **Conclusions:** A concise evaluation and interpretation of the data and results. Opinions of the results may be expressed in this section. The conclusions should be limited to results of the investigation and should refer to the stated established design criteria. The effects of experimental error should be estimated and considered while drawing conclusions.

vi. **Reference List:** A list of at least 12 published articles, books, and other communications, including works either quoted or paraphrased that are actually cited in the Review of Literature. Use the format described in the Publication Manual of the American Psychological Association, 7th ed. (APA style). The reference list should be presented alphabetically by the author's last name and should be placed at the end of the paper. Use Purdue Owl as a resource for APA formatting.

Reference List Format

Reference List Format

The correct style to use for citing references in the Reference List section is discussed in detail in the most current Publication Manual of the American Psychological Association, 7th Edition (APA style). Be careful to follow the exact punctuation, indentation, and format shown in the samples. The Reference List must be doublespaced. Note: If using the APA Publication Manual, all example references are single-spaced to save space in the Publication Manual. The Reference List should be alphabetized according to the first letter of each entry. Entries should be formatted using a hanging indent. Entries should begin flush left and the second and all subsequent lines should be indented. Italics are preferred over the use of underlining. The abbreviation for Page(s), p. or pp. is not used except in references to newspapers. Electronic sources must provide the date the information was retrieved, and also the name and/or address of the source.

The following are examples of how to cite a reference in the Review of Literature

1. One method of citing a direct quote in the research paper should be in the form: She stated, “The ‘placebo effect’, which had been verified in previous studies, disappeared when behaviors were studied in this manner” (Miele, 2001, p.276), but she did not clarify which behaviors had been studied.
2. A paraphrasing of the text should be in one of the following forms:-as Smith (2002)demonstrated… as has been demonstrated (Smith, 2002).

APA Resource Websites

- https://apastyle.apa.org/apa-style-help
- https://www.noodletools.com/
- https://www.easybib.com/
- https://www.citationmachine.net/
- https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/index.html

Exhibit Guidelines

Exhibit Guidelines

Display Design and Evaluation

- The exhibit must not exceed dimensions of 61 cm (24”) front to back and width 107 cm (42”) from side to side. Boards that are 36” x 48” are fine for use.
- Build the exhibit no higher than 152 cm (60”) No overhang is allowed. If the scientific apparatus exceeds the height limit, use photographs to show what has been done. No part of the project may be placed on the floor.
- Construct your own exhibit; teachers and parents are to provide only the necessary guidance, encouragement, and constructive criticism.
- Keep the title of your project brief, captivating, and prominently visible on the exhibit. It may contain no more than 45 characters and spaces.
- Determine the best way to present the research. The presentation may include graphs, charts, and demonstration of design apparatus only (must meet safety inspection guidelines). Attach a copy of your Abstract, Safety Sheet, and Endorsement(s) (if necessary) to the front of your display board. These documents must be part of your display board and cannot be attached to the board with clips, block the view of posted information on the display board or overhang on any side of the display board. The Abstract and Safety Sheet can be reduced to one half of a page, 8.5 inches (vertical) x 5.5 inches (horizontal). Less than 75% reduction is not acceptable..
- No apparatus for Experimental or Design projects will be allowed to be displayed. You may only bring your display board and computer. Pictures, drawings, diagrams and video footage of experiments should replace equipment. Computers may be used to enhance the presentation, but media presentations, such as PowerPoint,Prezi or Google Slides are not acceptable.
- Exhibits must conform to size limitations. No easels or tripods are allowed on the floor around the exhibit. Floormounted exhibits will not be considered for competition.
- Exhibits must be constructed so that wall space is not required. All exhibits must be freestanding. Objects may not be attached to draperies or the exhibitor identification sign. No lighting of any type may be used to illuminate the exhibit. No items may be stored under the exhibit table.
- The City Science Fair Exhibits Committee will provide space on a table, a table covering, and an identification sign.The student must provide all other needs of his/her exhibit (for example, tape, staples...). The exhibit space can only accommodate a display of the following dimensions: 61 cm deep, 107 cm wide, and 152 cm high. No exceptions are made. Boards that are 36” x 48” are fine for use
- All equipment and materials brought into the exhibit area during the exhibition is at the risk of the exhibitor. The Science Fair Exhibits Committee, the CPS Student Science Fair, Inc., and the Illinois Institute of Technology assume no responsibility for loss or damage to such equipment and materials.
- Normal wear and tear on exhibits is to be expected during the time the exhibition is open to the public. For this reason, each exhibitor is advised to protect his/her project as

completely as possible. Valuable equipment should be secured to prevent its removal and should be safely stored and guarded when the exhibitor is away from his/her project.

Presentation Tips

The exhibitor's personal appearance adds to the attractiveness of the exhibit. Students should dress neatly and appropriately for the occasion.

- Be well versed in as many aspects of the project as possible.
- Be enthusiastic about the project.
- Prepare not only for direct questions pertinent to the research but also for related questions.
- The Research Summary paper must be in English. Students who require a language interpreter or sign language interpreter need to make a request for the service when registering for Regionals.

Safety Guidelines for Project Display

Safety Guidelines for Project Display

The City Exhibition for Student STEM Research is an opportunity to communicate research findings. Part of the judging process is to evaluate each exhibitor's ability to present research findings to judges. By this time, experiments have been completed and data have been collected, analyzed, and interpreted. This is not the time to perform experiments.The City Exhibition for Student STEM Research is not a place for demonstration. All lab equipment and prototypes should be left at home or at school. Displaying pictures, drawings, and diagrams on the display board should replace the display of equipment at the exhibit area.

Only display boards and a computer (if required) will be allowed to be displayed in the exhibit area.

Glassware Hazards
No glassware may be displayed on the display board and/or on the table.

Chemical Hazards
No chemicals may be displayed. Photographs or drawings may be attached to the presentation board to illustrate chemicals used in the experiment. Food or drugstore products, such as toothpaste, deodorant, mouthwash, antacids, sleep aids, aspirin, sunscreens, and so forth, may not be displayed on the display board or on the table, Empty packages of products may not be displayed on display board or table. Water may not be displayed.

Hazardous Materials
Explosive, flammable, corrosive, or highly poisonous substances are not to be brought to any exhibit area. This includes gasoline, alcohol, and lighter fluids. Armed rockets or their propellants are prohibited. Cylinders for compressed gas or aerosol cans are not allowed in the display area. Batteries containing any type of liquid electrolytes are not allowed. No firearms of any type may be brought to any exhibit area. No drones may be displayed in the exhibit area.

Fire Hazards
Open flames, torches, electric heaters, or burners are not to be displayed. No apparatus which has fire hazards can not be displayed in the exhibit area**.**

Radiation Hazards
No radiation hazardous materials are allowed in the exhibit area.

Projects dealing with radiation from cathode rays, X-rays, or radioactive materials must present no hazard to the public or the student exhibitor.

Laser Hazards
No lasers or laser pointers of any kind may be displayed on the display board or on the table in the exhibit area.

Any laser used in an experimental or design project must be no greater than Class 2 (visible-light continuous wave lasers under 1 mW such as red laser pointers) without special registration from the State of Illinois. In general the lowest class laser possible should be used for a given project. The revised laser classification system along with associated hazards and safety precautions are reviewed at: https://www.osha.gov/laser-hazards and https://ors.od.nih.gov/sr/dohs/Documents/laser-safety-program.pdf. Each experiment using lasers should clearly state the safety precautions taken. Under special circumstances, where the use of such a laser is absolutely critical to the success of a project, Class 3R lasers (also labeled as Class 3A for older lasers) may be used. These lasers require written documentation of registration from the State of Illinois and need to follow all applicable safety precautions required by the State (https://iemaohs.illinois.gov/nrs/radsafety/laser.html). The scientific justification for using a 3R / 3A laser must be explained, and incorporation of these extra safety precautions must be written into the experimental procedures. Among other practices, we require that 3A lasers use a protective housing or barricade which, when in place, prevents human access to the beam during operation. Under no circumstances may lasers above Class 3R / 3A be used in any project.

Ultraviolet Light Sources
No ultraviolet light source may be exhibited on the display board or any place in the exhibit area. Exhibitors may show light source by using pictures displayed on their display board.

Electric Hazards
No electrical apparatus for experimental or design projects can be displaced in the exhibit area. Exhibitors should adhere to the Electrical Hazards safety rules.
All electrical equipment must be constructed according to standard electrical safety codes. If there is doubt, consult with an electric shop teacher or an electrician. The city of Chicago's electrical code requires all electrical devices connected to the circuits within a building to be grounded using type SO three-wire conductors.
All wiring, switches, and metal parts carrying current must be completely enclosed

by barriers on all sides to absolutely prevent receiving an electrical shock.

