MSEF

Massachusetts Science + Engineering Fair

High School Manual

2026-2027

QUICK HIGHLIGHTS

GETTING STARTED?

Check out page 4 for information on the Science & Engineering Fair program.

Find additional resources at www.scifair.com

DATES and LOCATIONS

Find Regional Fair dates and locations at www.scifair.com/fairs

The High School State Fair is April 8, 2027 in Worcester.

MAHS.zfairs.com

Students must submit their project to MAHS.zfairs for review. Follow instructions at MAHS.zfairs.com for account creation and paperwork upload.

FORMS

MSEF uses the same forms as ISEF, with the exception of a modified Form 1B. Download at MAHS.zFairs.com or societyforscience.org/isef/forms
Modified 1B found at MAHS.zfairs.com.

CHANGES for 2026-27

Find changes from Society for Science to the International Rules for Pre-Collegiate Research here, Appendix H, and embedded in line below. **New** ISEF Form for Student Disclosures: 2A

AI POLICY & GUIDANCE

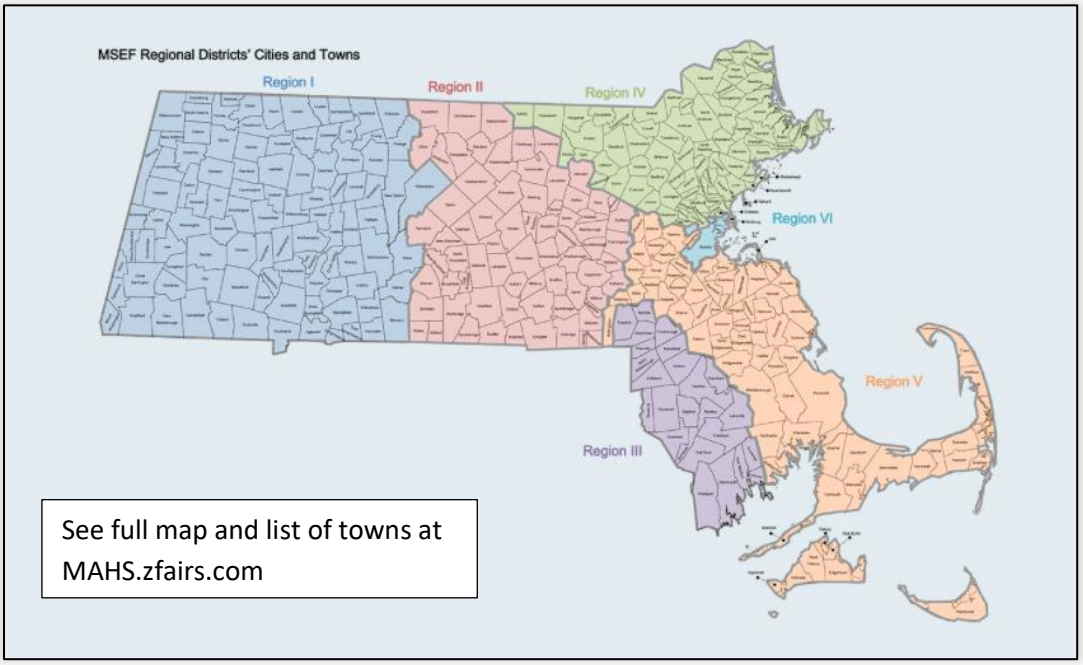
See updated guidance on the use of Artificial Intelligence. Please note students using Generative AI must track their use in their project notebook and Form 2A.
See page 7.

DEADLINES

Projects in restricted areas (Forms 3, 4, 5, or 6) must be approved before experimentation. Submit **no later than December 15th**.
All other projects must submit by **January 15th**.
See page 17.

CONTACT US

MSEF and the Regional Fair committees are here to help. Reach out if you need support with systems, rules, or deadlines.
info@scifair.com



See full map and list of towns at MAHS.zfairs.com

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INTRODUCTION: The Experience

Why Science & Engineering Fairs?

The Massachusetts Science & Engineering Fair (MSEF) gives high school students throughout Massachusetts a unique opportunity to compete for college scholarships, awards, honors programs, and other exciting prizes. But Science Fair is much more than an event. Each year, young scientists and engineers from public, private and parochial high schools (grades 9-12) pursue specialized fields of science by working on individualized research projects, either as part of their core curriculum or through independent study.

These projects broaden scientific and engineering awareness and allow students to delve deeply into areas of special interest giving them a chance to explore, to gather information, to think critically, to arrive at conclusions, and to present ideas in a competitive forum. Curiosity and interest stimulate respect for evidence and develop a sense of stewardship. The science and engineering process demands an open mind and the use of analysis to process information. The student learns that success in investigation and research requires persistence and that such persistence can be both fun and rewarding.

The Science & Engineering Process

The most critical aspect of a project is the way the student explores and manages the project. Projects can be based of a simple idea, but should be done carefully, thoroughly, and build student understanding. Even projects that 'don't work' can do well at the Fairs. Visit the scifair.com for resources and opportunities to support project work.

PHASES of WORK	Students work on:
PHASE 1 - OBSERVE: Choosing a Project The first phase of this process celebrates curiosity. Students should take ownership of their work and develop an idea of a QUESTION TO ANSWER or a PROBLEM TO SOLVE. We recommend starting early in the school year to begin brainstorming ideas and working on background research so students are ready to go when it is time to narrow down ideas and create a research plan. The objective is to begin shaping a testable idea or actionable plan that reflects the student's own interests and motivations. The strongest projects often grow from topics that students find personally relevant or exciting. Judges will later evaluate the strength of the project based on the student's process, depth of thinking, and understanding of the topic and related concepts. To help brainstorm and refine ideas, students are encouraged to use MSEF's *Building Curiosity* sheet.	☐ Project Notebook starts now ☐ Generate possible ideas ☐ Background research ☐ Preview Rules and Guidelines ☐ Identify project category ☐ Draft research questions or problem statements ☐ Review judging rubric to inform scope of work ☐ Create a check-in plan with teacher
PHASE 2 - PLAN: Research and Design The next key step is to decide how to answer the question or solve the problem. Writing a project plan will help flesh out the details. Students need to make sure their idea is something that can be measured and observed, and that is feasible in the timeframe, materials, and skills they have. This involves understanding of the rules of what's allowed (found in this manual) as well as an understanding of risks and safety that will need to be incorporated into their plan. Students may need to modify their plan to meet approval requirements. See the RULES section of this manual for more guidance.	☐ Setup research plan template ☐ Review rules carefully ☐ Determine project feasibility ☐ Create detailed materials list ☐ Write procedure ☐ Assess risks ☐ Gather Permissions ☐ Submit for approval
Students must submit plans for approval to their teacher and/or the Statewide SRC before starting experimentation. See rules and deadlines. Visit https://MAHS.zfairs.com.	
PHASE 3 - EXPLORE: Experimentation and Investigation Students will need to experiment and investigate according to the plan approved in the previous step. This may involve creating their prototype, testing and revising, and conducting multiple trials. Data collection and recording observations is critical in this step. In this phase, it is important for students to know how to ask for help and learn from the unexpected. Students should explore MSEF's Data Analysis Guide.	☐ Purchase and gather supplies ☐ Setup project & begin ☐ Record dated notes in project notebook ☐ Adjust plan as needed, submit for reapproval if required ☐ Review preliminary findings
PHASE 4 – EXPLAIN: Communication and Presentation Students must analyze, interpret, and represent their work to tell the story of their project in a few different ways. Students will need to create graphs & tables, written reports, as well as poster presentations. They should be prepared to present their work with an oral presentation and respond to questions from judges and volunteers in a thoughtful, confident way. See the student-facing Checklist for Judging.	☐ Conduct further analysis ☐ Draft project paper, display board, and oral presentation ☐ Refine and practice ☐ Prep for the Fair events

MSEF Ethics Statement

Massachusetts Science & Engineering Fair, Inc. has adopted an ethics statement that each student is required to adhere to and will be asked to sign as a part of the research plan and application process. Before experimentation begins, each student is required to complete a Research Plan and permissions, which includes signing the Ethics Statement that the student will "adhere to all MSEF/ISEF rules when conducting research."

The Statement

Student researchers, and any adults who have a role in their projects, are expected to maintain the highest ethical standards. This includes, but is not limited to, academic and scientific integrity, legality and compliance, and respect for confidentiality and intellectual property. The hallmark of science & engineering projects is that students "own the question" as well as manage the process from start to finish. It is through this work that students learn and grow.

Integrity

Students are expected to display honesty, transparency, and avoid conflicts of interest in their work.

- Students may compete in only one MSEF Regional Fair and/or the Massachusetts State Fair in a given school year. They cannot participate in more than one state or region.
- They cannot submit more than one project for participation.
- They can only present the most recent year's research for judging at the Fair.
- They must only present the work that was approved by the Statewide SRC.
- Students must present their project in their own words with proper citations.

Presenting fraudulent data, evidence of plagiarism, inappropriate use of AI, or acts of misrepresentation associated with project work exhibited at the Massachusetts Science & Engineering Fair may lead to disqualification.

When participating in Massachusetts Science & Engineering Fair, the student MUST:

- Honestly complete all the necessary paperwork and permission forms, before, during and after experimentation.
- Document their work in a dated notebook - recording the development of the project including all references, procedures, original data, and other relevant material.
- Include a bibliography as part of their background research.
- Cite the author of any original statement that is not their own, including use of AI
- Follow guidance for use of Artificial Intelligence and document approved use in Project Notebooks and bibliographies
- Give credit to anyone assisting the student. If another person(s) performed any part(s) of the experiment, data collection, etc., credit must be given in the student's journal/log, display, and report.
- Comply with all rules and policies laid out by MSEF, ISEF, school, municipal, and state laws.

Artificial Intelligence (AI): Participation in independent research builds students' independence and critical-thinking skills, and the considerations in this statement are intended to reinforce these growth areas. When used appropriately, AI can support student learning, boost creativity, and improve accessibility to STEM concepts. However, AI also has the capacity to do the cognitive work of thinking for people, which may stifle development. It is also subject to hallucinations, bias, and misinformation.

THEREFORE: AI may be used as a research tool but must be cited and given proper acknowledgment. A student is expected to do independent work, and all materials presented must be in the researcher's own words. A student may not use generative AI to write the research plan, report or abstract, poster or to create citations (it is known to hallucinate and falsify references).

See full policy below.

Adults and Mentors:

When students work with a mentor either at school, in a lab, or wherever project work takes place, ***adults working with students should bear in mind that it is the student's project.*** The mentor's job is to help students acquire background information, teach the techniques required to test the purpose or hypothesis, and to supervise the safety of young scientists.

The mentor should not suggest or assign a specific topic to the student (the idea must come from the student), take data for the student (unless the student is willing to give credit to the data taker and does not claim the data as their own), or analyze the data for the student.

It is assumed that work discussed at science and engineering fairs is the work of the student. When this is not the case, the student must make this clear in their oral and written project presentations.

Photographs and Visuals - Any photographs included in the student's paper or on their presentation board are assumed to have been taken by the student. Any photographs NOT taken by the student MUST be clearly labeled giving credit to the photographer. This includes any visuals taken from magazines, newspapers, journals, the internet, or texts where appropriate permission must be solicited and included. **The use of photographs of persons requires a photo release signed by the subject, and if under 18 years of age, also by the guardian of the subject.** Sample consent text: *"I consent to the use of visual images, (photos, videos, etc.) involving my participation/my child's participation in the research."*

Scientific/engineering fraud and misconduct are not condoned at any level of research or competition. This includes plagiarism, forgery, the use or presentation of other researchers' work as one's own, and fabrication of data. Fraudulent projects will fail to qualify, and MSEF reserves the right to revoke recognition of a project subsequently found to have been fraudulent.

Students MUST NOT:

- In any way falsify a permission form or scientific paper.
- Use another person's results or thoughts as their own even with the permission of this person. This includes work done by a family member or a mentor.
- Use information or data obtained from the internet without proper citation.

Statement on Scientific Integrity

The Ethics statement will be reviewed by students, teachers, parents, mentors, and supervisors so that they are individually and collectively aware of and monitoring for scientific integrity. If an issue of concern arises related to scientific integrity at an MSEF State or Regional Fair or other grievance, the following process should be followed.

Email info@scifair.com
Subject: Grievance/ Accusation of wrong-doing

Body of email:

- Include your First and Last Name
- Your affiliation: school or company
- Your contact information (phone and email)
- The Fair at which the concern is placed/originated
- Indicate whether you are a: Student Participant, Parent, Teacher, Advisor/Mentor, or Concerned Citizen.
- Please provide a brief description of the issue. Be sure to include your concern, any actions taken, responses received (or not), etc.
- Please indicate any other people you have spoken with about your concern.

Please note:

- Grievances should be shared within 21 days of the relevant Fair.
- MSEF will keep the identity of the reporting individual anonymous in any resulting communication.
- MSEF is not obligated to share any subsequent details about the resolution with the individual/institution that issues the grievance.
- If action is warranted, MSEF will coordinate with the relevant fair, teacher, and student for corrective action.
- If anonymous information is received, MSEF is not under any obligation to take action.

ADDITIONAL POLICIES can be found at www.scifair.com/fairs including:
Harrassment Policy
Policy for Reasonable Accomodation of Qualified Students with Disabilities
Student Eligibility Policy

For additional information from the Society for Science, you can review the statement of Scientific Integrity for each national and international competition they host.

Students should also follow the ethics and integrity expectations of their sponsoring school.

Artificial Intelligence (AI) Use Policy

For the complete MSEF Artificial Intelligence Guidelines with rationales and examples, continue reading here.

Students are permitted to use artificial intelligence tools to assist in their research or as a standalone project topic, so long as they adhere to school or district policies. When used appropriately, AI tools can support student learning and increase access to STEM concepts. Inappropriate use of AI prevents the growth, critical thinking, and independence that Science Fair is meant to build. *This policy defines what is and is not allowed. For full explanations, examples, and citation formats, see the **2026 MSEF Artificial Intelligence Guidelines**.*

1. Permitted Uses (Disclosure Required)

Students may use AI tools for the following, provided every use is disclosed and verified as described in Section 3:

- **Brainstorming and safety planning.** Identifying real-world problems, assessing feasibility, or drafting safety checklists (e.g., asking an LLM what safety gear is needed), verified with a teacher or trusted source.
- **Clarification.** Asking AI to explain complex topics or academic publications at an appropriate reading level.
- **Programming assistance.** Fixing or debugging code the student wrote (e.g., GitHub Copilot), provided the student tests and understands the fix themselves.
- **Accessibility.** Generating alt-text, captions, or meeting notes; translating content into a student's home language.
- **Language polishing.** Correcting grammar, spelling, and syntax in the student's own writing (e.g., Grammarly).
- **Visualizing the student's own data.** Dedicated tools such as Microsoft Excel or Google Sheets may be used to create charts or graphs from student-collected data. Tools not designed for this purpose may introduce hallucinations in their data sets.
- **Summarizing student-provided documents.** Summarizing a paper the student uploads (e.g., NotebookLM with search off), always checked against the original source.

2. Prohibited Uses

The following uses are *not* allowed:

- **Question, hypothesis, or procedure generation.** Using AI to produce the research question, hypothesis, or step-by-step procedure. These must be the student's original work.
- **Ghostwriting.** Using AI to write the methodology, data analysis, conclusions, abstract, report sections, or presentation content.
- **Generating research or data.** Using AI to generate background research, sources, or data to support a hypothesis. AI citation tools are also known to hallucinate and falsify references. Students should not rely on AI summaries in search engines, but they may be used to find primary sources.
- **Unverified AI summaries as sources.** Relying on search-engine AI summaries or LLM responses as research sources. These may be used only to locate primary sources, which must be read and cited directly.
- **Data privacy violations.** Entering personal details (names, addresses), confidential mentor notes, or proprietary information into public AI platforms. Using ID numbers, not identifying information, would be appropriate for human subjects' data.
- **Generating Images:** Unless AI image generation is the project focus, the use of AI tools to generate images, art, or diagrams for their poster boards or reports is discouraged, as these are valuable skills for students to learn themselves.

3. Disclosure, Citation, and Verification

Every AI-generated output (text, code, or images) must be disclosed in the Project Notebook and final report. Each disclosure must include: (a) the tool and model used; (b) the date; (c) the task performed; (d) the exact text of the prompt; and (e) how the output was verified (e.g., cross-checked with a textbook, tested manually, confirmed with a teacher). Students must treat all AI output as potentially false and independently verify citations, statistics, and explanations against primary sources. Citation formats for AI-generated content are provided in the full Guidelines.

If you are quoting or relying on specific, generated text and the AI tool provides a shareable URL, use this format:

Reference Entry:
Author Company. (Year, Month Day). Title of chat [Description, e.g. Generative AI chat]. Tool Name. URL
Example: OpenAI (2025, September 21), High school grammar concepts [Generative AI chat]. ChatGPT. Chatgpt.com

In-Text Citation:
(Author Company, Year)
Example: (OpenAI, 2025)

4. Data Integrity
All experimental results must come from the student's own hands-on work or from credible, properly cited external datasets. Raw data (notes, spreadsheets, photos) must be saved and available for SRC reviewers and judges upon request. AI may assist in analyzing or visualizing this data but may never generate it.

5. AI as a Project Topic
Projects that create, train, test, or study AI models are permitted. This includes machine learning classifiers, neural networks, and agents. These projects must include a detailed Methodology section in Project Notebooks describing each model used and its training data, all prompts, an explanation of how project data was collected and checked, any known limitations, and any ethical concerns (e.g., privacy, data ownership). See the full Guidelines for details.

6. Transparency, Compliance, and Consequences
MSEF seeks to establish a culture of transparency around AI use where honest, open disclosure of AI use is expected and rewarded. Rather than existing to "trap" inappropriate use, this framework represents an opportunity for students to learn how to use this novel technology responsibly.

That said, work that does not adhere to this policy may be penalized for reduced scientific rigor or independent work. Work that intentionally subverts this policy may be disqualified on the grounds of plagiarism or ethical violations.
Students must also follow their school and district AI policies and work in collaboration with their teachers. This policy applies to all MSEF participants and affiliated Regional Fairs.

Questions? Contact SRC@scifair.com. For full rationale, worked examples by project stage (Plan / Explore / Explain), AI limitations (bias and hallucinations), environmental considerations, and citation formats, refer to the 2026 MSEF Artificial Intelligence Guidelines, along with official Massachusetts DESE and ISEF guidance.

Roles and Responsibilities of Students and Adults

- The Student Researcher(s)
- The Teacher
- Adult Sponsor
- The Qualified Scientist - *if applicable*
- The Direct Supervisor - *if applicable*
- Review Committees
  - The Scientific Review Committee (SRC)
  - The ISEF Scientific Review Committee - *if applicable*
  - The Institutional Review Board (IRB) - *if applicable*
  - Regulated Research Institutions/Industrial Settings Review Committees (RRI) - *if applicable*

STUDENT INDEPENDENCE is a critical part of the Science Fair process – both in individual & team projects.

While parents, mentors, and other adults can offer support and guidance, all communication and project work is expected to come from the student and coordinated with the teacher.

The Student Researcher(s)

The student researcher is responsible for all aspects of the research project:

- Enlisting the aid of any required supervisory adults (Teacher, Adult Sponsor, Qualified Scientist, etc.), obtaining necessary approvals (SRC, IRB, etc.)
- Following the International and Massachusetts Rules & Guidelines and obtaining all necessary approvals (SRC, IRB, etc.) and completing all appropriate documentation
- Performing the project (which may include, but is not limited to) experimentation, data collection, engineering, data analysis, and any other process or procedures related to the project
- Understanding and abiding by the Ethics Statement and attesting to this understanding on Approval Form

Teacher - The Teacher and the Adult Sponsor are often the same person. If not, the following bullets outline the role of the each.

Students must select a school and teacher to support their participation. In many cases, the teacher is also the Adult Sponsor on the program (**see below**). Communication through zFairs and from the SRC goes to the Teacher. The Teacher is also responsible for the project's academic integrity by reviewing the project plan and ensuring the student is following both MSEF and the school's ethics standards.

The teacher is responsible for:

- Reviewing MSEF and school ethics statements and reviewing applicable rules.
- Providing signed 'permission' on the paperwork packet as the teacher.
- Creating an account in zFairs and marking the student's completed paperwork 'ready for review' in zFairs
- Monitoring any communication with the SRC for project approval follow-up as needed.
- Communicating with MSEF and Regional Fairs about students' participation in the Fair(s).

If students do not have support of a school:

- Homeschool students can participate with a **licensed** homeschool parent as 'teacher.'
- Select STEM non-profit or municipal organization, like a library or nature center, may apply to sponsor student projects. Applications must be submitted between August and December of the year preceding the Fair . Email info@scifair.com to learn more.
- Students should contact MSEF for more details at info@scifair.com BEFORE starting projects.

The Adult Sponsor- In most cases, the adult sponsor is also the **teacher**.

Qualifications:

- An Adult Sponsor may be a teacher, parent, professor, and/or other professional scientist
- Should be knowledgeable in the area of student research, be familiar with the regulations around procedures and materials that apply to the student project, particularly when involving human participants, vertebrate animals, potentially hazardous biological agents or hazardous chemicals, devices, or activities.
- Should have close contact with the student throughout the project's timeline.

Responsibilities:

The Adult Sponsor is responsible for:

- Working with the student to evaluate any possible risks involved to ensure the health and safety of the student conducting the research and the humans and/or animals involved in the study.
- Reviewing the student's Student Checklist (1A) and Research Plan/Project Summary to ensure that:
  - experimentation follows local, state, and Federal laws and MSEF/ISEF rules
  - forms are completed by other required adults
  - any required Qualified Scientist meets the criteria in the MSEF/ISEF Rules and Guidelines
  - the student's research is eligible for entry in MSEF/ISEF

The Qualified Scientist

Qualifications:

- Earned a doctoral/professional degree in a scientific discipline related to student's area of research AND/OR Individual with extensive experience and expertise in the student's area of research
- Must be thoroughly familiar with the regulations that govern the student's area of research including all local, state, Federal regulations, and laws.
- Can also serve as the Adult Sponsor if that person meets both sets of qualifications
- A teacher may be eligible to serve as the Qualified Scientist
- May live elsewhere and not be local to the student, in which case, a Direct Supervisor has been appointed and trained to serve as the onsite supervisor for the specific student project.

Responsibilities:

The Qualified Scientist is responsible for:

- Reviewing the MSEF/ISEF rules relevant to the project and approving the student's research plan or engineering design prior to the start of experimentation
    - Completing the required documentation which may include the Regulated Research Institutional Setting Form (2C), the Qualified Scientist Form (2), or the Risk Assessment Form (3), when applicable.
- Providing direct supervision throughout the timeline of the project or coordinating with a Direct supervisor to serve in this capacity
- Ensuring the proper training of the Student Researcher and/or Direct supervisor in the necessary procedures
- If located outside of Massachusetts, review any differences in rules and regulations for Massachusetts students.

The Direct supervisor

Qualifications:

- Does not need an advanced degree
- Must be familiar with the student's project and agree to any training necessary
- May also serve as the Adult Sponsor for the project
- If the project involves the use of Vertebrate Animals (where behavior/habitat is influenced by humans), must be knowledgeable about the humane care and handling of the animals

Responsibilities:

The Direct supervisor is responsible for:

- Providing direct supervision of the student experimentation
- Completing the required documentation — the Direct supervisor box on the Qualified Scientist Form (2) when applicable
- Reviewing and completing the Risk Assessment Form (3) when needed

Review Committees

To avoid conflict of interest, no Adult Sponsor, parent or other relative of the student(s), the Qualified Scientist, or the Direct supervisor who oversees the project may serve on the SRC reviewing that project.

Both the MSEF SRC and ISEF SRC are made up of adults knowledgeable about research regulations. In addition to the review of all projects, committee members answer questions about rules throughout the year from students and teachers.

- The MSEF SRC can be contacted at SRC@scifair.com
- The ISEF SRC can be contacted at SRC@societyforscience.org

The Scientific Review **Committee (SRC)**

A Scientific Review Committee (SRC) is a group of qualified individuals that is responsible for evaluation of student research, certifications, research plans and exhibits for compliance with the rules, applicable laws, and regulations at each level of science fair competition. MSEF manages as Statewide SRC for all projects in Massachusetts regardless of region. The Statewide SRC is a volunteer group of professional scientists and engineers as well as STEM educators.

ALL proposed research projects involving any of the **Restricted Areas of Research** (work with human subjects, with vertebrate animals, with potentially hazardous biological agents, or with any hazardous chemicals/activities/devices) must be reviewed and approved BEFORE experimentation begins.

ALL projects, including those previously reviewed and approved by an SRC/IRB, must be reviewed, and approved by the SRC after experimentation and before competition in a Fair.

A Scientific Review Committee (SRC) examines projects for the following:

- Evidence of proper supervision
- Completed forms, signatures, research dates, and preapproval dates (when required)
- Evidence of proper team composition
- Compliance with rules and laws governing human and/or animal research and research involving potentially hazardous
- Compliance with ISEF ethics statement
- Use of accepted and appropriate research techniques
- Evidence that risks have been properly assessed
- Evidence of search for alternatives to animal use
- Humane treatment of animals
- Documentation of substantial expansion for continuation projects
- Evidence of appropriate literature search and attribution

Students:
Make sure your research plan covers these elements, as appropriate, to streamline the review process!

The ISEF Scientific Review Committee (Regeneron ISEF SRC)

For students selected to represent Massachusetts at ISEF, all projects are reviewed by ISEF Scientific Review Committee prior to competition at Regeneron ISEF. The ISEF SRC is the final arbiter of the qualification of students to participate in ISEF. Before the fair, committee members review research plans and all required forms to confirm that applicable ISEF rules have been followed. ISEF SRC may request additional information from students prior to ISEF or may interview potential ISEF participants at the fair to ensure that they qualify to compete.

Note: Students selected for participation will need to work with MSEF for a quick response to submit forms by the ISEF deadlines.

The Institutional Review Board (IRB) – this review occurs at the SCHOOL LEVEL

An Institutional Review Board (IRB) is a committee that, according to federal regulations (45-CFR-46), must evaluate the potential physical and/or psychological risk of research involving humans. All proposed human research must be reviewed and approved by an IRB before experimentation begins. **This includes review of any surveys or questionnaires to be used in a project.**

Federal regulations require local community involvement. Therefore, it is advisable that an IRB be established at the school level to evaluate human research projects. If necessary, the local or ISEF-affiliated SRC can serve as an IRB if it has the required membership. An IRB must consist of a minimum of **three** members including the following:

- An educator
- A school administrator (preferably principal or vice principal)
- A medical or mental health professional. The medical or mental health professional may be a medical doctor, nurse practitioner, physician's assistant, doctor of pharmacy, registered nurse, psychologist, licensed social worker or licensed clinical professional counselor. The medical or mental health professional on the IRB may change depending on the nature of the study. This person must be knowledgeable about and capable of evaluating the physical and/or psychological risk involved in a given study.

For most projects, an IRB is an informal collection of three individuals who can review projects at the localized setting (the school). It does not need to be an existing committee.

The composition of this group may change for individual projects based on needed expertise. Students and teachers should work together to collect the signatures from the appropriate individuals.

Additional Expertise: If an expert is not available in the immediate area, documented contact with an external expert is recommended. A copy of all correspondence with the expert (e.g., emails) must be attached to Human Participant Form 4 and can be used in lieu of the signature of that expert.

IRBs exist at federally Regulated Research Institutions (e.g., universities, medical centers, NIH, correctional facilities). Prisoner advocates must be included on the IRB when research participants are incarcerated. The institutional IRB must initially review and approve all proposed research conducted at or sponsored by that institution. The Adult Sponsor and the local IRB are responsible for ensuring that the project is appropriate for a pre-college student and adheres to ISEF rules.

Overriding IRB Approval: An IRB is responsible for assessing risk and documenting the determination of risk level on Human Participant Form 4. However, in reviewing projects just prior to a fair, if the SRC serving at that level of competition assesses an IRB's decision as inappropriate, thereby placing human participants in jeopardy, they may override the IRB's decision and the project may fail to qualify for competition. It is advised that IRBs consult with the local or affiliated fair SRCs and/or with ISEF SRC in questionable cases.

Regulated Research Institutions/Industrial Settings Review Committees

A **Regulated Research Institution** (RRI) within the U.S. is defined as a professional research/teaching institution that is regularly inspected by the USDA and is licensed to use animals covered by the Animal Welfare Act and may also be subject to U.S. Public Health Service Policy. Also included are all federal laboratories such as National Institutes of Health, Veteran's Affairs Medical Centers, and the Centers for Disease Control. In addition, pharmaceutical and biotechnology companies and research institutions that utilize research animals that are not covered by the Animal Welfare Act but have an operational Institutional Animal Care and Use Committee and are following U.S. federal laws are included in this definition.

For projects conducted outside of the United States, a Regulated Research Institution would be a comparable research institution that adheres to country laws governing the care and use of vertebrate animals.

It is critical that students working in **institutions outside the United States** communicate with BOTH their foreign research mentors and a **teacher** or mentor in the United States to ensure that the students are complying with both local safety regulations in the country they are working in and follow the Massachusetts regulations. Safety protocols should refer to US guidelines for researchers (ie. the designations for biological safety levels) so that the US based reviewers can understand if proper safety procedures are in place before the work commences.

Regulations for minors working in a lab are often stricter than those for an undergraduate or graduate student in the same lab. Mentors not aware of the additional restrictions on minors may unknowingly authorize work not eligible for competition in MSEF.

Certain areas of research conducted in a regulated research institution or an industrial setting require review and approval by federally mandated committees that have been established at that institution. These committees include:

1. Institutional Animal Care and Use Committee (IACUC); Animal Care and Use Committee (ACUC); Animal Ethics Committee
2. Institutional Review Board (IRB); Human Subjects Participant Program (HSPP)
3. Institutional Biosafety Committee (IBC)
4. Embryonic Stem Cell Research Oversight Committee (ESCRO)
5. Safety Review Committee

Independent or private laboratories, such as those established to support student researchers, do not meet the requirements of oversight or committee infrastructure to be considered Regulated Research Institutions (RRI). Therefore, such laboratories should be considered the same as high school laboratories as it pertains to the International Rules and the types of projects able to be conducted in this setting. For purposes of documentation, such facilities may complete the Regulated Research Institution/ Industrial Setting Form 2C to address the adult supervision and conditions of research.