Mechanical Hazards
No mechanical apparatus may be displayed.
All moving parts of machines and/or electrical circuitry must have adequate protective coverings or guards. Push-buttons and levers must be securely mounted. Materials and construction must be durable. All moving parts must be firmly attached. Power-driven parts must be protected with guards.

Biological Hazards
Cigarettes and tobacco may not be displayed. Empty packages may not be displayed on the display board or in the exhibit area.

Animal Hazards
No live or preserved invertebrate or vertebrate animals may be exhibited. All vertebrate projects, including those dealing with humans, must have an approved Vertebrate animal Endorsement. (See pages 13-14 of this handbook for rules regarding animal experimentation.) It is imperative that students not be exposed to any bacteria that are considered pathogenic; for this reason, two rules are very strictly enforced:

1. No primary or secondary cultures taken from humans or other warm-blooded animals may be displayed. This includes, but is not limited to, skin, throat, mouth, and other areas.
2. No display of cultures/fungi is permitted at the exhibit area, although they may be used in experiments if incubated at or below room temperature.

Sharps Hazards
Hypodermic syringes, needles, and surgical tools cannot be part of the display board or displayed at the exhibit area.

Biological Substance Hazards
No materials may be displayed that can undergo a chemical or biological change. This includes molds, bacteria, yeasts, pond water, aquatic plants, and other potentially gasproducing substances. Wild cultures cannot be displayed at a STEM exhibition. Those projects should display photographs.

Part Two: Symposium, IJAS, ISEF, QED, and Patents

Part Two:

Symposium Process Flowchart

START: Project Planning & Selection

- Choosing the Correct Research – Experimental vs. Design
- 2026 STEM Exhibition Categories

↓

Safety & Endorsement Review

- Safety in Experimentation
- Endorsement Flow Chart

↓

Does your project involve any of the following?

- Use of Humans in Experimentation
- Use of Animals in Experimentation
- Use of Microorganisms
- Use of Human or Vertebrate Tissue
- Use of Recombinant DNA
- Use of Hazardous Equipment
    - **YES** → Must follow specific safety protocols and obtain endorsements before proceeding.
    - **NO** → Proceed to research.

↓

Conducting Research

- Required Experimental Research **OR** Required Design Research
- Estimating Experimental Error
- Correct SI Metric System Usage

↓

Documentation & Reporting

- Reference List Format

↓

Preparing for Presentation

- Symposium Guidelines
- Safety Guidelines for PowerPoint presentation

↓

END: Project Ready for Symposium

STEM Exhibition Symposium

STEM Exhibition Symposium

STEM Exhibition Symposium

A major part of the annual Chicago Public Schools Student STEM Exhibition is the Symposium Competition. The Symposium is an opportunity for the exchange of ideas between a student presenter and a panel of university and industrial scientists in a particular area of STEM. This differs from the Exhibit presentations which are several discussions between the student scientist and individual judges at different times. Emphasis is placed on a student's inherent scientific interest, gained knowledge and his/her ability to express himself/herself completely and correctly in oral and written form on their research
Like STEM Exhibition exhibitors, symposium entrants are required to conduct original research as a basis for the Symposium paper. However, this research need not be exhibited at the City STEM Exhibition. The research project and paper requirements for exhibits and the Symposium are identical. The page limit of 30 pages also applies. Only the format for presentation differs.

Entry Procedure

Each school is allowed to submit to the Symposium & Essay Committee no more than 30 research papers (including both Symposium papers and Essay papers). The school STEM Exhibition coordinator should screen the papers before submission.

They need to be submitted by Friday, January 9, 2026 to SurveyMonkey Apply. This is a firm deadline. It will NOT be extended. Details regarding submission with SurveyMonkey Apply will be shared with school sponsors.

Papers submitted by the due date will be read and evaluated by the Screening Committee. All schools submitting Symposium Papers are required to have Readers which will be completed virtually from Saturday, January 10 - Friday, January 23, 2026. All papers that do not follow the guidelines in this handbook will be returned to the student.

Students and their sponsors whose papers are selected will be notified by January 30, 2026 and given a complete set of instructions for participation in the City STEM Exhibition Symposium.

Examine the Symposium Paper/IJAS State Essay Checklist helpful information in completing the
Symposium paper.

Symposium Program

An orientation meeting for all finalists will be held virtually before the Symposium date to familiarize the students with the Symposium room locations and available audiovisual equipment. Participants will receive information about the presentation format and presentation schedule.

During the Symposium presentation, each finalist will be given 10 minutes to present his/her paper,
followed by a five-minute question-and-answer period. The presentation may be read, given from notes,
or a computer presentation (preferred). Students may use programs such as Powerpoint, Prezi, or Google
Slides to create their presentation.

All participating students must remain for the entire morning or afternoon session. Computers with LCD projectors will be available for student use during their presentation. The main task of the participant is to present (in the time allotted) a recapitulation of his/her Research Paper, highlighting the Purpose, Hypothesis, Review of Literature, Materials, Procedure, Results, and Conclusion(s). Judges will not accept revisions of student papers after they have been received by the Symposium & Essay Committee. Further research, conducted after the regional and/or city exhibitions, however, may be presented as a written addendum given to the judges at the time of the oral presentation.

The 15 top scoring Symposium participants proceed to the IJAS state paper session and will each receive cash awards.

IJAS State Science Fair Competition

IJAS State Science Fair Competition

Information for the IJAS State Science Fair can be found at https://ijas.org/.

IJAS Essay Contest

IJAS 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 Paper Session Competition. However, this does not rule out the possibility of personal experimentation as a supplement to the library research.

General IJAS Essay Guidelines:

Make sure the topic is narrow enough to write a proper essay--do not try to overview every topic that relates to the theme.

- Choose a topic that has been developed or is being theorized.
- Support your topic’s significance through research.

Structure of the Essay:

- The author must follow the essay theme: as specified in this handbook and on the www.cpsssf.org website
- The author must use the formal essay style that adequately expresses the chosen topic.
- The essay must be original and follow the basic rules of essay writing.

Essay Entry Procedures

Students are to submit to the school coordinator four copies of their essay and three copies of the 2019 Exhibition of Student STEM Research Official Entry Form for Symposium and Essay Competition. Each essay must include the Essays due to Lucy Young, by Friday, January 10, 2020. The physical arrangement of the essay must be as follows:

- Give the essay a title that is indicative of the content of the essay.
- If supplemental experimentation is used, a Safety Sheet and any applicable endorsement(s) must be attached.
- Table of Contents
- Introduction
- Body–Discussion, including an alternate point of view or counter argument
- Conclusion or Summary
- Reference List – A list of published articles, books, and other communications actually cited in the essay, using APA format. Do not refer to this list as a bibliography.

The essay should be 1,200 to 1,500 words. The essay should include at least 12 current references and no more than one reference to an encyclopedia. Students are to type their last name and the title of the essay at the upper righthand corner of each page. Papers should follow the basic rules of essay writing and should be carefully proofread.

Checklist

- ☐ Completed the work as an individual student.
- ☐ Type the paper, double-spaced, on one side only.
- ☐ Typed student's name and title of essay at the upper right hand corner of each page.
- ☐ Included (in this sequence): Essay Cover Page; Table of Contents; Introduction, Body, Conclusion or Summary, and Reference List.
- ☐ Limited the paper to 1200–1500 words.
- ☐ Submitted by Friday, January 9, 2026 This is a firm deadline. It will NOT be extended.

The IJAS Essay Contest allows students to explore a chosen topic in an essay related to the exposition theme. This contest is terrific for students who prefer to show their creativity through writing. For the MIddle School Prompts (Grades 7 & 8) and High School Prompts (Grades 9-12) go to https://ijas.org/Additional-IJAS-Contests#essaycontests.

IJAS Cover Design Contest

IJAS Artistic Design Contest

Do you have an eye for design? Do you have a way with words? IJAS offers something for every student!

All 7th - 12th-grade students who are individual members or attend a current IJAS member school are eligible to participate in the contests below, in addition to the traditional poster and paper sessions. Students DO NOT need to compete in any local, regional, or state science fair paper or paper session to be eligible. Learn about this year's contest at https://ijas.org/Additional-IJAS-Contests#ArtisticDesign.

International Science and Engineering Fair (ISEF)

International Science and Engineering Fair (ISEF)

Selection of Students

Four students who receive Gold awards at the City Exhibition of Student STEM Research will be selected to attend the International Science and Engineering Fair, held May 10 – 15, 2026, in Phoenix, Arizona. All expenses for the international competitions are funded by the Chicago Public Schools Student Science Fair, Inc. and Chicago Public Schools Department of STEM.