Statement from Society for Science on the Disclosure of Mentors & Paid Support
There is no rule that prohibits a student from working closely with a mentor – whether a family relative, friend or colleague or an individual sought for their expertise in the field of study. A student may participate in a paid or unpaid research program (with compensation to the mentor or not) and receive private lessons, tutoring or mentoring support.
What is important is full disclosure of the relationship, the nature of the mentorship and full acknowledgement of the support received in conducting the research. A student researcher must attest that they have done an independent project and what they are presenting is their own work. The documentation of their project – the research plan and the abstract – must present clearly what they have done and what support they received.
New in 2027, all students must now complete the Student Support Disclosure Form 2A. This form provides an opportunity to list all of the adults who supported the project as well as indicating any programs or paid mentorship that was provided and how artificial intelligence was used in the project.

See full statement and advice on seeking legitimate research programs on page 6 and 7 of the Companion Guide to International Rules 2026-2027, societyorscience.org/ISEF.

Official Rules and Requirements

Index

General

1. All students competing in MSEF, or its affiliated Regional Fairs, must adhere to all rules as set forth in this document.
2. All projects must adhere to the **Ethics Statement**. https://scifair.com/msef-ethics-statement/ or Page 4 of this Manual.
3. It is the responsibility of the student and the Adult Sponsor to evaluate the study to determine if the research will require additional forms and review and approval prior to experimentation (known as 'pre-approval').
4. Projects must adhere to local, state and U.S. Federal laws, regulations and permitting conditions. In addition, projects conducted outside the U.S. must **also** adhere to the laws of the country and jurisdiction in which the project was performed.
5. The use of non-animal research methods and alternatives to animal research are strongly encouraged and must be explored before conducting a vertebrate animal project.
6. Introduction or disposal of non-native, genetically altered, and/or invasive species (e.g., insects, plants, invertebrates, vertebrates), pathogens, toxic chemicals or foreign substances into the environment is prohibited. Students should reference their local, state, or national regulations and quarantine lists.
7. A project may include no more than 12 months of continuous research and may not include research performed before January of the year before the fair. (e.g., projects in the 2050 Fair cannot begin before January 2049)
8. Projects that are demonstrations, library research or informational projects, explanation models or kit building are not appropriate for competition in MSEF.
9. Artificial Intelligence (AI) may be used as a project resource but must be cited and given proper acknowledgment. A student is expected to do independent work and all materials presented must be in the researcher's own words. A student may not use generative AI to write the research plan, abstract, poster or to create citations (it is known to hallucinate and falsify references).
10. All sciences and engineering disciplines are represented at MSEF and projects compete in one of the 14 categories. Review the list and definitions here and in Appendix E. Students can not change categories between regional and state fairs.
11. A research project may be a part of a larger study performed by professional scientists, but the project presented by the student must be only their own portion of the complete study. These details must be explained thoroughly on form 2C and in the research plan and other forms as appropriate. Students should be clear to the review committee and judges what their own independent work entailed.

Approval and Documentation

1. Student researchers must have a Research Plan that includes:
   a) Rationale
   b) Research Question/Hypothesis(es), Engineering Goal(s), Expected Outcomes
   c) List of Materials
   d) Procedures
   e) Risk and Safety
   f) Data Analysis
   g) Bibliography

The Research Plan (aka 'Project Plan') is a critical tool both in securing approval for the project, and in preparing for a well thought-out project. Clear and thorough plans also streamline approval.

Follow the guidance, tools and suggestions at www.scifair.com.

2. This research plan should be completed before experimentation and will inform the forms required for your research.

3. Every student must complete the Student Checklist (1A), a Research Plan/Project Summary and Approval Form (1B) and review the project with the Adult Sponsor in coordination with completion by the Adult Sponsor of the Checklist for Adult Sponsor (1). **See Paperwork Package Instructions – MSEF uses a modified Form 1B for permissions.**

   NEW FOR 2026/2027: The **Student Support Disclosure** form that includes disclosures about adult support and use of generative AI. Students can submit this form proactively for the Regional or State Fair, or submit on request of the Statewide SRC. Students competing at ISEF will be required to submit this form.

4. If a mentor was involved in the project, the research plan should delineate what parts of the project were done by the student and which parts of the project were done by the mentor.

5. RESTRICTED AREA PROJECTS: Projects involving human participants, vertebrate animals, potentially hazardous biological agents and/or tissue must be reviewed and approved by a local review boards and/or Statewide Scientific Review Committee (SRC) prior to the start of experimentation. Review this manual for exemptions to pre-approval. *(Note: If a project involves the testing of a student designed invention, prototype or concept by a human then an IRB review and approval may be required prior to experimentation. See Human Participants Rules for details.)*

6. A **Qualified Scientist** (Form 2B) is required for ALL studies involving **Restricted Areas of Research** (work with human subjects, with vertebrate animals, with potentially hazardous biological agents (BSL-2), or with DEA-controlled substances) or upon request from the Statewide SRC.

7. If students attending **summer institutes** or **summer science training programs** plan to submit their summer project work to a Science & Engineering Fair, they must have the Qualified Scientist and the Scientific Review Committee (SRC) approve the research plan BEFORE the research begins.

While projects in restricted areas require approval before experimentation for safety reasons, it also allows students time to make adjustments and strengthen their plan.

Questions from the SRC will help students refine their work and avoid disqualification.

8. After initial IRB/SRC approval (if required), any proposed changes in the Student Checklist (1A) and/or the Research Plan/Project Summary must be **re-approved** before laboratory experimentation/data collection resumes. Contact src@scifair.com to submit an addendum and revised paperwork. Please note: any changes should align with original scope of work and/or research question.

9. After competing in a Regional Fair, projects may not be changed or amended. The approved research plan must include any and all phases of the project to be conducted. Additional data may be collected using the same methodology that was previously approved for the affiliated fair.

10. Projects which are continuations of a previous year's work **and** which also require IRB/SRC approval must undergo the review process with the current year Research Plan/Project Summary prior to experimentation/data collection for the current year. Any continuing project must document that the additional research is new and different by completing a Continuation/Research Progression Projects Form (7). *This form must be displayed with the project during competition.* A continuation project includes any work done on the same topics or with the same tools. See page 14

11. If work was conducted or mentored either virtually or on site at a regulated research institution, industrial setting, or any work site other than home, school or field at any time during the current ISEF project year, the Regulated Research Institutional/Industrial Setting Form (2C) must be completed and displayed at the project booth.
    Note: If working in a lab, the expectation is that your project is your own work and your own design. The lab may sponsor your project as an independent study separate from any lab- tech assignment, but a lab-tech assignment does not qualify as a science fair project.

12. After experimentation, each student or team must submit a (maximum) 250-word **abstract** which summarizes the current year's work. The abstract must describe research conducted by the student, not by the supervising adult(s).

13. A project **notebook** is required and is part of the judging process and scoring at regional and state fairs. Project notebooks should demonstrate evidence of your project development including data collection and research. Each student should keep their own project notebook. These can be digital or hand-written, although handwritten is preferred.
    Note: Students must maintain a log of any use of Generative AI including prompts and checks for accuracy. See full AI Policy.

14. All signed forms, certifications, and permits must be available for review by all regional, state, national and international affiliated fair SRCs in which the student(s) participate. This final review must occur **after experimentation** and **before competition**.

Continuation/ Research Progression of Projects

1. As in the professional world, research projects may build on work performed previously. A valid continuation project is a sound scientific endeavor. Students will be judged only on laboratory experiment/data collection performed over 12 continuous months beginning no earlier than January of the previous year and ending in May of the current year.

2. Any project based on the student's prior research could be considered a continuation/research progression project. These projects must document that the additional research is a substantive expansion from prior work (e.g., testing a new variable or new line of investigation). Repetition of previous experimentation with the same methodology and research question, even with an increased sample size, is an example of an unacceptable continuation.

3. The display board and abstract must reflect the current year's work only. The project title displayed in the finalist's booth may mention years (for example, "Year Two of an Ongoing Study"). Previous year's data books, research papers and supporting documents may be at the project display if properly labeled as such.

Form 7 is required for projects that includes research, topic, or methodology from an earlier project.

The purpose of this form is to illustrate that the current project is different from previous work to avoid any concern of an ethics violation. Form 7 is not punitive.

4. Longitudinal studies are permitted as an acceptable continuation under the following conditions:
    a. The study is a multi-year study testing or documenting the same variables in which time is a critical variable. (Examples: Effect of high rain or drought on soil in a given basin, return of flora and fauna in a burned area over time.)
    b. Each consecutive year must demonstrate time-based change
    c. The display board must be based on collective past conclusionary data and its comparison to the current year data set. No raw data from previous years may be displayed.

5. All projects must be **reviewed and approved each year** and forms must be completed for the new year.

6. Retention of all prior years' paperwork is required and must be presented to the MSEF SRC upon request. Each page of the previous year's forms must be clearly labeled in the upper right-hand corner with the appropriate year.

Team Projects

1. Teams must have no more than three members.

2. Each team is encouraged to appoint a **Team Leader** to coordinate the work and act as spokesperson. However, each team member should be able to serve as spokesperson, be fully involved with the project, and be familiar with all aspects. The final work should reflect the coordinated efforts of all team members and will be evaluated using the same judging criteria as individual projects.

    Teams composed of members attending different high schools can compete in MSEF and its affiliated Regional Fairs as an entry through the enrollment school for the Team Leader. The teacher of record must be employed by the same school as the Team Leader. *Note: Any Multi-school team project may only participate in one (1) affiliated Regional Fair.* The following team compositions are allowed:
    a. Students attending different high schools in the same Massachusetts Region.
    b. Students attending different high schools in different Massachusetts Regions.
    c. Students attending different high schools in different states as long as the Team Leader attends a Massachusetts High School.
    d. Students attending different high schools in different countries as long as the Team Leader attends a Massachusetts High School.

3. Team membership cannot be changed **during** a given research year unless there are extenuating circumstances and the local SRC reviews and approves the change, including converting a team project to an individual project or vice versa. Such conversions must address rationale for the change and include a clear delineation between research preceding the change

and that which will follow. A memorandum documenting this review and approval should be attached to Student Checklist (1A).

4. Once a project has **competed** in a science fair at any level, team membership cannot change, and the project cannot be converted from an individual project to a team project or vice versa.
    a. Teams may not have more than three members at a local fair and then eliminate members to qualify for the regional, state, or international fairs.
    b. All members of the team must be present at the local, regional, state, and international fairs to compete. *See specific fair rules for policies and award eligibility.*
    c. In a future research year, any project may be converted from an individual to a team project, from a team to an individual project and/or have a change in team membership.

5. Each team member must submit an Approval Form (1B). All other forms are submitted jointly. MSEF usese a modified Form 1B for Massachusetts Regional and State Fair. Students proceeding to ISEF will have adjustments to this form for compliance.

6. Full names of all team members must appear on the forms, Research Plan/Project Summary, and Abstract.

Guidelines for Pre-College Research and Experimentation: Restricted Areas

1. General Rules and Process
2. Understanding Restricted Areas
3. Conducting a Risk Assessment
4. Restricted Areas of Research
    - I. Hazardous Chemicals, Activities or Devices
    - II. Human Subjects
    - III. Vertebrate Animals
    - IV. Potentially Hazardous Biological Agents (PHBAs), including Tissues

1. General Rules and Process

1. Projects involving **Restricted Areas of Research** must be reviewed and approved by the Scientific Review Committee (SRC) **prior to the start of experimentation**. This is called *PRE-APPROVAL*.

2. Have your research plan and any required paperwork **approved**
    a) All projects must first be approved by your adult sponsor/teacher through the signature on form 1A before experimentation.
    b) If your project involves one or more **Restricted Area of Research**, you must have the approval of the Scientific Review Committee (SRC) before starting the experimentation. This should be no later than **December 15th,** but paperwork submitted at the deadline may experience delays. **PLAN AHEAD.**
    c) **Summer projects** in restricted areas and all projects that take place internationally must also follow this pre-approval process BEFORE EXPERIMENTATION. Email src@scifair.com for approval.
    d) A **Qualified Scientist** is required for ALL studies involving **Restricted Areas of Research** that require pre-approval by an SRC. **Note:** The Qualified Scientist *may* be your teacher or another teacher in the school with familiarity of your project area

All project accounts will start with the basic paperwork packet that includes required forms and permissions. zFairs will generate additional forms that are required based on the student project details as entered to the account.

Reviewers may ask for additional documentation to process the approval. Individual forms can be downloaded from MAHS.zfairs.com as needed.

REQUIRED FORMS for ALL PROJECTS	SPECIALIZED FORMS, MAY REQUIRE PRE-APPROVAL
ALL PROJECTS: These forms are included in the Paperwork Package you will download from MAHS.zfairs.com. **Checklist for Adult Sponsor (1)**, **Student Checklist (1A),** **Research Plan/ Project Summary,** **Approval Form (1B) and MSEF permissions** **Risk Assessment (3)**, *recommended for all projects*	**IF NEEDED, PRE-APPROVAL IS REQUIRED** **Risk Assessment (3)**, *if required instead of just recommended* **Qualified Scientist Form (2B)**, *when applicable* **Human Subjects (4),** *when applicable, must be printed, signed, and uploaded* **Informed Consent**, *when applicable, copy of survey and/or form* **Vertebrate Animal (5A, 5B),** when applicable **PHBA Risk Assessment Form (6A)**, *when applicable* **Human and Vertebrate Animal Tissue Form (6B)**, *for all studies involving tissues and body fluids* **MAY BE NEEDED AT CONCLUSION OF PROJECT, or earlier by request of the SRC** **Regulated Research Institution Form (2C)**, *when applicable* **Continuation Form (7)**, *for projects that build on earlier projects* **Student Disclosures Form 2A**

3. **DEADLINES- All projects** that will be participating in a Fair need approval by the Statewide SRC before participating in a Regional or State Fair. Plan ahead, follow directions carefully and work with your Adult Sponsor to create a goal deadline for your specific project. Paperwork can be submitted to **MAHS.zfairs.com** on a rolling basis for review and approval. Submit when you are ready and before experimentation. Please finish your submission within TWO WEEKS of creating your account in zFairs.
    a) If your project **requires** forms 3, 4, 5, or 6 your paperwork must be submitted before you begin experimentation. SUBMIT EARLY and no later than **December 15.**

b) Final deadline for ALL projects to be approved for regional or state fair participation is **January 15th.** Paperwork submitted closer to the final deadline will take longer to review.
c) Paperwork submitted at the deadline and/or incomplete may not be approved in time for experimentation.
d) Teachers must **'MARK READY'** in the zFairs platform (Paperwork > Review) to signal that project paperwork is ready for review. Once uploaded, ask your teacher to 'Mark Ready' in their zFairs dashboard. Projects will not be reviewed until this box is checked. Incomplete projects will not be reviewed.

DEADLINES
Pre-approval projects must be submitted **before experimentation** and **NO LATER than DECEMBER 15th.**

All other projects must be submitted **before January 15th** Email src@scifair.com to discuss accomodations for later school fairs.

2. Understanding Restricted Areas

When planning your project, this summary below should help you identify the scope of what's possible as well as advice on making your project more feasible and, therefore, more successful. **It is the responsibility of students and teachers to review the rules in the following sections as it applies to their project.**

TIP: If students are not able to secure access or approval for a substance, consider modifying your work. Science Fair projects may be an opportunity to explore a 'proof of concept' even if the ideal substance or setup is not possible

Even if your project does not require pre-approval, include details such as those outlined below in your research plan and Form 3. This illustrates your understanding of your project and provides essential details to the reviewers.

- For example, students will need to explain their safety plan including storage, use, and disposal. Make note of PPE and other lab safety guidelines. Include these details in your research plan and Form 3.

1. **Hazardous Substances and Chemicals:** A general rule for substances and chemicals is that anything not found in a grocery store and/or not being used for its intended purpose or as directed is either NOT allowed or requires PRE-APPROVAL before experimentation. Just because a product can be purchased for home use doesn't mean it's automatically safe.

2. **Hazardous Activities and Devices:** When working with tools and devices that could potentially poses a hazard, students should consider all possible safety concerns and include these in their submitted forms. Include information about proper instruction on each tool, that the workspace is appropriate, and that a teacher or responsible adult is accessible nearby, even if not directly watching. No tool is universally safe in every context. Also include information about how electrical power and power supplies will be used and managed.

3. **Human Subjects:** Working with human subjects for behavioral science projects or testing materials and devices is a popular starting point for many students. Because of the challenges inherent in human research, the paperwork involved for human subjects projects can be extensive. In addition to the research plan, researchers need to include documentation on how individuals will be recruited to participate, include language for 'informed consent' permissions, submit copies of any materials presented to human subjects, and secure guardian signatures for anyone under 18. Review the section below carefully, including possibly exemptions from advanced paperwork and pre-approval.

4. **Vertebrate Animals**: Manipulation of an environment or interaction with animals in any way, requires a rigorous review process with animal care professionals in addition to pre-approval from the Statewide SRC committees and completion of special forms. Additionally, the State of Massachusetts has strict guidelines on the use of vertebrate animal research for K-12 research. Euthanasia is not allowed at all. Students looking to pursue projects will need to document why vertebrates were essential to their project, document safety requirements, and secure the authorization of a veterinarian.

5. **Potentially Harmful Biological Agents:** As a general rule, projects may only use microorganisms that are classified as BSL-1 or BSL-2. The use of PHBAs may be expempt from pre-approval if they are well-understood, pose minimal risk to healthy individuals, and are commonly found in educational settings. However projects involving unknown microorganisms, samples collected from the environment (such as soil or water), or any agent that could potentially cause disease are not permitted without explicit SRC approval and appropriate containment measures.

3. Conducting a Risk Assessment

As students develop their research plan, all are asked to "identify any potential risks and safety precautions needed." There are some projects where the hazards are clear (to at least the adults supervising the project) and a risk assessment can be created that states clearly the required supervision, laboratory/research setting, the personal protective equipment (PPE), the proper disposal, etc.

And some projects appear to have no risks at all. Mathematics comes to mind. However, the process of considering risks is important for all projects and not just to avoid papercuts or eye strain (the popular answer on a mathematics project risk assessment.) It is a valuable exercise to consider unintended consequences and how to ensure that a student research project "does no harm." While the core of a risk assessment is the student researcher's safety, it is also important for a student to consider the potential risks in their data management and to any psychological or privacy concerns their project may involve (particularly those working with human participants.)

In the more 'classic" risk assessment, consider the formula:

Hazards x Exposure = Risk

A risk assessment is assessing the potential hazards involved in the materials or methodology of the project and the exposure to the student researcher. Wherever possible when assessing risk, the project should limit the hazard and the exposure to the hazard. In hazardous materials, this may mean using the least amount and the lowest concentration of hazardous materials as possible to achieve the goals of the project.
One example: A student project involves constructing an apparatus and power tools are going to be used.

- Is the student operating the equipment or will the direct supervisor be using?
- Where is the research being conducted (a
- laboratory, business workshop, or home basement)?
- Is the student trained to use the equipment?
- Is the student supervised during the usage of the equipment by a qualified individual?
- Does the student have the appropriate personal protective equipment (PPE)?
- How often/how frequently will the equipment need to be used?

Society for Science, page 12 of the Companion Guide to International Rules 2026-2027, societyorscience.org/ISEF.

See Appendix G: Project Approval Decision Grid
See Appendix H: 2026-2027 Changes to International Pre-Collegiate Research rules

Section I - Hazardous Chemicals, Activities or Devices

Includes DEA-controlled substances, prescription drugs, alcohol & tobacco, firearms, and explosives, regulated drones, radiation, etc.

The following rules apply to research using hazardous chemicals, devices, and activities. These include substances and devices that are regulated by local, state, country, or international law, most often with restrictions of their use by minors such as DEA-controlled substances, prescription drugs, alcohol, tobacco, firearms, and explosives. **Hazardous activities are those that involve a level of risk above and beyond that encountered in the student's everyday life.** If students are using tools or devices that are in common use in the classroom or home and students are familiar with their use, they MAY be exempt from pre-approval (consult appendix A and email src@scifair.com for clarification). Form 3 is still *recommended* for final approval to ensure safety procedures were in place.

These rules are intended to protect the student researcher by ensuring proper supervision and the consideration of all potential risks so that the appropriate safety precautions are taken. Students must meet all standards imposed by school, local, regional and/or state level fairs.

The student researcher must minimize the impact of an experiment on the environment. Examples include using minimal quantities of chemicals that will require subsequent **disposal**; ensuring that all disposal is done in an environmentally safe manner and in accordance with good laboratory practices. (Proper chemical, sharps and other hazardous materials disposal must follow local, state, federal guidelines.)

Rules:

1. The student researcher must conduct a risk assessment in collaboration with a Direct Supervisor or Qualified Scientist prior to experimentation. The research must be supervised as appropriate for the hazardous substance, activity or device being used.
2. Students are required to meet all standards and rules imposed by ISEF, school, local, and/or regional fair(s).
3. Student researchers must acquire and use regulated substances in accordance with all local, state, U.S. federal and country laws. This includes:
    1. Regulations regarding DEA-controlled substances,
    2. FDA and state laws regarding prescription drugs,
    3. TTB and state laws regarding alcohol and tobacco,
    4. ATF and state laws regarding firearms and explosives and
    5. FAA and state laws regarding drones.
    6. For further information or classification for these laws and regulations, contact the appropriate regulatory agencies.
4. For all chemicals, devices or activities requiring a **federal and/ or state permit**, the student/supervisor must obtain the permit prior to the onset of all transportation and acquisition of materials must comply with all Federal and State laws and regulations.
5. Projects using chemicals with a Globally Harmonized System of Classification and Labelling of Chemicals (GHS) safety rating of 1, 2 or 3 or National Fire Protection Association (NFPA) safety rating of 3 or 4 must be conducted in a **school or laboratory setting**. Projects conducted with chemicals outside these ratings may be conducted in a **home setting** under the following conditions:
    1. Projects in a home setting must follow standard lab practices for chemical handling, safety, ventilation, and specific disposal procedures used as outlined in the Safety Data Sheets (SDS).
    2. Any cookware, utensils, and/or equipment used during the experimentation cannot be reused for food preparation.
    3. Be conducted with a Direct Supervisor with proper training and knowledge of the chemicals being used.
6. **Disposal procedures** shall be described in sufficient detail to ensure compliance with EPA Guidelines as outlined in the appropriate Safety Data Sheets. Examples include minimal quantities of chemicals that will require subsequent disposal; ensuring that all disposal is done in an environmentally safe manner. Proper chemical, sharps and other hazardous materials disposal must follow local, state, and federal guidelines.

Chemicals

1. All projects using chemicals in a home, school, or lab setting must be conducted under the following conditions:
    1. Obtain and read the Safety Data Sheets (SDS) for each chemical being used.*
    2. Follow standard lab practices for chemical handling, safety, ventilation, and specific disposal procedures as outlined in the Safety Data Sheets (SDS).
    3. Cannot reuse any cookware, utensils, and/or equipment used during the experimentation for regular household use.

4. Be conducted with a Direct Supervisor with proper training and knowledge of the chemicals being used.

2. Projects involving chemicals that are listed as carcinogenic, teratogenic, or reproductive system damaging on the SDS must be conducted at an RRI or in a restricted access fume hood outside of the regular classroom (i.e. school lab). The qualified scientist and direct supervisor must have training in the usage, safe handling, and disposal of the chemicals.

*NOTE: Safety Data Sheets can be found online and provide Globally Harmonized System (GHS) ratings for chemicals. These ratings use different categories to define a chemical's physical, health, and environmental hazards. The GHS rating should be factored into a student's risk assessment and safety precautions. Chemicals may also be rated on the National Fire Protection Association (NFPA) scale. This scale runs from 0-4, with 4 being the most hazardous.

DEA-Controlled Substances

The U.S. Drug Enforcement Administration (DEA) regulates chemicals that can be diverted from their intended use to make illegal drugs.

1. All studies using DEA-controlled substances must be supervised by a Qualified Scientist at a Regulated Research Institution (RRI) and must be conducted at an RRI who is licensed by the DEA (or other international regulatory body) for use of the controlled substance.
2. All studies using DEA Schedule 1 substances must have the research protocol approved by DEA before research begins. Schedule 2, 3 and 4 substances do not require protocol approval by DEA. *Please note, marijuana is no longer categorized as Schedule 1.*

Prescription Drugs

In the United States, the Food and Drug Administration (FDA) tightly regulates the issuance of prescription drugs including non-controlled medications. It is unlawful to use a prescription for persons or purposes outside of the original intent of the prescription or for the person it was originally prescribed for. All applicable federal, state, and country laws must be followed.

1. A study involving prescription drugs must obtain the prescription drug through the authority of a practitioner or researcher that has obtained the non- controlled medication with appropriate approvals or be using a prescription drug that is a research or education research-grade product and therefore not for human consumption.
2. Research involving prescription drugs being administered to vertebrate animals, may only be done under a veterinarian's supervision and with prescriptions provided for this specified purpose.

Alcohol and Tobacco

The U.S. Alcohol and Tobacco Tax and Trade Bureau (TTB) regulates the production of alcohol and distribution of alcohol and tobacco products. Many such products are restricted by age for purchase, possession and consumption.

1. Fermentation studies in which minute quantities of ethyl alcohol are produced are permitted.
2. The Direct Supervisor is responsible for the acquisition, usage and appropriate disposal of the alcohol, tobacco, or vape products used in the study.
3. Production of wine or beer by adults is allowable in the home and must meet TTB home production regulations. Students are allowed to design and conduct a research project, under direct parental supervision, involving the legal production of the wine or beer.
4. Students may distill alcohol for fuel or other non- consumable products, but the work must be conducted at school or a Regulated Research Institution and follow all local and country laws.

Firearms and Explosives

The U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), along with state agencies, regulates the purchase and use of firearms and explosives. Explosives include, but are not limited to, dynamite, black powder, pellet powder, detonators, and igniters. The purchase of a firearm by a minor is generally unlawful. The use of a firearm, without proper state certification, is illegal. Students should check the training and certification requirements of individual states and countries.

1. Projects involving firearms and explosives are allowable when conducted with the direct supervision of a Direct Supervisor and when in compliance with all federal, state and local laws and regulations. Any use of a firearm must be conducted with the proper state certification and training.
2. A fully assembled rocket motor, reload kit or propellant modules containing more than 62.5 grams of propellant are subject to the permitting, storage, transportation, and other requirements of federal explosive laws and regulations.
3. Potato guns and paintball guns are not considered firearms unless they are intended to be used as weapons. However, they must be treated as hazardous devices.

Regulated Drones

1. Projects involving unmanned aircraft systems (UAS)/ drones must follow all state, federal and country laws. See the Federal Aviation Administration (FAA) for more details (https://faa.gov/uas/).
2. Current U.S. law requires all forms of drones to be registered with the FAA.

Radiation

Projects involving radionuclides (radioisotopes) and X-rays must involve a careful examination of the risks associated with the study and appropriate safety precautions must be taken. For projects using a high vacuum system:

1. If the voltage needed in the study is <10 kvolts, a risk assessment must be conducted. The study may be done at home or school, and SRC preapproval is not required.
2. A study using 10–25 kvolts must have a risk assessment conducted and must be preapproved by the SRC to assess Such a study must be conducted in a metal-lined chamber using a camera only, not direct view through glass. A dosimeter or radiation survey meter is required to measure radiation exposure.
3. All studies using > 25 kvolts must be conducted at an institution with a Licensed Radiation Program and must be preapproved by the Institutions' Radiation Safety Officer or the Committee which oversees the use of ionizing radiation to ensure compliance with state and federal regulations.
4. Only experiments with Exempt Quantities of radionuclides and Naturally Occuring Radioactive Materials (NORM) will be permitted with risk assessment required. Other uses of radioactive materials must be conducted at an institution with a Licenses Radiation Program and must be pre-approved by the Institutions' Radiation Safety Officers or the committee which oversees the use of ionizing radiation to ensure compliance with state and federal regulations.

Documentation and Approval:

1. Student researchers must have a Research Plan that includes all of the standard elements as well as a thorough risk assessment that discusses:
    1. process,
    2. supervision,
    3. usage,
    4. safety precautions and
    5. methods of disposal
2. The student researcher must conduct a risk assessment in collaboration with a Direct Supervisor or Qualified Scientist prior to experimentation. The result of this review is also documented on Risk Assessment Form 3.
3. Any permits and/or licenses collected as a requirement of the project must be included with the project paperwork and must be available for review by adults supervising the project and the local, affiliated, and ISEF SRCs in their review prior to competition.

Find more information from Society for Science on

- **Categories of Hazardous Chemicals and Devices**
- **Tips for Reading Safety Data Sheets (SDS)**
- **Environmentally Responsible Chemistry**
- **GHS Classifications**

These can be found starting on page 44 in the Companion Guide for International Rules 2026-2027, societyforscience.org/ISEF

SEE ALSO Appendix A: Guidance for Risk Assessment: Hazardous Chemicals and Devices
SEE ALSO Appendix D: Guidance for Risk Assessment: Engineering and Invention Projects

The following forms are required for Hazardous Chemicals, Activities or Devices:

a. Checklist for Adult Sponsor (1), Student Checklist (1A), Research Plan/ Project Summary, and Approval Form (1B)
b. Regulated Research Institution Form (2C), *when applicable*
c. Qualified Scientist Form (2B), *when applicable*
d. Risk Assessment Form (3)
e. Student Support Disclosure (2A), *when applicable*

The use of hazardous chemicals and devices and involvement in hazardous activities **require direct supervision** by a Direct supervisor, except those involving DEA-controlled substances, which require supervision by a Qualified Scientist.

Section II - Human Participant Research

The following rules were developed to help pre-college student researchers adhere to the federal regulations governing professional scientists and to protect the welfare of both human participants and the student researcher. **Health and well-being are of the highest priority when students conduct research with human participants.**

According to Code of Federal Regulation 45, CFR 46, a **human participant** is a living individual about whom an investigator conducting research obtains (1) data or samples through intervention or interaction with individuals(s) or (2) identifiable private information.