Find specific information about International Science and Engineering Fair rules and appropriate documents at
https://student.societyforscience.org/international-rules-pre-college-science-research

Judging criteria for ISEF can be reviewed at
https://www.societyforscience.org/isef/grand-award/criteria/

QED

QED

QED is Chicago's only Youth Math Symposium, essentially a science fair for participants whose projects are in mathematics, applied mathematics, or computer science. Participants are divided into three divisions: Junior, grades 5-6; Intermediate, grades 7-8; Senior, grades 9-12. Any public school student in Chicago (including those attending charter schools) at these grade levels are eligible to participate.

At QED, each presentation is evaluated by two or three judges; the rubric our judges use is posted on our website. Projects are placed into three categories: Successful Contributor, Contributor with Distinction, and Contributor with High Distinction. The top six Senior level projects, as well as, the top six projects at the Intermediate level automatically qualify for the Citywide 2026 Exhibition of Student STEM Research. These projects will need to adhere to the rules and regulations of participating in the City 2026 Exhibition of Student STEM Research as published in the 2026 STEM Exhibition Handbook.

See the QED Website for more information.

Patent and Copyright Information

Patent and Copyright Information

You may want to consider applying for a patent or copyright if you want to protect your work. More information on Patents can be found at http://www.uspto.gov or you can contact the Customer Support Center of the U.S. Patent and Trademark Office, at (800) 786-9199 or (571) 272-1000 for patent information. The Copyright Office at the Library of Congress can be reached at (202) 707-3000 or (877) 476-0778. You can also go to https://www.copyright.gov/ for copyright information.

Additional information can be obtained from two libraries that serve as patent depositories in Illinois: The Illinois State Library in Springfield; and the Harold Washington Library of the Chicago Public Library system (Science and Technology, 4th Floor).

General information concerning patents

https://www.uspto.gov/patents-getting-started/general-information-concerning-patents

What is a patent?

A patent is granted by the federal government to an inventor “to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States.” There are three types of patents:

- Utility patents may be granted to anyone who invents or discovers any new and useful process, machine, article of manufacture, composition of matter, or any new useful improvement thereof.
- Design patents may be granted to anyone who invents a new, original, and/or ornamental design for an article of manufacture.
- Plant patents may be granted to anyone who invents or discovers and asexually reproduces any distinct and new variety of plant.

Answers to the following questions can be answered by reading Basic Facts About Patents.

- How long does patent protection last?
- Who owns the patent rights?
- How do I get a patent?
- Do I need to hire a lawyer?
- What about patent promotion organizations?
- Do I need to do a patent search before I apply?

Part Three: Guidelines for Judging

Part Three: Guidelines for Judging

Poster Competition Rubrics - Will be updated with the new IJAS rubrics once they publish them.

- Experimental
- Design

Part Four: Awards

Part Four: Awards

In addition to the awards of Gold the following presentations will be made.

Special Awards and Tours

Companies and organizations offer special awards and tours to selected exhibitors. These awards are made on the basis of criteria established by the companies or organizations that provide the special award. Judging in this category involves numerous diversified criteria and does not always correspond to the general evaluative judging all participants at the city STEM Exhibition undergo. It should be noted that many of these awards are based on the subject matter of the project as well as its quality.

International Science and Engineering Fair (ISEF) Awards

Four high school students selected from among the projects earning Gold awards will compete at the Regeneron ISEF in Phoenix, Arizona, May 10-15, 2026. Additional information can be found at the Student Science, Regeneron ISEF website: http://www.societyforscience.org/isef; or email: isef@societyforscience.org

Junior Innovators Challenge Awards

The top 10% of middle school projects will receive an invitation to apply online for the Thermo Fisher Scientific Junior Innovators Challenge. This competition is the premier STEM research competition for 7th & 8th grade students in the United States.

Illinois Junior Academy of Science (IJAS) Awards

Fifteen symposium participants and fifty (50) exhibitors receiving a Gold award will be eligible to compete in the statewide competition held at Southern Illinois Carbondale, Carbondale IL on Friday and Saturday, April 24, 2026 and April 25, 2026. Additional information can be obtained from the IJAS website: https://ijas.org/

Part Five: Programs

Programs

- Research Grant Programs
- Alumni Mentor Program
- Scholarship Program

Research Grant Programs

Research Grant Programs

- Maxi Grant can be downloaded as a fillable PDF.
- Mini Grant can be downloaded as a fillable PDF.

Students who have started on their investigation by completing their library research and formulating an experimental design may apply for funds to reimburse expenses for supplies and equipment not normally available at the local school. All reusable equipment reimbursed through either the mini or maxi grant becomes the property of the school when the project is completed for future students to use.

The Mini Research Grant Program awards a maximum of $100 per semester or $200 per year to help finance the research of students in Grades 7–12. The application may be found on pages 79 – 80 of this Handbook, and may be duplicated for your use. The Research Grant Committee awards grants on the basis of the application. Criteria included on the application will be used to evaluate projects and should be used as guidelines when applying.

Pre-approval for reimbursement - A student may apply by November 20, 2016 to be pre-approved for reimbursement prior to beginning experimentation if reimbursement will affect whether he/she wishes to purchase the materials and continue with the project. Applicants will be notified promptly by the Research Grant Committee whether they will be reimbursed for their materials should they pursue the proposed project. Students whose applications are approved must purchase only the materials for which they've applied and submit original receipts for these materials. A check for the exact amount of the materials will be issued only after original receipts have been received by the Research Grant Committee.

Post-project reimbursement - Alternately, a student may apply by March 1, 2026 (after purchasing the materials and finishing the STEM project) to be reimbursed should his/her project qualify. Students applying after purchasing materials must submit the original receipts for these materials and finished science project paper with the application.

A check for the exact amount of the materials will be issued only after original receipts have been received by the Research Grant Committee.

High school students whose funding requirements exceed $100 should apply by March 1, 2026 for funds through the Maxi Research Grant Program. Students applying for a Maxi Research Grant must have participated in a past Regional or City STEM Exhibitions. The application should be completed with careful attention to detail. Do not request equipment that is usually part of the school inventory.

Maxi Research Grant applications are screened by the Research Grant Committee and evaluated using an initial point system. If an application passes the initial screening, the student will be invited to a personal interview conducted by selected Chicago Public Schools Student

Science Fair, Inc. committee chairpersons. Maxi Research Grants are awarded to students on a one-time-only basis.

A student may apply for either the Mini Research Grant or the Maxi Research Grant, but not both.

Alumni Mentor Program

Alumni Mentor Program

Information coming soon.

Scholarship Program

Scholarship Program

Over $3.9 million in scholarships have been awarded to 2157 Chicago public school students who have participated in the Student STEM Exhibitions as exhibitors of projects and/or as Symposium participants. Scholarships are awarded by corporations, individuals, philanthropic organizations, universities, and the Chicago Public Schools Student Science Fair, Inc. The number of available scholarships varies each year. Any senior who has participated in at least one Chicago Public Schools STEM Exhibit at either the Regional Networks or city level and/or the symposium, is graduating in June 2026 from a Chicago public high school, and is majoring in a STEM related field is eligible to apply for a scholarship Interested seniors may obtain scholarship application forms from their high school science fair coordinator, their senior counselor, or science department chairperson.

Applicants should be aware that a completed application with required documents is due on or before the April 3, 2026, deadline for receiving their applications. Late and/or incomplete entries will not be considered and will be returned to the student. Faxed applications will not be accepted.

Completed application forms will be judged on the following criteria:

- •pursuing a major in a STEM related field
- amount of science fair participation, and level of achievement
- academic profile: type of courses and grades, class rank, and standardized test results
- personal essay
- letter of recommendation

Approximately 25 candidates will be selected and invited to meet with the Scholarship Committee in the final step of screening. Recipients of scholarships are selected by the committee to discuss their candidacy with the committee in an informal setting. The candidates are notified by letter as to the decision of the Scholarship Committee whose decisions are final. A formal presentation of scholarships takes place at an awards dinner to honor the recipients, their parents, and teachers. The university scholarships listed below and on the following page were available to Chicago Public Schools Science Fair, Inc. at the time of publication. The list is subject to change. See the STEM Exhibition website for updates and changes.

Information on the specific universities offering scholarships will be coming soon.

A number of monetary scholarships will be available. The funding of these scholarships depends on the generosity of corporations and philanthropic organizations that contribute to Chicago Public Schools Student Science Fair, Inc. Cash grants may range from $1,000 to $10,000. The application for the STEM Exhibition Scholarship can be found at SchooLinks.

Appendix

Appendix

- Sample of Title Page
- Experimental Project Checklist Arrangement Paper
- Design/Math Project Checklist Arrangement Paper
- Links: Abstract, Safety Sheet Title & Endorsements
- SurveyMonkey Apply
- Approved Microorganisms for Science Research
- Symposium Paper/IJAS State Essay Checklist
- Consent Form and Release
- Calendar of Events
- CPS Regular School Calendar

Guidelines for AI Usage

Guidelines for AI Usage

We are following the new guidelines for AI usage in student research that was issued by The Society For Science.