Examples of **projects that are considered "human participant research"** include:

- Participants in physical activities (e.g., physical exertion, any medical procedure)
- Psychological, educational and opinion studies (e.g., surveys, questionnaires, tests)
- Studies in which the **researcher is the subject** of the research
- Testing of student designed invention, prototype, or computer application by human participants other than student researcher
- Data sets that include data that are not de-identified/anonymous.
- Behavioral observations that
    - involve any interaction with the observed individual(s) or where the researcher has modified the environment (e.g., post a sign, place an object).
    - occur in non-public or restricted access settings (e.g., day care setting, doctor's office)
    - involve the recording of personally identifiable information.

All non-exempt human participant studies must be reviewed and pre-approved using form 4. Many projects can be approved at the school with an ad hoc committee. See page 10.

Exempt Studies (Do Not Require IRB Pre-approval or Human Participants Paperwork)

Some studies involving humans are exempt from IRB pre-approval or additional human participant forms. Exempt projects for ISEF and affiliated fairs are:

1. Student-designed Invention, Prototype, Computer Applications, Engineering/Design Project, or Consumer Product Testing in which **the student researcher is the only person testing** the invention, prototype, computer application or consumer product and **the testing does not pose a health or safety hazard**.
    a. The exemption can also apply when the human participant testing is a single adult guardian or Adult Sponsor/QS/DS when the testing requires an adult tester.
    b. A Risk Assessment Form (3) must be completed for all such projects.
    c. IRB review and pre-approval is required if the project involves more than the student researcher or any introduction of a human variable or factor in the testing of a consumer product/invention/prototype/application (e.g., amount of sleep, strength, or endurance of tester, etc.).
2. Data/record review studies (e.g., baseball statistics, crime statistics) in which the **data are taken from preexisting data sets that are publicly available** and/or published and do not involve any interaction with humans or the collection of any data from a human participant for the purpose of the student's research project.
3. Behavioral **observations** of unrestricted, public settings (e.g., shopping mall, public park) in which all the following apply; a) the researcher has **no interaction** with the individuals being observed, b) the researcher **does not manipulate the environment** in any way, and c) the researcher **does not record any personally identifiable data**.
4. Projects in which the **student receives pre-existing/retrospective data in a de-identified/anonymous format** which complies with both of the following conditions:
    - the professional providing the data certifies in writing that the data have been appropriately de-identified before being given to the student researcher and are following all privacy and HIPAA laws, and
    - the affiliated Regional Fair SRC ensures that the data were appropriately de-identified by review of the written documentation provided by the supervising adult(s)

Prohibited Studies

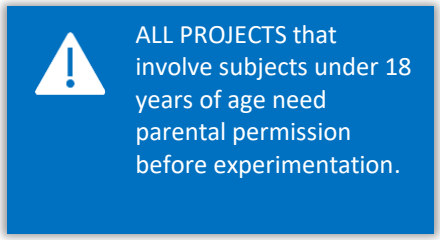
1. Students are prohibited from independently diagnosing any human condition, illness or disease, administering medication, and/or performing medical procedures on human participants.
    a. Students are prohibited from drawing blood or conducting any other medical procedures on anyone except themselves.
    b. Students are prohibited from disclosing research data from their study and/or from providingadvice, diagnostic or medical information to participants
    c. Students are prohibited from publishing diagnostic apps on public websites or app stores without appropriate FDA approvals.

d. Students are prohibited from disclosing results or data from their study to the human participants.

2. Student researchers may NOT publish or display information in a report that identifies the human participants directly or through identifiers linked to the participants (including photographs) without the written consent of the participant(s) (Public Health Service Act, 42, USC 241 (d)).

Rules

1. Student research involving human participants must be reviewed and approved by an Institutional Review Board (IRB) before any interaction (e.g., recruitment, data collection) with human participants may begin. An IRB will determine any additional supervision required, make any adjustments to the research plan and designate the risk and consent processes required.
2. A consent process is required. Participation in research may begin only after participants have voluntarily given informed consent/assent (and in many cases received parental permission).
    a) Adult research participants may give their own consent.
    b) All human participant studies involving minors (students under 18 years of age) must receive assent from the student participant and **written parental permission from a legal guardian.**
    c) For studies involving minors, if the study includes a survey, the survey must be attached to the consent form as part of the written parental permission process and parental permission obtained prior to the minor accessing the survey.
    d) Informed consent requires that the researcher provides complete information to the participant (and where applicable, parents or guardians) about the risks and benefits associated with participation in the research study, which then allows the participants and parents or guardians to make an informed decision about whether or not to participate.
    e) Participants must be informed that their participation is voluntary and that they are free to stop participating at any time (i.e., they may participate or decline to participate, with no adverse consequences of non- participation or aborted participation).
    f) Informed consent may not involve coercion.
    g) A student researcher may request that the IRB waive the requirement for written informed consent from adult participants (over the age of 18) if the research involves only minimal risk and anonymous data collection.



3. The research study must be in compliance with all privacy laws (e.g., U.S. Family Educational Rights and Privacy Act (FERPA) and the U.S. Health Insurance Portability and Accountability Act (HIPAA)) when they apply to the project (e.g. the project involves medical information).
4. A student may observe and collect data for analysis of medical procedures, medication/treatment efficacy, and diagnosis of illness, only under the direct supervision of a licensed health care provider. This Healthcare provider/professional must be named in the research plan/ protocol approved by the IRB. The IRB must also confirm that the student is not violating the appropriate practice act (medical, nursing, pharmacy, etc) of the state or country in which he/she is conducting the research.
5. All published instruments that are not in the public domain must be administered, scored and interpreted by a Qualified Scientist as required by the instrument publisher. Any and all use and distribution of the test must be in accordance with the publisher's requirements, including procurement of legal copies of the instrument.
6. Studies that involve recruitment and interaction with human participants online or via the internet are allowed if they adhere to all of the human participant rules above regarding consent processes and restrictions, including obtaining written parental permission for studies involving minors. This written parental permission must include a copy of the survey and be obtained prior to a minor accessing the online survey. In order to protect the confidentiality of the participants, it is extremely important that IP addresses, as well as the data provided, be safeguarded.
7. Student-designed invention, prototype, computer application, engineering/design projects and product testing that involve testing of the invention or consumer product by any human participant require attention to the potential risks to the individual(s) testing or trying out the invention/prototype.
    1. IRB review and pre-approval is required when the student- designed invention, prototype, application, etc. is tested by human participants other than the student researcher(s) or a single adult guardian/ adult sponsor/QS/DS when the testing requires an adult tester (such as driving or other age-restricted activities). This includes surveys conducted regarding potential use or opinions of the invention or consumer product by the general public. This is not intended to apply to receiving professional feedback from experts in the field of study prior to experimentation.
    2. Human participants testing of an invention, prototype or project that involves a medical diagnosis or intervention (as defined by the FDA or Medical Practices Act) must adhere to the prohibition of medical procedures (see

Prohibited Studies) and be supervised by a health care professional with appropriate credentials and specialization in the area of medical diagnosis or intervention being studied.

Documentation and Approval

1. Student researchers must have a Research Plan that includes all of the standard elements as well as the following areas specific to human participant research:
    1. Participants:
        - Describe age range, gender, racial/ethnic composition of participants.
        - Identify vulnerable populations (minors, pregnant women, prisoners, mentally disabled or economically disadvantaged).
    2. Recruitment:
        - Where will you find your participants?
        - How will they be invited to participate?
    3. Methods:
        - What will participants be asked to do?
        - Will you use any surveys, questionnaires or tests? If yes and not your own, how did you obtain? Did it require permissions? If so, explain.
        - What is the frequency and length of time involved for each subject?
    4. Risk Assessment:
        - What are the risks or potential discomforts (physical, psychological, time involved, social, legal, etc.) to participants?
        - How will you minimize risks?
        - List any benefits to society or participants.
    5. Protection of Privacy:
        - Will identifiable information (e.g., names, telephone numbers, birth dates, email addresses) be collected?
        - Will data be confidential/anonymous?
        - If anonymous, describe how the data will be collected.
        - If not anonymous, what procedures are in place for safeguarding confidentiality?
        - Where will data be stored? Who will have access to the data?
        - What will you do with the data after the study?
    6. Informed Consent Process:
        - Describe how you will inform participants about the purpose of the study what they will be asked to do, that their participation is voluntary and they have the right to stop at any time.
        - If participants are minors, explain the process by which written parental permission will be received and a parent will have access to the survey instrument prior to providing permission.
2. Student research involving human participants must be reviewed and approved by an IRB before any interaction (e.g., recruitment, data collection) with human participants may begin. It is the responsibility of the IRB to evaluate potential physical and/or psychological risks of the project and make a determination about whether the project is appropriate for student research and safe for the student researcher and participants.
    1. Projects that are conducted at school, at home or in the community that are not affiliated with a Regulated Research Institution (RRI) must be reviewed and approved by the School IRB before the student may begin recruiting and/or interacting with human participants.
    2. The School IRB (or SRC/IRB from your affiliate fair) must assess the risk and document its determination of risk on Form 4.
    3. Projects that are conducted at an RRI (e.g., university, hospital, medical center, government lab) must have IRB approval from the A copy of the IRB approval for the project must be obtained.
    4. A letter from an adult mentor and/or Qualified Scientist is not sufficient documentation of the RRI IRB review and approval process.
3. When working with a facility for protected groups where participants live or attend programming (e.g. retirement home, daycare, prison, etc.) written approval from the facility must be obtained prior to experimentation, as well as informed consents for the individual participants.
4. The student must comply with all determinations made by the School or RRI IRB before beginning any interaction with human participants (e.g., recruitment, data collection).
    1. If the IRB requires a Qualified Scientist (QS), Form 2 must be completed by the QS before any interaction with human participants. The School IRB will review this completed form before approving the project.
    2. If the IRB requires a Direct supervisor (DS), Form 3 must be completed before any interaction with human participants. The School IRB will review this completed form before approving the project.

5. After initial IRB approval, a student with any proposed changes in the Research Plan must repeat the approval process and regain approval before resuming interaction (recruitment, data collection) with human participants.
6. After experimentation and before competition, the Affiliated Fair SRC will review for compliance with all rules.
7. Risk Assessment Form 3 is required for all projects that involve human participant testing of any project involving student-designed inventions, prototypes or consumer products.

Find more information from Society for Science on

- **Human Participants & IRB Resources**
- **Online Survey Consent Procedures**
- **Human Participant Risk Assessment Guide**
- **Special Discussion on Apps: Machine Learning/Modeling**

These can be found starting on page 30 in the Companion Guide for International Rules 2026-2027, societyforscience.org/ISEF

SEE ALSO Appendix B: Guidance for Risk Assessment: Human Participants

The following forms are required for Human Participant research:

a. Checklist for Adult Sponsor (1), Student Checklist (1A), Research Plan/ Project Summary, and Approval Form (1B)
b. Human Participants Form (4) including informed consent and surveys if applicable
   AND/OR (*if applicable*): Regulated Research Institution Form (2C) and
   the IRB approval form from the RRI and all applicable consents and survey(s)
c. Qualified Scientist Form (2B), *when applicable*
d. Risk Assessment (3), *when applicable*
e. Student Support Disclosure (2A), *when applicable*

Section III - Vertebrate Animals

The following rules were developed to help pre-college student researchers adhere to the federal regulations governing professional scientists and to protect the welfare of both animal subjects and the student researcher. Health and well-being are of high priority when students conduct research with animal subjects.

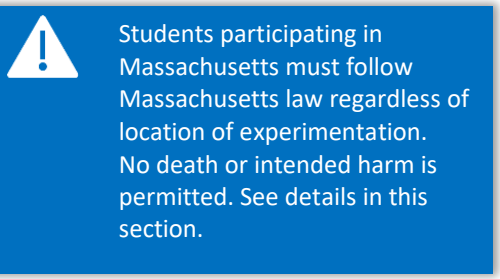
Massachusetts Science & Engineering Fair, Inc. (MSEF) promotes humane attitudes toward all animals used in scientific investigation. MSEF opposes projects that involve cruelty or abusive treatment, either during the preparation process or in the actual demonstration at the Fair. The basic aim of projects using live organisms is to achieve an understanding of life processes. Therefore, experimentation must be conducted in a manner that fosters a **humane regard for animals** and a **respect for life**.

According to Massachusetts State Law:

> **Chapter 272, Section 80G.** No school principal, administrator or teacher shall allow any live vertebrate to be used in any elementary or high school under state control or supported wholly or partly by public money of the state as part of a scientific experiment or for any other purpose in which said vertebrates are experimentally medicated or drugged in a manner to cause painful reactions or to induce painful or lethal pathological conditions, or in which said vertebrates are injured through any other type of treatment, experiment or procedure including but not limited to anesthetization or electric shock, or where the normal health of said animal is interfered with or where pain or distress is caused.

Therefore,

1. No vertebrate animals can be sacrificed (killed) for the purpose of student research or to obtain tissue for a student's research.
2. No studies with the intent to cause duress, pain, injury, distress, or death are allowed.
3. No studies with the intent to study the toxic effects of a substance on a vertebrate animal are allowed.



MSEF **strongly endorses** the use of **non-animal research methods** and encourages students to use alternatives to animal research, which must be explored and discussed in the research plan. The guiding principles for the use of animals in research include the following "Four R's":

- **Replace** vertebrate animals with invertebrates, lower life forms, tissue/cell cultures and/or computer simulations where possible.
- **Reduce** the number of animals without compromising statistical validity.
- **Refine** the experimental protocol to **eliminate any potential** pain or distress to the animals.
- **Respect** animals and their contribution to research.

If the use of vertebrate animals is necessary, students must consider **additional alternatives** to reduce and refine the use of animals.

What are considered vertebrate animals?: Vertebrate animals, as covered by these rules, are defined as:

1. All nonhuman vertebrates (including fish) at hatching or birth
2. Live nonhuman vertebrate mammalian embryos or fetuses
3. Tadpoles
4. Bird and reptile eggs starting three days (72 hours) prior to hatching
5. Zebrafish past 7 days (168 hours) post-fertilization due to delayed cognitive neural development
6. Cephalopods are to be treated as vertebrate animals

NOTE: A project is not considered a vertebrate animal study if tissue is obtained from an animal that was euthanized for a purpose other than the student's project. (See Tissue & Body Fluid Rules)

Exempt Studies (Do Not Require SRC Preapproval)

Studies involving behavioral observations of animals are exempt from prior SRC review if **ALL** the following apply:

1. There is no interaction with the animals being observed
2. There is no manipulation of the animal environment in any way, and
3. The study meets all federal and state agriculture, fish, game and wildlife laws and regulations.