Sample of Title Page

Sample of Title Page

Template Title Page Google Document

(Title)

(Category)

(Type of Investigation)

Student Name
School
Grade

Experimental Project Checklist Arrangement Paper

CHECKLIST FOR THE PHYSICAL ARRANGEMENT OF THE STEM RESEARCH PAPER - EXPERIMENTAL

(Abstract, Safety Sheet, Endorsements, & Research Summary)

ALL ITEMS MUST BE TYPED

- ☐ ABSTRACT (Must be the Official IJAS 2024-2026 Abstract)
  - ☐ Included in paper
  - ☐ Three (3) paragraphs with headings: Purpose, Procedure, and Conclusion
  - ☐ Typed single-spaced, 200 words or less
  - ☐ Check appropriate box - Experimental
- ☐ SAFETY SHEET (Must be the Official IJAS 2024-2026 Safety Sheet)
  - ☐ Included in paper
  - ☐ Lists possible hazards, precautions described
  - ☐ If no hazards were possible a statement indicating this is included
  - ☐ Signed by student and sponsor
- ☐ APPROPRIATE ENDORSEMENTS AND ATTACHMENTS (If applicable)
  - ☐ Included in paper
  - ☐ Endorsement signed and stamped by the CPS Scientific Review Committee (SRC) member
  - ☐ Signed by student and sponsor

- [ ] All pages of completed endorsement and proper documentation is attached, if necessary

- [ ] TITLE PAGE OF RESEARCH SUMMARY (SIGNATURES NO LONGER REQUIRED)
  - [ ] Formatted as on example
    - [ ] Title of project
    - [ ] Experimental
    - [ ] Name(s) of student(s)
    - [ ] School
    - [ ] Grade

- [ ] TABLE OF CONTENTS
  - [ ] All subsections are listed with page numbers
  - [ ] Pagination is accurate

- [ ] ACKNOWLEDGMENTS
  - [ ] Credit is given to those who have helped with the research

- [ ] PURPOSE AND HYPOTHESIS OR NEED
  - [ ] Experiment Project - Hypothesis and prediction is present

- [ ] BACKGROUND RESEARCH
  - [ ] Provides information that supports the hypothesis and if necessary, the procedure
  - [ ] Provides adequate background information about the topic

- [ ] Use of third person is evident
- [ ] Logical and/or related grouping of information
- [ ] Accurate spelling, grammar, quotations and citations and page set-up
- [ ] Parenthetically cited.

- [ ] MATERIALS AND METHODS OF PROCEDURE
  - [ ] All equipment and materials are listed
  - [ ] Drawings and photographs are present if they enhance and clarify the project
  - [ ] Step-by-step, chronological procedures are present and replicable
  - [ ] A control or comparison group is present and appropriate
  - [ ] Number of trials within each test group is adequate
  - [ ] Control of variables is evident

- [ ] RESULTS
  - [ ] All data is presented, including results inconsistent with the hypothesis, if applicable
  - [ ] Data and calculations are clear and accurate
  - [ ] Data is quantitative and correct units of measurement (metric) are used
  - [ ] Data is organized into clear & informative tables or charts with accompanying graphs
  - [ ] Effect of experimental error was estimated and considered

- [ ] CONCLUSIONS
  - [ ] Evaluation and interpretation of data is present
  - [ ] Refers back to purpose and hypothesis
  - [ ] Answers the original question
  - [ ] Is valid and limited to the results of the experiment
- [ ] REFERENCE LIST (Purdue University OWL APA Formatting and Style Guide - 7th Edition)
  - [ ] References in this list are actually cited in the paper
  - [ ] References from a variety of at least 12 sources and are current (copyright within the last seven years)
  - [ ] Reference list is alphabetical
  - [ ] Proper APA format is used for all references
  - [ ] Titled “Reference List” or “References Cited” not “Bibliography”
- [ ] OTHER REQUIREMENTS
  - [ ] STEM Project Paper clearly and concisely explains the project
  - [ ] Exhibitor’s last name and page numbers in the top right corner of header of all pages after Table of Contents
  - [ ] All pages are numbered in the top right hand corner of header after Table of Contents and referenced in the Table of Contents
  - [ ] Typed double-spaced, one-inch margins on all sides, double-sided is

permitted

- [ ] Standard type font and size (ex. Times New Roman 10 – 12 point font)
- [ ] STEM Research Summary (Abstract, Safety Sheet, and Research Summary) is no more than 30 pages (33 if an endorsement is included)
- [ ] Paper is well typed, with correct spelling, grammar and punctuation
- [ ] Voice should be consistent throughout the paper. Scientific writing avoids the use of I or We. Most formal writing, including APA papers, uses the **third person** point of view. Third person point of view makes ideas sound less subjective since it removes direct reference to the writer.
- [ ] We are following the same guidelines as Society For Science for the usage of AI in student research.
- [ ] Indicate Experimental Investigation on all forms and pages where required

Google Doc Checklist for Physical Arrangement of the STEM Research Paper

Checklist for Physical Arrangement of the STEM Research Paper Experimental

Design/Math Project Checklist
Arrangement Paper

CHECKLIST FOR THE PHYSICAL ARRANGEMENT OF THE STEM RESEARCH PAPER - DESIGN/MATHEMATICS

(Abstract, Safety Sheet, Endorsements, & Research Summary)

ALL ITEMS MUST BE TYPED

- ☐ ABSTRACT (Must be the Official IJAS 2024-2026 Abstract)
  - ☐ Included in paper
  - ☐ Three (3) paragraphs with headings: Purpose, Procedure, and Conclusion
  - ☐ Typed single-spaced, 200 words or less
  - ☐ Check appropriate box - Design Investigation
- ☐ SAFETY SHEET (Must be the Official IJAS 2024-2026 Safety Sheet)
  - ☐ Included in paper
  - ☐ Lists possible hazards, precautions described
  - ☐ If no hazards were possible a statement indicating this is included
  - ☐ Signed by student and sponsor
- ☐ APPROPRIATE ENDORSEMENTS AND ATTACHMENTS (If applicable)
  - ☐ Included in paper
  - ☐ Endorsement signed and stamped by the CPS Scientific Review Committee (SRC) member
  - ☐ Signed by student and sponsor

- [ ] All pages of completed endorsement and proper documentation is attached, if necessary

- [ ] TITLE PAGE OF RESEARCH SUMMARY (SIGNATURES NO LONGER REQUIRED)
  - [ ] Formatted as on example
    - [ ] Title of project
    - [ ] Design/Mathematics
    - [ ] Name(s) of student(s)
    - [ ] School
    - [ ] Grade

- [ ] TABLE OF CONTENTS
  - [ ] All subsections are listed with page numbers
  - [ ] Pagination is accurate

- [ ] ACKNOWLEDGMENTS
  - [ ] Credit is given to those who have helped with the research

- [ ] REAL WORLD PROBLEM/NEED
  - [ ] Defines a need or real-world problem and established design criteria

- [ ] BACKGROUND RESEARCH
  - [ ] Provides information that supports the design criteria
  - [ ] Provides adequate background information about the topic
  - [ ] Use of third person is evident

- [ ] Logical and/or related grouping of information
- [ ] Accurate spelling, grammar, quotations and citations and page set-up
- [ ] Parenthetically cited

- [ ] DESIGN PLAN
  - [ ] The apparatus and materials used are listed
  - [ ] The explanation of what was done must be clear and detailed enough so that the reader could duplicate the work.
  - [ ] Explain the workings of any apparatus that was constructed or used.
  - [ ] A decision matrix is used with the criteria by which the prototype and redesign will be evaluated
  - [ ] Includes a flowchart
  - [ ] Drawings and diagrams that are clearly labeled, and photographs are appropriate if they enhance and clarify your explanation.Step-by-step, chronological procedures are present and replicable

- [ ] RESULTS AND DISCUSSION
  - [ ] Constructing and Testing the Design Prototype
    - [ ] A description of the prototype/computer program/mathematical algorithm is included.
    - [ ] The prototype has been tested and the results have been discussed.
    - [ ] After the initial testing, design modifications are made and the redesigned product is tested and evaluated again .
    - [ ] May involve targeted users and/or analysis of data sets. (This may or may not include traditional data such as tables and graphs).

- [ ] Results of Testing and Redesign
  - [ ] Testing results have considered the parts and subsystems that required redesign in order to meet the performance criteria.
  - [ ] The redesign shows the changes in parts and subsystems.
- [ ] Redesign and Retest
  - [ ] This portion of the design process gives evidence that changes in design were made to better meet the performance criteria established at the beginning of the project.
  - [ ] Test results may be included in tables, if applicable.
  - [ ] Data analysis/validation may be present.