A project is considered a **tissue study** and NOT a **vertebrate animal study** if tissue is obtained from an animal that was euthanized for a **purpose other than the student's project**. (Use of tissues obtained from research conducted at a Regulated Research

Institution requires a copy of an IACUC certification with the name of the research institution, the title of the study, the IACUC approval number and date of IACUC approval.) In tissue studies, a student may observe the vertebrate study, but may not manipulate or have any direct involvement in the vertebrate animal experimental procedures. *Rules pertaining to tissue studies are including in the next section on Potentially Hazardous Biological Agents (PHBAs).*

Prohibited Studies

In addition to the restrictions under Massachusetts law referenced above, International Pre-Collegiate Research rules prohibit the following studies:

1. Research projects which cause more than momentary or slight pain or distress to any vertebrate animals are prohibited.
2. Studies that are designed or anticipated to cause vertebrate animal death are prohibited.
3. No vertebrate animal deaths due to the experimental procedures are permitted in any group or subgroup.
4. Student researchers are prohibited from performing euthanasia.
    1. Projects conducted in a school/home/field location are prohibited from performing euthanasia for tissue removal and/or pathological analysis. (Such projects must be conducted at a Regulated Research Institution (RRI) with qualified personnel performing euthanasia.) **Note: Massachusetts law forbids euthanasia for student projects.**
5. Students are prohibited from designing or participating in an experiment associated with the following types of studies on vertebrate animals:
    1. Induced toxicity studies with known toxic substances that could cause pain, distress, or death, including but not limited to alcohol, acid rain, pesticides, or heavy metals or studies with the intent to study toxic effects of a substance on a vertebrate animal.
    2. Behavioral experiments using conditioning with aversive stimuli, mother/infant separation or induced helplessness.
    3. Studies of pain.
    4. Predator/vertebrate prey experiments.
6. Students are prohibited from fishing with barbed hooks, live bait or from performing electrofishing.

All projects involving vertebrate animals **must adhere to the rules below** AND to the rules in **either Section A** (School/Home/Field Site) or **Section B** (Regulated Research Institute), depending on the nature of the study and the research site.

Rules for ALL Vertebrate Animal Studies

1. All vertebrate animal studies must have a research plan that includes:
    a. **Justification why animals must be used**, including the reasons for the choice of species, the source of animals and the number of animals to be used; description, explanation, or identification of alternatives to animal use that were considered, and the reasons these alternatives were unacceptable; explanation of the potential impact or contribution this research may have on the broad fields of biology or medicine.
    b. **Description of how the animals will be used**. Include methods and procedures, such as experimental design and data analysis; description of the procedures that will **eliminate** the potential for discomfort, distress, pain, and injury to the animals during the course of experimentation; identification of the species, strain, sex, age, weight, source, and number of animals proposed for use.
2. **All vertebrate animal studies must be reviewed and approved before experimentation begins.**
    a. An Institutional Animal Care and Use Committee, known as an IACUC, is the institutional animal oversight review and approval body for all animal studies at a Regulated Research Institution.
    b. The Statewide SRC serves in this capacity for vertebrate animal studies performed in a school, home, or field. Any SRC serving in this capacity must include a veterinarian or an animal care provider with training and/or experience in the species being studied. Email src@scifair.com if you need approval from a DVM.
3. Students performing vertebrate animal research must satisfy US federal law as well as local, state, and country laws and regulations of the jurisdiction in which research is performed.
4. Research projects which cause slight pain or distress are **prohibited**. Any **illness** or **unexpected weight loss** must be investigated, and a veterinarian consulted to receive required medical care. This investigation must be documented by the Qualified Scientist or Direct supervisor, who is qualified to determine the illness, or by a veterinarian. If the illness or distress is caused by the study, the experiment must be terminated immediately.
5. **No vertebrate animal deaths** due to the experimental procedures are permitted in any group or subgroup.
    a. Studies that are designed or anticipated to cause vertebrate animal death are prohibited.

b. Any death that occurs must be investigated by a veterinarian, the Qualified Scientist or the Direct supervisor who is qualified to determine if the cause of death was incidental or due to the experimental procedures. The project must be suspended until the cause is determined and then the results must be documented in writing.
c. If death was the result of the experimental procedure, the study must be terminated, and the study will not qualify for competition.

6. All animals must be **monitored for signs of distress**.
    a. Because significant weight loss is one sign of stress, weight must be recorded at least weekly with 15% being the maximum permissible weight loss or growth retardation (compared to controls) of any experimental or control animal. If weighing of animals cannot be done in a fashion that is safe for both the researcher and the animal, then an explanation and approval by an SRC or IACUC needs to be included in the research plan, as well as an alternative method(s) to address signs of distress.
    b. Additionally, body conditioning scoring (BCS) systems are available for most species of animals utilized in research and agriculture and are an objective method for assessing the overall health status of the research subject, with or without weight loss. A BCS system should be included in the design of any study utilizing live vertebrate animals and results regularly recorded.
7. Students are **prohibited** from **designing or participating** in an experiment associated with the following types of studies on vertebrate animals:
    a. Induced toxicity studies with known toxic substances that could cause pain, distress, or death, including but not limited to, alcohol, acid rain, pesticides, or heavy metals or studies with the intent to study toxic effects of a substance on a vertebrate animal.
    b. Behavioral experiments using conditioning with aversive stimuli, mother/infant separation, or induced helplessness.
    c. Studies of pain.
    d. Predator/vertebrate prey experiments.
8. Justification is required for an experimental design that involves food or fluid restriction and must be appropriate to the species. If the restriction exceeds 18 hours, the project must be reviewed and approved by an IACUC and conducted at a Regulated Research Institution.
9. Animals must be obtained from licensed laboratory animal breeders. Pet store animals, except fish, are inappropriate because their genetic and nutritional background, as well as disease potential, is unknown.
    a. Animals **may not be captured from or released into the wild** without approval of authorized wildlife or other regulatory officials. All appropriate methods and precautions must be used to decrease stress.
    b. Fish may be obtained from the wild only if the researcher releases the fish unharmed, has the proper license, and adheres to state, local and national fishing laws, and regulations.
    c. The use of electrofishing is permissible only if conducted by a trained supervisor; students are prohibited from performing electrofishing.
10. A Qualified Scientist or Direct supervisor must **directly supervise all research** involving vertebrate animals, except for observational studies.
11. After initial SRC approval, a student with any proposed changes in the Research Plan of the project must repeat the approval process before laboratory experimentation/data collection resumes.

Section A Rules: Additional Rules for Projects Conducted at School/Home/Field

Vertebrate animal studies may be conducted at a home, school, farm, ranch, in the field, etc. This includes:

1. Studies of animals in their natural environment.
2. Studies of animals in zoological parks.
3. Studies of livestock that use standard agricultural practices.
4. Studies of fish that use standard aquaculture practices.

These projects must be reviewed and approved by an SRC in which one member is either a veterinarian and/or an animal care provider/expert with training and/or experience in the species being studied.

1. These projects must adhere to BOTH of the following guidelines:
    a. The research involves only agricultural, behavioral, observational, or supplemental nutritional studies on animals.
    AND
    b. The research involves only non-invasive and non- intrusive methods that do not negatively affect an animal's health or well-being.

Any vertebrate animal studies that do not meet the above guidelines must be conducted in a Regulated Research Institutions. *See Section B Rules.*

2. Animals must be treated kindly and cared for properly.
    a. Animals must be housed in a clean, ventilated, comfortable environment appropriate for the species.
    b. They must be given a continuous, clean (uncontaminated) water and food supply.
    c. Cages, pens, and fish tanks must be cleaned frequently.
    d. Proper care must be provided at all times, including weekends, holidays, and vacation periods.
    e. Animals must be observed daily to assess their health and well-being.
    f. A Direct supervisor is required to oversee the daily husbandry of the animals.
    g. Any of the following U.S. documents provide further guidance for animal husbandry:
        - Federal Animal Welfare Regulation
        - Guide for the Care and Use of Laboratory Animals
        - Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching (Ag-Guide)
        - Quality Assurance Manuals (for the appropriate species)
3. The SRC must determine if a veterinarian's certification of the research plan and animal husbandry plans is required. This certification, as well as SRC approval, is required before experimentation and is documented on Vertebrate Animal Form 5A. A veterinarian must certify experiments that involve supplemental nutrition, administration of prescription drugs and/or activities that would not be ordinarily encountered in the animal's daily life.
4. If an illness or emergency occurs, the affected animal(s) must receive proper medical or nursing care that is directed by a veterinarian. A student researcher must stop experimentation if there is unexpected weight loss or death in the experimental subjects. The experiment can only be resumed if the cause of illness or death is not related to the experimental procedures and if appropriate steps are taken to eliminate the causal factors. If death is the result of the experimental procedure, the study must be terminated, and the study will not qualify for competition.
5. The final disposition of the animals must be described on Vertebrate Animal Form 5A.
6. Euthanasia for tissue removal and/or pathological analysis is **not permitted** for a project conducted in a school/home/field site.

Section B Rules: Additional Rules for Projects Conducted in a Regulated Research Institution

All studies not meeting the criteria in Section A that are otherwise permissible under these rules must be conducted in a Regulated Research Institution (RRI). A Regulated Research Institution within the U.S. is defined as a professional research/teaching institution that is regularly inspected by the USDA and is licensed to use animals covered by the Animal Welfare Act and may also be subject to U.S. Public Health Service Policy. Also included are all federal laboratories such as National Institutes of Health, Veteran's Affairs Medical Centers, and the Centers for Disease Control. In addition, pharmaceutical and biotechnology companies and research institutions that utilize research animals that are not covered by the Animal Welfare Act but have an operational Institutional Animal Care and Use Committee and are in compliance with U.S. federal laws are included in this definition. For a project conducted outside of the United States, a Regulated Research Institution would be a comparable research institution that adheres to country laws governing the care and use of vertebrate animals.

Some protocols permitted in a Regulated Research Institution are not permitted for participation in MSEF; therefor adherence to RRI rules is required but may not be sufficient for MSEF.

1. The Institutional Animal Care and Use Committee (IACUC) or the comparable animal oversight committee must approve all student research projects before experimentation begins. Such research projects must be conducted under the responsibility of a principal investigator. The SRC must also review the project to certify that the research project complies with MSEF Rules. This SRC review should occur before experimentation begins, if possible.
2. Euthanasia for tissue removal and/or pathological analysis is **not permitted** for a project conducted in a Regulated Research Institution.
3. *Intentionally left blank.*
4. Research in nutritional deficiency or research involving substances or drugs of unknown effect is permitted to the point that any clinical sign of distress is noted. **In the case that distress is observed, the project must be suspended, and measures must be taken to correct the deficiency or drug effect**. A project can only be resumed if appropriate steps are taken to correct the causal factors.

Documentation and Approval:

1. Student researchers must have a Research Plan that includes all of the standard elements as well as the following areas specific to vertebrate animal research:

1. Justification why animals must be used.
    1. including the reasons for the choice of species,
    2. the source of animals and the number of animals to be used;
    3. Description, explanation, or identification of alternatives to animal use that were considered with reasons these alternatives were unacceptable;
    4. explanation of the potential impact or contribution this research may have on the broad fields of biology or medicine.
2. Description of how the animals will be used.
    1. Include methods and procedures, such as experimental design and data analysis;
    2. description of the procedures that will minimize the potential for discomfort, distress, pain and injury to the animals during the course of experimentation;
3. identification of the animals proposed for use, to include:
    1. species
    2. strain
    3. sex
    4. age
    5. weight
    6. source
    7. number of animals

2. All vertebrate animal studies must be reviewed and approved before experimentation begins.
    1. The local or affiliated fair Scientific Review Committee serves in this capacity for vertebrate animal studies performed in a school, home or field. Any SRC serving in this capacity must include a veterinarian or an animal care provider with training and/or experience in the species being studied.
    2. The local or affiliated fair SRC must determine if a veterinarian's certification of the research and animal husbandry plan is required. This certification, as well as SRC approval, is required before experimentation and is documented on Vertebrate Animal Form 5A. A veterinarian must certify experiments that involve supplemental nutrition, administration of prescription drugs and/or activities that would not be ordinarily encountered in the animal's daily life.
    3. An Institutional Animal Care and Use Committee, known as an IACUC, is the institutional animal oversight review and approval body for all animal studies at a Regulated Research Institution.
    4. When working at an RRI, the IACUC or the comparable animal oversight committee must approve all student research projects before experimentation begins. Such research projects must be conducted under the responsibility of a principal investigator. The local and affiliated fair SRCs must also review the project to certify that the research project complies with ISEF This local and regional SRC review should occur before experimentation begins, if possible.
    5. A Qualified Scientist or Direct Supervisor must directly supervise all research involving vertebrate animals, except for observational studies under the exempt guidelines below.
    6. After initial SRC approval, a student with any proposed changes in the Research Plan/Project Summary of the project must repeat the approval process before laboratory experimentation/data collection resumes.

The following forms are required for Vertebrate Animal Studies:

a. Checklist for Adult Sponsor (1), Student Checklist (1A), Research Plan/ Project Summary, and Approval Form (1B)
b. Regulated Research Institution Form (2C), if applicable
c. Qualified Scientist Form (2B), if applicable
d. Vertebrate Animal Form (5A) if conducted at home/school/field OR Vertebrate Animal Form (5B) if conducted at an RRI
e. PHBA Risk Assessment Form (6A), *for all studies involving tissues and body fluids*
f. Human and Vertebrate Animal Tissue Form (6B), *for all studies involving tissues and body fluids*
g. Student Support Disclosure (2A), *when applicable*

Section IV - Potentially Hazardous Biological Agents (PHBAs)

Includes microorganisms (bacteria, viruses, viroids, prions, rickettsia, fungi, and parasites), recombinant DNA technologies, human or animal fresh/frozen tissues, blood, or body fluids.

Students are permitted to do research projects with potentially hazardous biological agents meeting the conditions and rules described below which were designed to protect students and to ensure adherence to federal and international biosafety regulations and guidelines.

When dealing with potentially hazardous biological agents, it is the responsibility of the student and all of the adults involved in a research project to conduct and document a risk assessment on Potentially Hazardous Biological Agents Risk Assessment Form (6A) to define the potential level of harm, injury or disease to plants, animals and humans that may occur when working with biological agents. The **risk assessment determines a biosafety level** which in turn determines if the project can proceed, and if so, the proposed laboratory facility is properly equipped, and all personnel are trained and appropriate supervision is planned.

All projects involving microorganisms, recombinant DNA technologies and human or animal fresh/frozen tissues, blood or body fluids must adhere to the rules below AND, depending on the study, to the additional rules in **Section A** (unknown microorganisms), **Section B** (rDNA Technology), or **Section C** (Tissues and Body Fluids).

Exempt PHBA Studies (no SRC pre-approval required)
The following types of studies are exempt from requiring SRC pre-approval *as listed below but* **may be subject to additional rules dependent upon the design of the project**. Student Researchers and Adult Sponsors are required to still refer to the Rules for ALL projects and sections A-C of the PHBA rules to be aware of additional rules for projects that involve unknown organisms, recombinant DNA (rDNA) technologies, tissues, fluids, blood, or blood products **before deciding upon a final biosafety level** (BSL) designation for projects.