- [ ] CONCLUSION
  - [ ] Evaluation and interpretation of data/results is present
  - [ ] Refers back to need/real world problem
  - [ ] Is valid and limited to the results of the investigation

- [ ] REFERENCE LIST (Purdue University OWL APA Formatting and Style Guide - 7th Edition)
  - [ ] References in this list are actually cited in the paper
  - [ ] References from a variety of at least 12 sources and are current (copyright within the last seven years)
  - [ ] Reference list is alphabetical
  - [ ] Proper APA format is used for all references

- [ ] Titled “Reference List” or “References Cited” not “Bibliography”

- [ ] OTHER REQUIREMENTS

  - [ ] STEM Project Paper clearly and concisely explains the project
  - [ ] Exhibitor’s last name and page numbers in the top right corner of header of all pages after Table of Contents
  - [ ] All pages are numbered in the top right hand corner of header after Table of Contents and referenced in the Table of Contents
  - [ ] Typed double-spaced, one-inch margins on all sides, double-sided is permitted
  - [ ] Standard type font and size (ex. Times New Roman 10 – 12 point font)
  - [ ] STEM Research Summary (Abstract, Safety Sheet, and Research Summary) is no more than 30 pages (33 if an endorsement is included)
  - [ ] Paper is well typed, with correct spelling, grammar and punctuation
  - [ ] Voice should be consistent throughout the paper. Scientific writing avoids the use of I or We. Most formal writing, including APA papers, uses the **third person** point of view. Third person point of view makes ideas sound less subjective since it removes direct reference to the writer.
  - [ ] We are following the same guidelines as Society For Science for the usage of AI in student research.
  - [ ] Indicate Design/Mathematics Investigation on all forms and pages where required

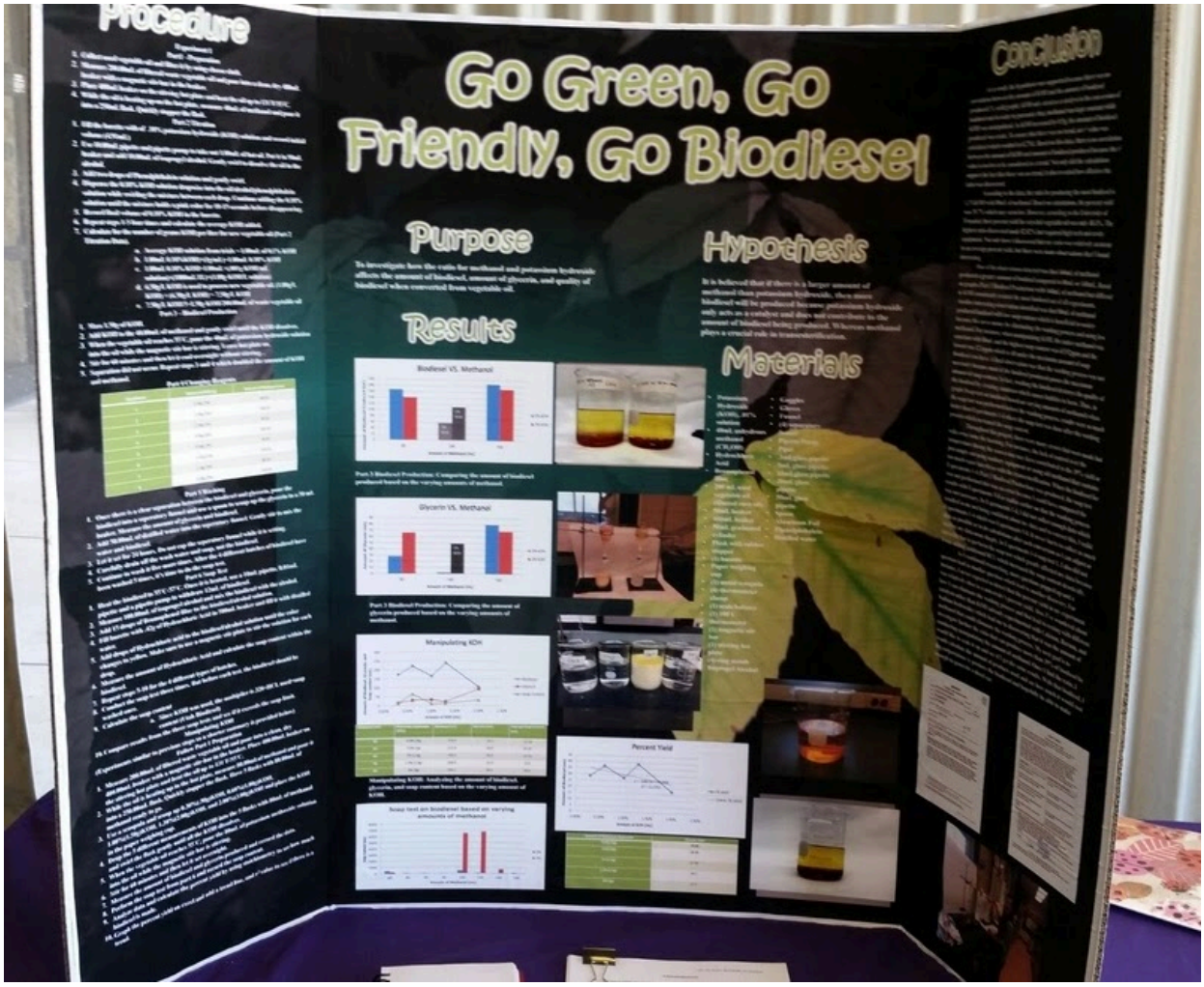
Google Doc Checklist for Physical Arrangement of the STEM Research Paper - Design/Mathematics

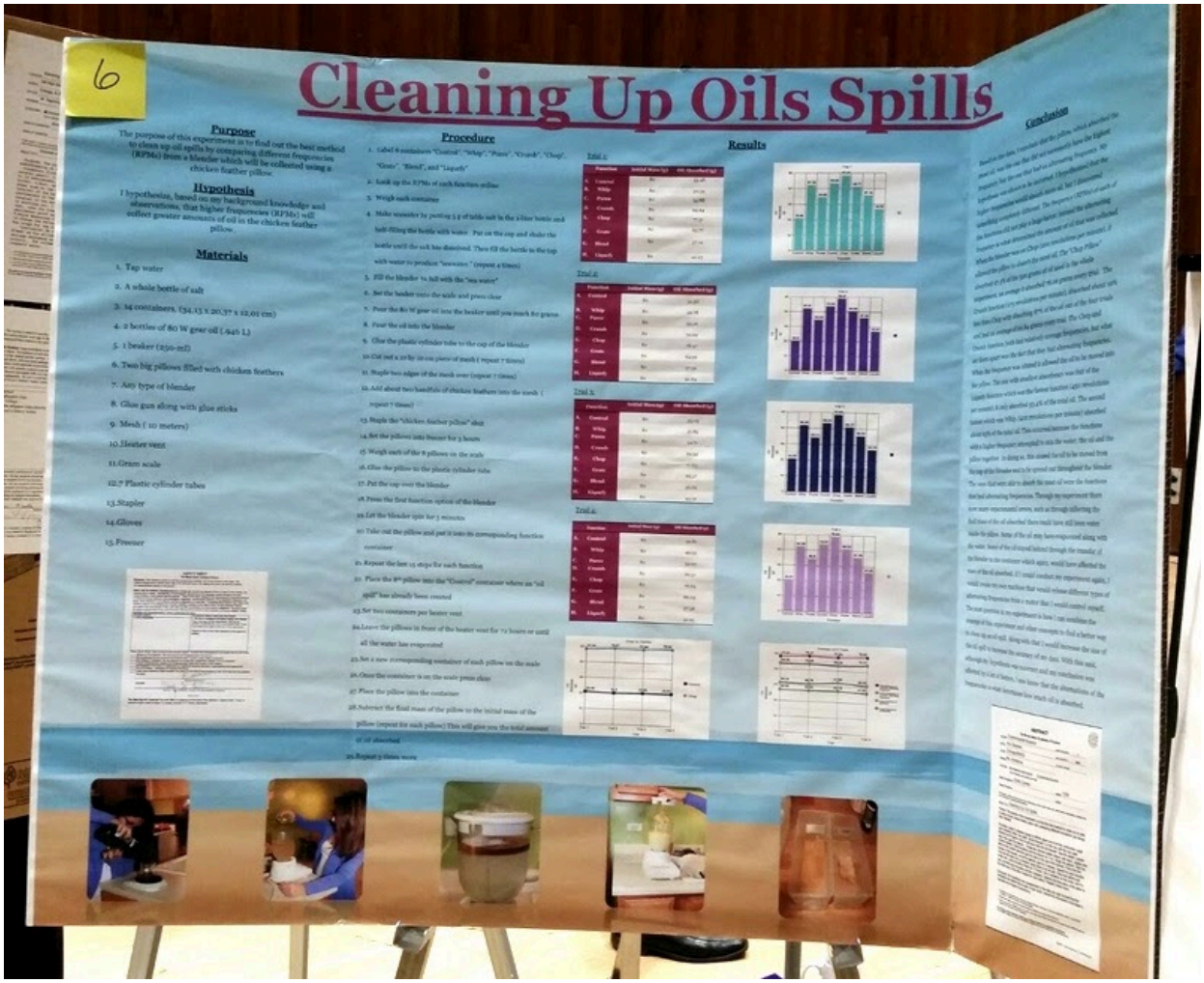
Checklist for Physical Arrangement of the STEM Research Paper - Design/Mathematics