The following types of studies are **exempt** from prior SRC review, but require a **Risk Assessment Form 3**:

- Studies involving protists and archaea
- Research using manure for composting, fuel production, or other non-culturing experiment
- Commercially available color change coliform detection test kits; these kits must remain sealed and must be properly disposed
- Studies involving decomposition of vertebrate organisms (such as in forensic projects)
- Studies with microbial fuel cells in which the device is sealed during experimentation and disposed of properly at the conclusion of the study
- Studies involving fermentation of baker's yeast and brewer's yeast, except in rDNA studies
- Studies involving Lactobacillus, *Bacillus thuringiensis*, nitrogen-fixing, oil-eating, and algae-eating bacteria introduced into their natural environment (not exempt if cultured in a petri dish environment)
- Studies involving water or soil microbes not concentrated in media conducive to their microbial growth
- Studies of mold growth on food items if the experiment is terminated at the first evidence of mold
- Studies of slime molds and edible mushrooms (no consumption)
- Studies involving E. *coli* OP-50 and other strains of *E. coli* that are used solely as a food source for *C. elegans* and are performed at school and are not subject to additional rules for recombinant DNA studies or use of antibiotic-resistant organisms
- Studies involving E. *coli* K-12 that are performed at school and are not subject to additional rules for recombinant DNA studies or use of antibiotic resistant organisms

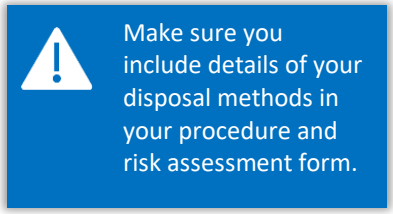
Prohibited PHBA Studies:

1. Experimentation involving the culturing of potentially hazardous biological agents, even BSL-1 organisms and *C. elegans*, is prohibited in a home environment.
    1. However, specimens may be collected at home as long as they are immediately transported to a laboratory with the BSL containment determined by the affiliated fair SRC.
2. Students are prohibited from designing or participating in any research involving biosafety levels above BSL-2. (This includes BSL-2+, BSL-3 and BSL-4.)
3. Any study involving the collection and examination of body fluids that may contain biological agents belonging to a biosafety level over 2 is prohibited. (Please see Tissue & Body Fluid Rules)

4. Students are prohibited from the insertion of antibiotic- resistance traits or selection of organisms expressing traits that may affect the ability to provide effective treatment of infections acquired by humans, animals, or plants.
    1. Students are prohibited from designing or selecting for multiple drug resistant organisms (MDROs) to investigate the pathology, development, or treatment of antibiotic- resistant infections..
5. All studies involving the use of prions or commercially available purified prion-like proteins are prohibited. This includes studies working with amyloid-beta (Ab), tau, alpha-synuclein, transactive response DNA-binding protein of 43kDa, amyloid fibrils, and Huntingtin protein. Studies involving plasmids that contain genes encoding prion-like proteins are also prohibited.
6. Propagation of recombinants containing DNA coding for human, plant or animal toxins (including viruses) is prohibited.
7. Introduction or disposal of non-native, genetically- altered, and/or invasive species (e.g. insects or other invertebrates, plants, vertebrates), pathogens, toxic chemicals or foreign substances into the environment is prohibited. Students and adult sponsors should reference their local, state and national regulations and quarantine lists.
8. Students are prohibited from collecting water samples during a Harmful Algal Bloom (HAB). Qualified personnel may collect the water samples and provide the student with the samples for testing. All water testing must be done in a BSL-2 lab, under BSL-2 conditions.

Rules for All PHBA Studies:

1. Prior review and approval is required for the use of potentially hazardous microorganisms (including bacteria, viruses, viroids, rickettsia, fungi, cyanobacteria, and parasites) and recombinant DNA (rDNA) technologies.
2. Research determined to be at Biosafety Level 1 (BSL- 1) must be conducted in a BSL-1 or higher laboratory. The research must be supervised by a trained Direct Supervisor or a Qualified Scientist. The student must be properly trained in standard microbiological practices.
3. Research determined to be a Biosafety Level 2 (BSL- 2) must be conducted in a laboratory rated BSL-2 or above and follow BSL-2 safety conditions throughout the study. (Commonly limited to a Regulated Research Institution (RRI). The research must be reviewed and approved by the Institutional Biosafety Committee (IBC) if the RRI requires the review. For a high school BSL-2 laboratory, the SRC must review and approve. The research must be supervised by a Qualified Scientist.
4. Laboratory studies involving the culturing of clinically significant multidrug resistant organisms (MDROs) must have a written justification for usage and be conducted at an RRI laboratory with a minimum of BSL-2 containment and documented IBC review and approval.
    1. Representative examples include, but are not limited to the following known agents: MRSA (Methicillin-Resistant *Staphylococcus aureus*), VISA/VRSA (Vancomycin Intermediate or Resistant *Staphylococcus aureus*), VRE (Vancomycin- Resistant *Enterococci*), CRE (Carbapenem Resistant *Enterobacteriacae*), ESBLs (Extended Spectrum Beta-Lactamase producing gram negative organisms), and fungi (yeasts or molds) with known resistance to antifungal agents.
    2. Extreme caution must be exercised when selecting and sub-culturing antibiotic-resistant organisms. Studies using such organisms, including BSL-1 organisms that may have originally been exempt from prior SRC approval, require at least BSL-2 containment.
    3. Insertion of antibiotic resistance markers for the clonal selection of bioengineered organisms is permitted, with the exceptions outlined in prohibited studies item #4.
5. The culturing of human or animal waste, including sewage sludge, is considered a BSL-2 study.
6. Naturally-occurring plant pathogens may be studied (not cultured) at home, but may not be introduced into a home/ garden environment.
7. Projects involving water samples collected from active Harmful Algal Blooms are considered BSL-2 studies.
8. Studies involving animal models that have been bred to express prion-like proteins, including but not limited to C. *elegans* and *Drosophila*, are permissible in a BSL-1 laboratory, if the studies are behavioral only and do not involve lysing or dissection of cells or purification of proteins. Work involving the lysis of cells or cell lines and/or purification of prion-like proteins must be conducted in a BSL-2 laboratory, under BSL-2 conditions.
9. All local, state and national laws and permit requirements must be followed regarding the transport and use of microorganisms such as, but not limited to citrus greening or tobacco mossaic, etc.
10. **All potentially hazardous biological agents must be properly disposed of at the end of experimentation in accordance with their biosafety level.** For BSL 1 or BSL 2 organisms: Autoclave at 121 degrees Celsius for 20 minutes, use of a 10% bleach solution (1:10 dilution of domestic bleach), incineration, alkaline hydrolysis, biosafety pick-up and other manufacturer recommendations are acceptable.



A. Projects Involving Unknown Microorganisms:

1. Research with unknown microorganisms can be treated as a BSL-1 study under the following conditions:
    1. Organism is cultured in a plastic petri dish (or other standard sterile non-breakable container) and sealed.
    2. Experiment involves only procedures in which the petri dish remains sealed throughout the experiment (e.g., counting presence of organisms or colonies).
    3. The sealed petri dish is disposed of via autoclaving or disinfection under the supervision of the Direct Supervisor.
2. If a culture container with unknown microorganisms is opened for any purpose, (except for disinfection/ disposal), it must be treated as a BSL-2 study and involve BSL-2 laboratory precautions.

B. Projects Involving Recombinant DNA (rDNA) Technologies:

1. All rDNA technology studies involving BSL-1 organisms and BSL-1 host vector systems, including commercially available kits, must be conducted in at least a BSL-1 laboratory under the supervision of a Qualified Scientist or Direct Supervisor and must be approved by the SRC prior to experimentation. Examples include cloning of DNA in E. coli K–12, S. cerevesiae, and B. subtilis host-vector systems.
    1. An rDNA technology study using BSL-1 agents that may convert to BSL-2 agents during the course of experimentation must be conducted entirely in a BSL-2 facility.
    2. All rDNA technology studies involving BSL-2 organisms and/or BSL-2 host vector systems must be conducted in an RRI and approved by the IBC prior to experimentation, where applicable.
    3. All genome editing studies that include alteration of germline cells, insertion of gene drivers, use of rapid trait development systems (RTDS®), etc., should be categorized as a BSL-2 study and must be conducted at an RRI and approved by the IBC from the institution. Qualified scientists are expected to ensure that student research protocols address appropriate intrinsic and extrinsic containment containment precautions.

Documentation and Approval:

1. The student and all of the adults involved in a research project must conduct and document a risk assessment on Form (6A) to define the potential level of harm, injury or disease to plants, animals and humans that may occur when working with biological agents. The risk assessment determines a biosafety level which in turn determines if the project can proceed, and if so, the proposed laboratory facility is properly equipped and all personnel are trained and appropriate supervision is planned:
    1. Give source of the organism and describe BSL assessment process and BSL determination.
    2. Detail safety precautions and discuss methods of disposal.
2. Prior review and approval is required for the use of potentially hazardous microorganisms (including bacteria, viruses, viroids, rickettsia, fungi, and parasites) and recombinant DNA (rDNA) technologies.
    1. An affiliated fair SRC, an IBC or an IACUC must approve all research before experimentation
    2. The initial risk assessment determined by the student researcher and adults supervising the project must be confirmed by the SRC, IBC or IACUC.
3. Any proposed changes in the Research Plan/Project Summary by the student after initial local or affiliated fair SRC approval must undergo subsequent SRC, IBC or IACUC review and approval before such changes are made and before experimentation resumes.

Section C Rules: Projects with Tissues and Body Fluids, including Blood and Blood Products

Projects that involve Tissues and Bodily Fluids follow these specific rules, exemptions and prohibitions

Exempt Tissue and Bodily Fluid Studies (No SRC Pre-Approval Required):

1. The following types of tissue do not need to be treated as potentially hazardous biological agents:
    1. Plant tissue (except those known to be toxic or hazardous)
    2. Plant and vertebrate established cell lines and tissue culture collections (e.g., obtained from the American Type Culture Collection). The source and/ or catalog number of the cultures must be identified in the Research Plan/Project Summary and on forms 3.
    3. Human capillary/blood collection (i.e. finger stick) of the student researcher to themself; blood collection from any other human participants must be reviewed and approved by an IRB
    4. Collection and/or study without culturing of eggs, pasteurized milk or fresh or frozen meat, meat by-products obtained from food stores, restaurants, or packing houses.
    5. Hair, hooves, nails and feathers
    6. Teeth that have been sterilized to kill any blood- borne pathogen that may be present
    7. Fossilized tissue or archeological specimens

Collected or purchased products must be sterilized in accordance with rules below to avoid danger of unknown organisms.

2. Projects utilizing only data or images are exempt from IACUC pre-approval ONLY if the originating study is published in a peer-reviewed journal or the data is available in a publicly available database. In this case, the student must provide a reference to the original study OR link to the database.
3. If the data or images were obtained from another scientist (mentor or not a mentor) or source AND the research is not yet published (not publicly available), then IACUC approval of the original study must be provided by the ISEF participant.

Prohibited Tissue Studies:

1. Any study involving the collection and examination of body fluids, including blood, that may contain biological agents belonging to BSL-2+, BSL-3, BSL-4 is prohibited.

Rules for Tissue Studies:

1. Research involving human and/or non-human primate established cell lines and tissue culture collections (e.g., obtained from the American Type Culture Collection) must be considered a BSL-1 or BSL-2 level organism as indicated by source information and treated accordingly.
2. If tissues are obtained from an animal that was euthanized for a purpose other than the student's project, it may be considered a tissue study.
    1. Use of tissues obtained from research conducted at a Regulated Research Institution (RRI) requires a copy of the Institutional Animal Care and Use Committee (IACUC) certification with the name of the research institution, the title of the study, the IACUC approval number and date of IACUC approval.
    2. Use of tissues obtained from agricultural/ aquacultural studies require prior SRC approval.
3. If the animal was euthanized solely for the student's project, it would be in violation of Massachusetts law for high school researchers.
4. The collection and examination of fresh/frozen tissues or body fluids or meat and meat by-products obtained from food stores, restaurants, or packing houses must be considered biosafety Level 1 studies and must be conducted in a BSL-1 laboratory or higher.
5. If body fluids or fresh/frozen tissues (including meat, meat by-products) are NOT obtained from food stores, restaurants, or packing houses:
    a) Collection must be made with appropriate precautions for safety addressed for the specific tissue/fluid.
    b) Examination and study must be conducted as BSL-2 studies in a BSL-2 laboratory under the supervision of a Qualified Scientist.
6. Human breast milk of unknown origin, unless certified free of HIV and Hepatitis C, and domestic unpasteurized animal milk are considered BSL-2.
7. Studies involving blood and/or blood products:
    a) If involving human blood, research must be considered BSL-2 and done under the supervision of Qualified Scientist. If only the blood of the student researcher, it is exempt from this requirement.
    b) If involving wild animal blood, research must be considered BSL-2 and done under the supervision of a Qualified Scientist.
    c) If involving domestic animal blood, the study may be considered a BSL-1 study.
8. All blood must be handled in accordance with OSHA and APHIS standards and guidelines. Anytissue or instruments with the potential of containing blood-borne pathogens (e.g. blood, blood products, tissues that release blood when compressed, blood contaminated instruments) must be properly disposed of after experimentation. Studies of human body fluids, where the sample can be identified with a specific person, must have IRB review and approval, and informed consent.
9. A project involving a student researcher using their own body fluids (if not cultured)
    1. must receive prior SRC review and approval prior to experimentation
    2. can be considered a BSL-1 study
    3. may be conducted in a home setting
    4. must have Institutional Review Board (IRB) review if the body fluid is serving as a measure of an effect of an experimental procedure on the student researcher (e.g. student manipulates diet and takes a blood or urine sample). An example of a project not needing IRB review would be collecting urine to serve as a deer repellent.
10. Studies involving embryonic human stem cells must be conducted in an RRI and reviewed and approved by the ESCRO (Embryonic Stem Cell Research Oversight) Committee.

Documentation and Approval:

1. Student researchers must have a Research Plan that includes all of the standard elements as well as the following areas specific to tissue research:
    1. Give source of the organism and describe BSL assessment process and BSL determination.
    2. Detail safety precautions and discuss methods of disposal.

2. The source and/or catalog number of the cultures must be identified in the Research Plan/Project Summary, and on forms 6A and 6B, even if the project is exempt from IRB approval. If catalog number is unavailable, student can provide a receipt and/or letter from mentor regarding the origin of the items.
    1. If the tissue is obtained from a private/non- commercial source (public or private laboratory, museum, etc.), documentation from the supplier must be uploaded in the application, including IACUC approvals for the original study. This includes samples from blood banks or human breast milk.
    2. If obtained from mentor's study or another lab's study, upload original study's IACUC approval OR reference to the original study's publication.
3. Prior review and approval is required for the use of human or vertebrate fresh/frozen tissues, blood, or body fluids.
    1. An affiliated fair SRC, an IBC or an IACUC must approve all research before experimentation begins.
    2. The initial risk assessment determined by the student researcher and adults supervising the project must be confirmed by the SRC, IACUC, or Institutional Biosafety Committee (IBC).
4. Any proposed changes in the Research Plan/Project Summary by the student after initial local or affiliated fair SRC approval must undergo subsequent SRC or IBC review and approval before such changes are made and before experimentation resumes.