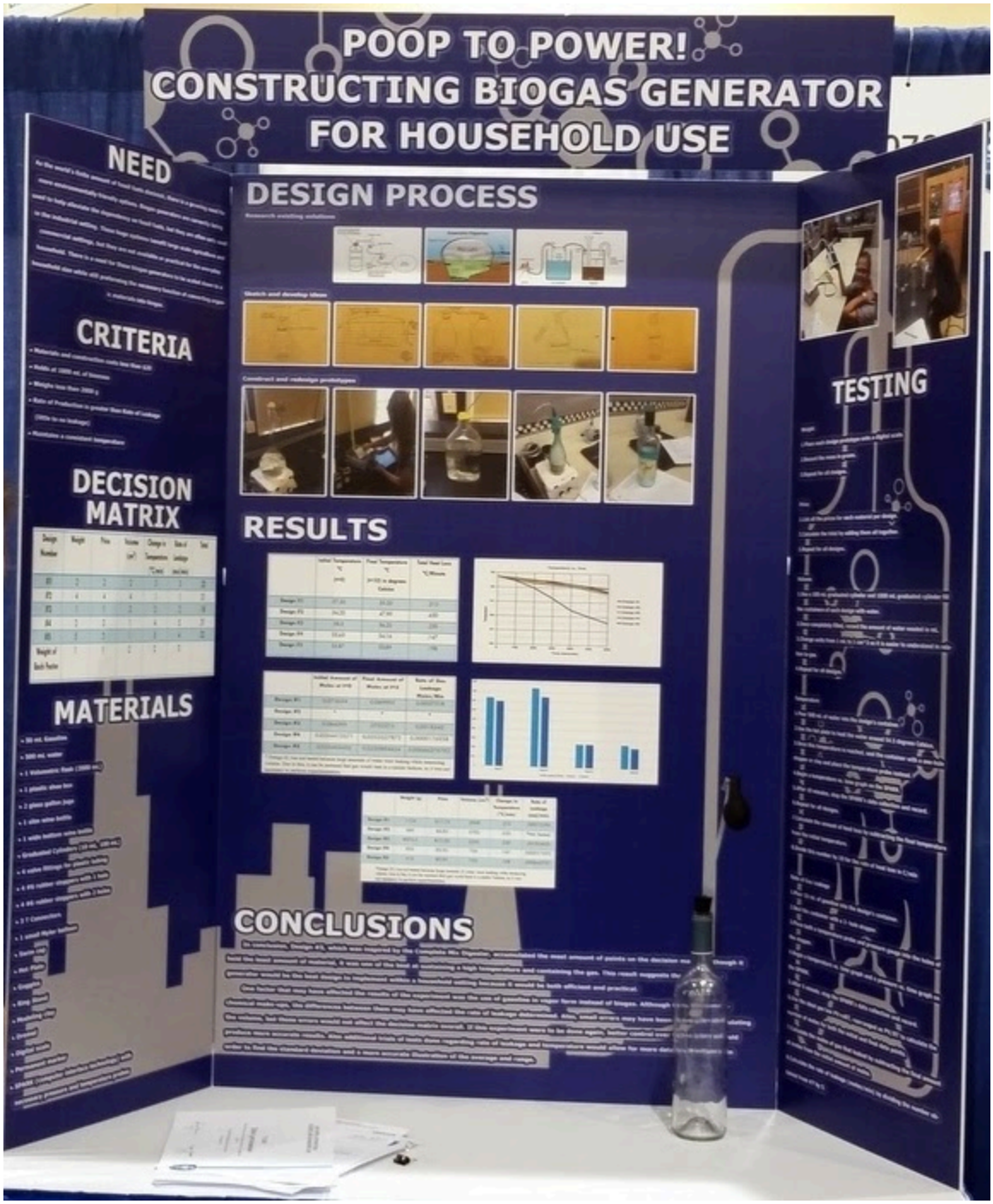
Boards

CHECKLIST FOR THE PHYSICAL ARRANGEMENT OF THE STEM RESEARCH EXHIBITION BOARD

- ☐ **Title**
  - ☐ Title of project
- ☐ **ABSTRACT, SIGNED SAFETY SHEET, ENDORSEMENTS (If applicable)**
  - ☐ Abstract, Signed Safety Sheet, & Endorsements (REDUCE EACH ONE TO NO LESS THAN 75% TO FIT ON THE FRONT OF YOUR BOARD.)
- ☐ **PURPOSE & HYPOTHESIS OR NEED/REAL WORLD PROBLEM**
  - ☐ Design Project - Define precisely a need or real-world problem and propose a design solution
  - ☐ Experimental Project - Hypothesis and prediction are present
- ☐ **MATERIALS**
  - ☐ All equipment and materials are listed
- ☐ **METHODS OF PROCEDURE**
  - ☐ Step-by-step, chronological procedures are present and replicable
  - ☐ Drawings and photographs are present if they enhance and clarify the project
- ☐ **SLIDES (S): RESULTS**
  - ☐ All data is presented, including results inconsistent with the hypothesis, if applicable
  - ☐ Data is quantitative and correct units of measurement (metric) are used
  - ☐ Data is organized into clear & informative tables or charts with accompanying graphs
- ☐ **CONCLUSIONS**
  - ☐ Evaluation and interpretation of data is present
  - ☐ Refers to purpose and hypothesis or need/real world problem
  - ☐ Answers the original question
  - ☐ Is valid and limited to the results of the experiment


Procedure
Go Green, Go Friendly, Go Biodiesel
Purpose
To investigate how the ratio for methanol and potassium hydroxide affects the amount of biodiesel, amount of glycerin, and quality of biodiesel when converted from vegetable oil.
Hypothesis
Materials
Results
Biodiesel VS. Methanol
Glycerin VS. Methanol
Manipulating KOH
Percent Yield
Soap test on biodiesel based on varying amounts of methanol
Conclusion


6
Cleaning Up Oils Spills
Purpose
The purpose of this experiment is to find out the best method to clean up oil spills by comparing different frequencies (RPMs) from a blender which will be collected using a chicken feather pillow.
Hypothesis
I hypothesize, based on my background knowledge and observations, that higher frequencies (RPMs) will collect greater amounts of oil in the chicken feather pillow.
Materials
1. Tap water
2. A whole bottle of salt
3. 14 containers. (34.13 x 20.3* x 12.01 cm)
4. 2 bottles of 80 W gear oil (.946 L)
5. 1 beaker (250-ml)
6. Two big pillows filled with chicken feathers
7. Any type of blender
8. Glue gun along with glue sticks
9. Mesh (10 meters)
10. Heater vent
11. Gram scale
12.* Plastic cylinder tubes
13. Stapler
14. Gloves
15. Freezer
Procedure
1. Label 8 containers "Control", "Whip", "Puree", "Crumb", "Chop", "Grate", "Blend", and "Liquefy"
2. Look up the RPMs of each function online
3. Weigh each container
4. Make seawater by putting 5 g of table salt in the 1-liter bottle and half-filling the bottle with water. Put on the cap and shake the bottle until the salt has dissolved. Then fill the bottle to the top with water to produce "seawater." (repeat 4 times)
5. Fill the blender ¼ full with the "sea water"
6. Set the beaker onto the scale and press clear
7. Pour the 80 W gear oil into the beaker until you reach 80 grams
8. Pour the oil into the blender
9. Glue the plastic cylinder tube to the cap of the blender
10. Cut out a 10 by 10 cm piece of mesh (repeat 7 times)
11. Staple two edges of the mesh over (repeat 7 times)
12. Add about two handfuls of chicken feathers into the mesh (repeat 7 times)
13. Staple the "chicken feather pillow" shut
14. Set the pillows into freezer for 3 hours
15. Weigh each of the 8 pillows on the scale
16. Glue the pillow to the plastic cylinder tube
17. Put the cap over the blender
18. Press the first function option of the blender
19. Let the blender spin for 5 minutes
20. Take out the pillow and put it into its corresponding function container
21. Repeat the last 15 steps for each function
22. Place the 8th pillow into the "Control" container where an "oil spill" has already been created
23. Set two containers per heater vent
24. Leave the pillows in front of the heater vent for +/- hours or until all the water has evaporated
25. Set a new corresponding container of each pillow on the scale
26. Once the container is on the scale press clear
27. Place the pillow into the container
28. Subtract the final mass of the pillow to the initial mass of the pillow (repeat for each pillow) This will give you the total amount of oil absorbed
29. Repeat 3 times more
Results
Trial 1:
Trial 2:
Trial 3:
Trial 4:
Conclusion


POOP TO POWER!
CONSTRUCTING BIOGAS GENERATOR FOR HOUSEHOLD USE
NEED
CRITERIA
DECISION MATRIX
MATERIALS
DESIGN PROCESS
RESULTS
CONCLUSIONS
TESTING

The Structural Integrity of Platonic Solids

Materials

Autodesk Inventor Professional 2014
Computer

Procedure

1. Computer model the hexahedron, dodecahedron, and icosahedron on Autodesk Inventor 2014.
2. Pack the platonic solids in a 3 x 3 x 3 cube.
3. Conduct a stress analysis on the packed platonic solids by adding a force on each solid located on the top face of the cubic structure.
4. Apply the amount of force calculated according to the volume of the solid.
5. Record the percent of total height that was displaced and compare between the solids.

How to construct a hexahedron

1. Sketch a square with 2.54 cm sides on a work plane.
2. Extrude the square by 2.54 cm.

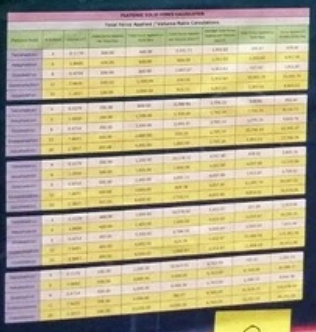
How to construct a dodecahedron

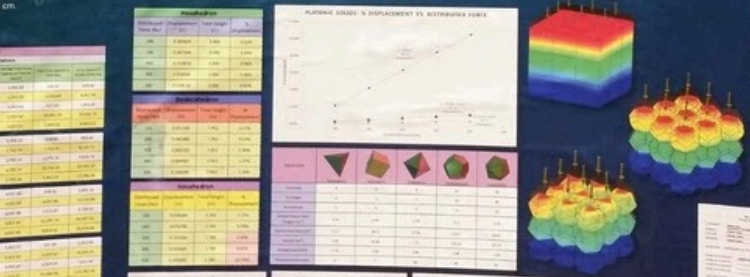
1. Sketch a regular pentagon with 2.54 cm sides.
2. Sketch another pentagon and constrain one of its sides to a side of the other pentagon by 116.57° (this is the angle at which all faces are connected)
3. Repeat step 2 until you have constrained a pentagon to all sides of the first pentagon.
4. Repeat steps 1-3
5. Take the two halves of the dodecahedron and constrain all of their sides to make a dodecahedron.
6. Create a boundary on each pentagonal face.
7. Thicken the boundary patches by 5.588 cm.
8. Combine all of the thickened boundary patches

Figure 3

How to construct an icosahedron

1. Sketch three orthogonal golden rectangles (1 in. x 1.618 in.)
2. Connect the vertices of the rectangles to create the icosahedron's wire frame. It should look like Figure 3.
3. Create a boundary patch on each triangular face.
4. Thicken each boundary patch by 5.588 cm.





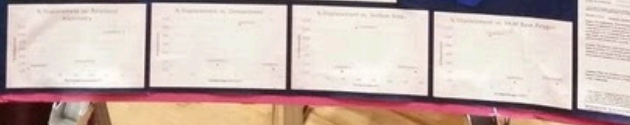
Purpose

The hexahedron, dodecahedron, and icosahedron are going to be studied for their structural integrity as measured by the percent of displaced height when a force is applied onto a cubic structure composed of 3 x 3 x 3 packed platonic solids. The independent variable that is going to be investigated is the distributed force applied on the platonic solids. The controlled variables will be the edge length, the total amount of force applied per volume ratio in each solid, and the amount of platonic solids in each cubic structure.

Hypothesis

It is believed that the packed dodecahedrons will be able to support force the most efficiently based on experimental data from previous science fair projects. When the icosahedron and dodecahedron were compared in terms of resistance to force, it was discovered that the dodecahedron was able to endure more force than the icosahedron. It was theorized that this was due to asymmetrical bases that weren't able to evenly support the force in the icosahedron, and a smaller surface area that wasn't able to spread out the consistent force. The dodecahedron with the larger surface area and more symmetry performed better. Therefore, the packed dodecahedron structure will continue to support force the most efficiently out of the three platonic solids when force is applied.

Results: Charts/Graphs/Pictures



Conclusion

In conclusion, the hexahedron had the most efficient packed platonic solid structure because it was able to support the maximum distributed force of 500 lbs with only 0.60% height displacement. It had the least percent of height displacement when the maximum force was applied. My hypothesis was invalid because the packed dodecahedron structure did not turn out to be the most efficient. It was the second most efficient packed platonic solid with a 1.34 % height displacement when the maximum force was applied. The packed icosahedrons had the least efficient structure with a 10.79% height displacement; this structure failed.

In this experiment, the total amount of force applied to volume ratio and the side length was controlled. This allowed each solid to be evenly compressed, despite their varying volumes. As the total force per solid was varied, the force was distributed evenly throughout all of the platonic solids by calculating an average total force applied per volume ratio. The corresponding forces that were applied to each solid were calculated using this ratio. The percent of displaced height was used to measure efficiency. Since this experiment was performed in a computer simulation, any height displacement above 5% was considered to be a failed structure.

Properties that identify the platonic solids like the total surface area, SA of the base polygon, compactness (SA/V), and rotational symmetry could not be controlled; each of these properties were investigated as a possible cause of efficiency. Each independent variable was graphed along with along with the results of the percent of stressed surface area of each platonic solid.

The graphs were analyzed, and it was discovered that the rotational asymmetry and the compactness contributed to the cause of efficiency. The hexahedron had no rotational asymmetry in its structure, and it was the most compact structure of all three solids. No rotational asymmetry allowed each top vertex to be directly supported by a base vertex, and it eliminated any torque that could occur when the force was applied. Also, because it was the most compact solid, it had the greatest total surface area per volume. This allowed less pressure on the structure when the force was applied because there was a greater surface area per volume that was able to support the load. The packed hexahedron structure did not experience as much pressure as the other solids due to its greater compactness.

If I were to improve this experiment, I would continue investigating and searching for the properties of platonic solids that significantly affect its efficiency using more data. I would also disassembling the platonic solids into different packing structures to investigate the chemical structural aspects of the platonic solids. In the near future, I will 3D print the small computer modeled solids and physically pack them together, so that I can perform a live experiment to prove the results in my simulation.

8

EXPERIMENTAL-BASED PROJECTS

PROBLEM/ PURPOSE

Hypothesis
-If, then, because format

Variables
-IV, DV, constants, control and experimental groups

MATERIALS

PROCEDURE

Name:
Grade:

TITLE

RESULTS
-Results paragraph

ALSO INCLUDES:

-Graphs (figures) Ex. Fig.1.1 description sentence
-Charts (tables) Ex. Table 1.1 description sentence
-Pictures, drawings, designs, etc.

CONCLUSION
-Restate hypothesis
-Hypothesis supported or unsupported and explain using data/results
-Error analysis, use error bars if applicable, explain possible sources of error and how to fix for future experiments
-suggested changes, improvements for future projects
-why important to society

IMPORTANT DOCUMENTS
-Abstract
-Safety sheet
-Endorsements

DESIGN-BASED PROJECTS

PROBLEM/NEED **MATERIALS** **Design / Redesign** **DESIGN PROCEDURE** Name: Grade:	# TITLE **DESIGN RESULTS** -Results paragraph RESULTS INCLUDE: -Graphs (figures) Ex. Fig.1.1 description sentence -Charts (tables) Ex. Table 1.1 description sentence -Pictures, drawings, designs, etc. **REDESIGN PLAN** **REDESIGN RESULTS**	**SKETCHES/PICS/ DIAGRAMS** **CONCLUSION** -Evaluation of the design and redesign process -Error analysis, use error bars if applicable, explain possible sources of error and how to fix for future experiments -suggested changes, improvements for future projects -why important to society **IMPORTANT DOCUMENTS** -Abstract -Safety sheet -Endorsements

Google Doc Checklist for Physical Arrangement of the STEM Research Paper - Design/Mathematics

CHECKLIST FOR THE PHYSICAL ARRANGEMENT OF THE STEM RESEARCH EXHIBITION BOARD

Links: Abstract, Safety Sheet Title & Endorsements

Links for Abstract, Safety Sheet, & Endorsements

Abstract

ABSTRACT (Must be the Official IJAS 2024-2026 Abstract)

Safety Sheet

SAFETY SHEET (Must be the Official IJAS 2024-2026 Safety Sheet)

Title Page

Title Page Template

Submit Endorsement(s) to the Scientific Review Committee (SRC)

We are a small team, so please be patient and give us up to two weeks to get a response on your endorsement(s) application once submitted.

Submit Completed Endorsement Form

Endorsements

Make sure that your Google Doc is shared so that anyone with the link can view.

The font *Homemade Apple* can be used for signatures.

Endorsement requests must be received by the SRC by November 21, 2025. Projects conducted under the supervision of a professor or scientist at a university, hospital or research facility must submit endorsements prior to beginning – must be received by the SCR by November 21, 2025. If the project is safe, the SRC will sign and stamp the form indicating they endorse the project. With this signature and stamp, the request form then becomes the endorsement. This endorsement must accompany the student's Research Summary at all STEM exhibitions.

Humans as Test Subjects Endorsement

Non-Human Vertebrate Animal Endorsement

Human or Vertebrate Tissue Endorsement

Microorganism Endorsement

Recombinant DNA Endorsement

SurveyMonkey Apply

SurveyMonkey Apply (SMA)

We will be using SMA for registering projects for both Regionals and City this school year. School STEM Exhibition Chairpersons will receive details on using SMA this school year for getting their students registered.

Approved Microorganisms for Science Research

Approved Microorganisms for Science Research

Students and sponsors using microorganisms in a science project must complete a Request for Microorganism Endorsement and receive approval from the Scientific Review Committee even if the microorganism used is listed below. The following organisms (bacteria and fungi) are recommended for use by students doing science projects. These organisms are not pathogenic to plants or humans. Likewise, archaebacteria, cyanobacteria, lichens and slime molds in pure culture that are available from biological supply houses to elementary and high schools do not pose a danger to plants or humans. Most protozoans and all green algae except Protothera and Pfiesteria are also safe to use and require an endorsement. They are readily available in pure culture from most biological supply houses. Most supply houses will provide culture information about the bacteria as well as their type and gram stain. Be sure to use only Biosafety Level 1 organisms. Projects involving viruses should be done in a professional research facility under the direct supervision of a professional researcher.

Biosafety Level Resources:

- Quick Learn Lesson: Recognizing the Biosafety Levels
- Center for Disease Control's Biosafety in Microbiological and Biomedical Laboratories
- For more information about the safe use of microorganisms go to the Society For Society Potentially Hazardous Biological Agents

Level 1

- *Actobacter aceti*
- *Alcaligenes faecalis*
- *Aquaspirillum intersonii*
- *Aquaspirillum serpens*
- *Aquaspirillum sinuosum*
- *Arthrobacter globiformis*
- *Aspergillus niger*
- *Azobacter chrococcum*
- *Azobacter vinelandii*
- *Bacillus brevis*
- *Bacillus coalulans*
- *Bacillus megeterium*
- *Bacillus sphacrius*
- *Bacillus stearothermorphilius*
- *Bacillus subtilis*
- *Brevibacterium linens*
- *Caulobacter vibroides*
- *Escherichia coli (Use only if Biosafety Level: 1)*
- *Flavobacterium capsulatum*
- *Lactobacillus acidophilus*
- *Lactobacillus casei*
- *Micrococcus luteus*
- *Micrococcus roseus*
- *Penicillium notatum*
- *Physarum polycephalum*
- *Rhizobium leguminosarum*
- *Rhizopus stolonifera*
- *Rhodospirillum rubrum*
- *Saccharomyces cerevisiae*
- *Saprolegnia*
- *Spirrilum volutans*
- *Flavobacterium capsulatum*
- *Streptococcus salivarius*
- *Streptomyces albus*

- *Clostridium butyricium*
- *Corynebacterium xerosis*
- *Dictyostelium discoideum*
- *Enterobacter cloacae*
- *Streptomyces griseus*
- *Streptomyces violaceus*
- *Thiobacillus thioparus*
- *Vibrio fischeri*

The student and the sponsor have the ultimate responsibility for the safety of the student while conducting experiments. All project development and experimentation should only be conducted under proper supervision and with safe methods of handling and disposal of biological cultures. It is the sole responsibility of all teachers/sponsors to teach students proper safety methods and sterile techniques when working with bacteria. Cultures taken from humans, other vertebrate animals or from sources that may indirectly harbor these bacteria (eating utensils, doorknobs, toilet seats, countertops, etc) MAY NOT be used. Students are not allowed to isolate known bacteria from wild cultures above room temperature. Cultures may not be displayed at any exhibition. All cultures should be destroyed by methods such as autoclaving or sanitizing with suitable NaClO (bleach) solution, 70% ethyl or isopropyl alcohol before disposal. Dispose of cultures and exposed materials by autoclaving at 121°C for 20 minutes. Dispose of sealed vials of freeze-dried material by dry heat sterilization at 170°C for four hours. Contact the Scientific Review Committee member listed on the microorganisms endorsement request if you are unsure about whether your organism and/or procedure falls within the rules of acceptable research.

Symposium Paper/IJAS State Essay Checklist

Symposium Paper/IJAS State Essay Checklist

Symposium Paper Checklist

- Same checklist as the STEM Exhibition
    - Experimental Project Checklist Arrangement Paper
    - Design/Math Project Checklist Arrangement Paper
- Submitted by Friday, January 9, 2026 This is a firm deadline. It will NOT be extended.

IJAS State Essay Checklist

- ☐ Completed the work as an individual student.
- ☐ Type the paper, double-spaced, on one side only.
- ☐ Typed student's name and title of essay at the upper right hand corner of each page.
- ☐ Included (in this sequence): Essay Cover Page; Table of Contents; Introduction, Body, Conclusion or Summary, and Reference List.
- ☐ Limited the paper to 1200–1500 words.
- ☐ Submitted by Friday, January 9, 2026 This is a firm deadline. It will NOT be extended.

Consent Form and Release

Consent Form and Release

Media Consent Form and Release

Please make sure that the Media Consent Form has the student name and parents signature. You are welcome to use a copy of the one that was turned into your school.

English Media Consent Form and Release

Spanish Media Consent Form and Release

Calendar of Events

Calendar of Events

Google Calendar of Events Link

Important Dates

Activity/Event	Due Date
Letter of Intent (LOI)	**Friday, October 10, 2025**
School Level STEM Exhibition (Science Fairs)	**At anytime during the Fall Semester**
Regional STEM Exhibition and Symposium Registration Only Abstracts/Safety Sheet (signed by student(s) and sponsor) Endorsements (if needed) will be required for registration. Students will bring full paper with them to their Regionals STEM Exhibition	**November 7, 2025 - December 24, 2025**
Northside/Central Schools Regional STEM Exhibition with Awards Ceremony at Von Steuben	**Saturday, January 10, 2026**
Southside/Central Schools Regional STEM Exhibition with Awards Ceremony at Carver Military Academy	**Saturday, January 17, 2026**
Essay/Paper Submissions Due Electronically (The Essay Competition is open to Grades 7-12; however, Symposium is only open for High School Grades 9-12)	**Friday, January 9, 2026**
Essay/Symposium Paper Reading (virtual)	**Saturday, January 10 - Friday, January 23, 2026**
City STEM Exhibition Finalist Registration	**Friday, January 23, 2026**
Symposium Presentations at Griffin Museum of Science and Industry	**Thursday, February 5, 2026**
In Person CPS STEM Exhibition Setup Student In Morning with Judging in Afternoon at Griffin Museum of Science and Industry	**Friday, February 6, 2026**
In Person Special Awards/ISEF Judging and the 6th Grade Luncheon at Griffin Museum of Science and Industry	**Saturday, February 7, 2026**
In Person Awards Ceremony Griffin Museum of Science and Industry	**Sunday, February 8, 2026**
In Person Illinois Junior Academy of Science (IJAS) State	**Friday, April 24 - Saturday, April 25, 2026**

Exposition at University of Southern Illinois Carbondale, Carbondale IL	
In Person International Science and Engineering Fair (ISEF) in Phoenix, Arizona (High School Only) We are USIL01.	**Sunday, May 10 - Friday, May 15, 2026**

CPS Regular School Calendar

CPS Regular School Calendar

English

Spanish

CPS District Calendar Website