Find more information from Society for Science on

- **Prohibted in a Home Environment**
- **PHBA Risk Assessment, Risk Groups and Biosafety Lists**
- **BSL-1 and BSL-2 Laboratory Self Checklists**

These can be found starting on page 38 in the Companion Guide for International Rules 2026-2027, societyforscience.org/ISEF

SEE ALSO Appendix C: Guidance for Risk Assessment: Potentially Hazardous Biological Agents (PHBAs)

The following forms are required:

a. Checklist for Adult Sponsor (1), Student Checklist (1A), Research Plan/ Project Summary, and Approval Form (1B)
b. Regulated Research Institution Form (2C), *when applicable*
c. Qualified Scientist Form (2B),
d. Risk Assessment (3), *when applicable*
e. PHBA Risk Assessment Form (6A),
f. Human and Vertebrate Animal Tissue Form (6B), *for all studies involving tissues and body fluids*
g. Student Support Disclosure (2A), *when applicable*

How to Participate in the Massachusetts Science & Engineering Fair

Index:

MSEF Network: Why and How

The Massachusetts Science & Engineering Fair (MSEF) is the culmination of programming for high school students who have produced science or engineering projects, exhibited in local school or Regional Fairs and advanced to statewide competition.

A one-day event held annually, the Fair event is a valuable learning experience and provides students with the opportunity to win awards and scholarships and participate in additional science-oriented activities. The Massachusetts Department of Elementary and Secondary Education (DESE) supports the opportunities available through participation in MSEF.

Beyond the event, Science & Engineering Fairs provide a unique journey for each student to explore personally meaningful questions, paving the way to academic growth and personal self-discovery. Each year, thousands of middle and high school students develop independent research questions, plan investigations, collect data, and share their stories with fellow students, teachers, and communities.

During the fair, students have an opportunity to showcase all their hard work and creativity through oral presentations and responding to questions from the judges, students, and members of their community. Although science and engineering fairs still involve an element of competition, this experience celebrates each student's learning journey. Receiving meaningful feedback from their peers and professionals in a STEM field is a powerful experience that has a lasting positive impact on students

Local

Many high schools across the state sponsor their own Science & Engineering Fairs at the school, district, or community level. These local Fairs give students a chance to share with classmates their ideas, discoveries, and enthusiasms for science. Local Fairs provide an excellent training ground for students to sharpen communication and presentation skills. Each high school in the Commonwealth may send two projects directly to the State Fair.

Regional

Six regional fairs are held in March. Students are encouraged to participate in their respective regional fairs as this provides the student with an opportunity to meet students from other schools and sharpen communication skills. Schools will participate directly with the Regional Chair for registration information.

Each regional fair can certify and send projects based on participation numbers at the regional fair and with a maximum set each year. Each school may also send two projects directly to the State Fair. If one of the regional winners is unable to participate in the State Fair, the student must notify the Regional Chair and MSEF who have the option to designate another candidate. It is important to note that a winner in a regional fair is ineligible for MSEF if s/he has participated in a regional fair outside the school's assigned region.

The six MA regional fairs, respective Chairpersons, and towns, cities and regional high schools in each region are available on the website: www.scifair.com and https://mahs.zfairs.com

Massachusetts Science & Engineering Fair: State Fair

Massachusetts Science & Engineering Fair, Inc. conducts an annual program of competitive science and engineering fairs open to high school (grades 9-12) and middle school (grades 6-8) students from all public, private, parochial, and home schools. This manual covers only the program for high schools. *See MAMS.zfairs.com for grades 6-8.* The MSEF program is composed of six separate regional fairs and one state fair, thereby providing a competitive hierarchical path upward, from school to the regional,

state, and even the International Science and Engineering Fair (ISEF). Student projects are judged at all fairs, the results are announced, and awards are presented at public ceremonies.

International Science & Engineering Fair (ISEF)
The Massachusetts Science & Engineering Fair is an affiliated fair of the International Science and Engineering Fair (ISEF). Participation at ISEF is based on participation and scoring at the regional fairs or the state fair. Typicallyt, the top project at each Regional Fair and the top several projects at the State Fair are the Massachusetts Delegates for ISEF. **Combined, Massachusetts typically sends fifteen projects to ISEF.** ISEF designates the number of projects that each fair can send.

Hosted annually in a North American city, ISEF hosts almost 1,700 student exhibitors from more than 70 countries and many states in the U.S. The weeklong program provides all participants with the opportunity to join with their national and international compatriots to share and exchange knowledge and develop lasting friendships.

Massachusetts follows the rules and requirements of ISEF fairs so that all students could be eligible to be a Massachusetts delegate if they are chosen through their fair placement.

Science & Engineering Fair Expectations and Policies

MSEF is open to students from all public, private, and home schools (grades 9-12) throughout the state. Schools are encouraged to send participants to their respective regional fairs. Schools should contact the appropriate regional fair director for details. Each regional fair sends a percentage of student projects to the State Fair based on participation and placement at the regional fairs. In addition to the regional fair entries, each school can send two additional projects directly to the state fair as a 'direct entry.'

- The completion of the Research Plan with accompanying required Approval and Consent Forms is required to certify the project in terms of safety and integrity. All students should have the approval of a qualified adult (usually a teacher) before beginning experimentation. Some projects need additional approval before experimentation.
- The final approval before participation in a regional or state fair. All projects must be reviewed and approved by MSEF and regions before participation in the fairs to confirm compliance. This typically occurs in January and February after projects are complete and before the regional fairs.
- Review the Science Fair Ready Checklist at www.scifair.com/resources for more details and resources.

Eligibility/Limitations

1. Each regional fair has an affiliation agreement with MSEF that determines the number of projects to send to the state fair.
2. A student must meet both of the following:
    a. be in grades 9-12 or equivalent; and
    b. not have reached age 20 on or before May 1 preceding the fair
3. English is the official language of MSEF. Student project boards and abstracts must be in English. Judging takes place in English. **If a translator is necessary, please contact MSEF.**
4. If students need accomodations for disabilities in order to participate fully in the fair, please contact MSEF and review the Policy for Reasonable Accomodation of Qualified Students with Disabilities found at www.scifair.com
5. Each student is only allowed to enter one project. That project may include no more than 12 months of continuous research and may not include research performed before January of the previous year.
6. Team projects must have no more than three members. The team lead determines the geographic eligibility of the team. Teams competing at MSEF must be composed of members who all meet MSEF eligibility.
7. Students may compete in only one affiliated regional fair each year.
8. Multiple sciences and engineering disciplines are represented at MSEF. Review a complete list of categories and sub-categories with definitions in the Appendix or at www.scifair.com/fairs

Sponsorship and Permissions

Students are eligible for participation in the Massachusetts Science & Engineering Fair (MSEF) and Affiliated Regional Fairs based on their enrollment in a Massachusetts School (grades 6-12) regardless of their state of residency. Eligibility in Science Fair is based on school affiliation.

- Students should coordinate with their school to identify a teacher to support their project. Students represent their schools so permission for participation, oversight of the project work and alignment with school rules and policies is important for integrity and safety. A teacher may serve one or both roles:
    - TEACHER: Provide permission to participate as a representative of the school; Oversee academic integrity and ethics of the project; Create a zFairs acct to indicate approval and communicate with fair organization about participation at event(s)
    - ADULT SPONSOR: Provide oversight of scientific integrity, ethics, and safety of the project; signs forms as Adult Sponsor; May be the teacher but may also be another teacher at the school or an outside professional

- Students who do not have their schools' support may have a path to participation through select non-profit or municipal organizations. Contact info@scifair.com for details and eligibility BEFORE beginning work. Hosting organizations must apply for inclusion no later than December in the year preceding the Fair.
- Students who are registered as state-approved homeschool are eligible to participate based on the town where they live
- Students who attend virtual schools are eligible based on the town where they live. Their affiliation will be listed as 'name of school, hometown.'

Timeline for Participation

1. The present project year includes research conducted over a maximum, continuous 12-month period between January 1st of the previous year and May of the year of the fair.
2. Projects in Restricted Areas of Research requiring SRC pre-approval must be submitted through zFairs to the Statewide SRC before experimentation begins – https://mahs.zfairs.com. See the **Regional and State Fair Info** tab for dates of review and deadlines.
3. Experimentation and data collection can begin only after forms have been completed, submitted, and approved by the Statewide SRC if the research topic is in a restricted area.
4. **School fairs** typically occur during January and February. School fairs must be held by the first week in March.
5. **Regional fairs** will be held by the first or second week in March. Check mahs.zfairs.com for actual dates and locations of regional fairs.
6. Information on how to access the online information for the **state fair** will be provided to regional winners and schools participating in direct entry.
7. Massachusetts Science & Engineering Fair – State Fair is typically the last week or March or first week of April. Watch for the official Fair Date announcement on www.scifair.com.

Please note:
MSEF, Inc. is responsible for all decisions relative to project acceptance. All decisions are final.
MSEF, Inc. assumes no responsibility for project acceptance decisions made at the school or regional levels

Student Risk
Projects shall be accepted for display upon the express condition that neither the Massachusetts Science & Engineering Fair, Inc., event host location, nor any other Fair sponsor be held responsible for the loss or theft of, or any damage to exhibits or exhibitor's personal property.

Student Obligations
Students must participate fully in all Fair activities including the Awards Ceremony. During judging and exhibition times, the students must remain with their projects. If a personal emergency occurs during the Fair, a student must notify a MSEF designated committee member at the Registration Table who will contact MSEF staff. **See full eligibility policy for the High School State Fair. Regional Fairs may enforce different policies.**

Student Expenses
MSEF and all its sponsors assume no responsibility for travel, lodging, or other activities of the state fair participants and exhibitors. These responsibilities lie with the local school authorities and/or with the students' parents and guardians.

Project Display Guidelines

If the MSEF Safety Committee and the Event Host site staff consider the presence or operation of any equipment or material to be dangerous or unsafe, they shall have the right to prohibit the presence or operation of such equipment or material. Exhibitors should plan to demonstrate the safe use of hazardous materials through photographs, videos, charts, diagrams, and other simulations such as facsimiles. These rules are subject to change based on parameters and restrictions of host site.

All Science & Engineering Fair participants must attend to the safety aspects of their project, as follows:

- No exhibit may be larger than 122 centimeters (cm) wide X 76 cm deep X 274 cm high from the floor. If the exhibit will be set on a table, the height cannot exceed 198 cm above the table.
    - No oversized projects will be permitted.
    - Due to safety and fire regulations, no portion of the project may occupy aisle space.
- The weight of the exhibit apparatus should not exceed what a typical folding table can support. Tape, tacks, and other such materials and wall space are not available. Students should construct their exhibit so that wall space is not necessary. Exhibitors must provide their own tape, thumbtacks, stapler, and any other necessary tools
- The following items cannot be included on the board or visual display: any awards, medals, personal websites, social media addresses, emails, QR codes, the name of any industrial/educational institution where the project was completed, school name, postal addresses, or telephone numbers.
- No display lighting is permitted.
- No running water is available.
- Quantities of water must be limited to small break-resistant containers/tanks and secondary containers used. The student shall protect experiments using any combination of water and electricity, by a Ground Fault Circuit Interrupter (GFCI).
- Anything that could be hazardous is prohibited, including the following:
    1. live animals and poisonous plants
    2. pathogenic microbial agents, e.g., viruses, bacteria, fungi
    3. microbial agents used in recombinant DNA experiments
    4. hypodermic needles, syringes, razor blades, and other sharp items
    5. all chemical substances except water and saline
    6. any instruments containing mercury, e.g., thermometers
    7. glass bottles and lab ware, either empty or containing any substance (must be replaced by break-resistant containers or placed in secondary containers)
    8. drugs, over-the-counter medications, antibiotics, and vitamins
    9. The following restrictions apply to acceptable chemical and microbial specimens:
        - All acceptable specimens to be used in the project must be fully and clearly labeled.
        - Abbreviations or formulas should not be used.
        - All acceptable specimens should be transported and displayed in break-resistant containers.
- All parts of the exhibit must be structurally sound and constructed of durable materials.
- Push buttons and levers must be securely mounted to the exhibit. They cannot be attached to tables or walls.
- All power-driven parts must be suitably guarded to prevent unauthorized or accidental access.
- All wiring of electrical apparatus must conform to the Massachusetts and National Electric Code. If in doubt, consult a licensed electrician.
- All exhibits that require an external source of electricity for operation must be designed for a standard 110–125 volt AC supply.
- Antenna lines and long leads cannot be used.
- All wiring, switches, power cords and metal parts carrying current in an AC circuit must be properly selected for load requirements and soldered or fixed under UL approved connectors with insulated connecting wires. No exposed wires, switches, joints, or non-insulated fasteners will be permitted.
- The power supply cord for the electrical apparatus must be no longer than six feet and must terminate in a three-pronged outlet. All power supplies and electrical equipment must be grounded and connected to a Ground Fault Circuit Interrupter (GFCI).
- High voltage areas and any areas which could present an electrical hazard must be completely enclosed by a protective barrier equipped with a safety interlock to cut off all power if the cover, door, barrier is opened or removed.
- Bare wire and exposed knife-type switches are permitted on 12-volt DC circuits or less. UL approved standard enclosed switches are required for all other electrical installations.
- Wet-cell batteries with open tops are not permitted. Closed-cell or dry-cell batteries are permissible.
- Compressed gases must be handled in compliance with standards established by the Compressed Gas Association.

- The operation of pressure vessels and pressurized systems is permitted providing all parts conform to the Massachusetts Safety Code for such items. Similarly, vacuum systems present an implosion hazard and all vacuum vessels must be determined to be capable of tolerating a high vacuum pressure environment.
- Any exhibit producing temperatures exceeding 100 degrees C. (212 degrees F.) must be adequately insulated from its surroundings. Asbestos-free insulation materials should be used.
- Because of the fire and burn hazard, there must be no open flame, torch, or burner in the display area.
- Projects involving ionizing radiation, such as x-rays and radioactive materials, must be equipped with minimum safeguards as required by the Massachusetts Department of Public Health and the U.S. Nuclear Regulatory Commission.
- Lasers, welders, high-intensity visible light, infrared and ultraviolet radiation and other non-ionizing radiation must be displayed with safeguards as required by the U.S. Department of Labor, Occupational Health, and Safety Standards and by the Massachusetts Department of Public Health. Class III and Class IV lasers are prohibited.
    - A source for information on laser standards and research is:
        U.S. Food and Drug Administration
        Office of Compliance and Surveillance
        1390 Piccard Drive, Rockville, MD 20850
        phone (301) 427-1172
- All microwave and radio frequency sources must be designed and operated in compliance with state and federal regulations as well as applicable standards of the American National Standards Institute.
- Robotics projects should have interlocks or other controls
- Participants may only present judges with a copy of their official abstract submitted at the time of registration and appears in the abstract book. Students may not present judges with other hand-out items, such as flyers, pens, flash drives, pins, disks, CD's business cards, brochures, etc.

Any Student, Adult Sponsor, Qualified Scientist, or Direct supervisor who has a question about a project's compliance to these rules should contact the MSEF Safety Committee.

Note: Students may petition the MSEF Safety Committee for exceptions before March 15th of the year of the fair in written correspondence to info@scifair.com. MSEF rules may differ from display regulations for ISEF found here: https://www.societyforscience.org/isef/international-rules/display-safety-rules/

Award Recognition Program

MSEF is fortunate to have many corporations, educational institutions, professional organizations, and individuals whose generosity has helped MSEF to provide a generous award program.

As registered MSEF entrants, students automatically become candidates for awards. Customary criteria used for award distribution include, but is not limited to, scoring results, prize values and individual student preferences. There is no consideration given to financial need. Massachusetts Science & Engineering Fair, Inc. retains the sole responsibility for award distribution and all decisions are final.

Awards and Recognition at the regional fairs is at the regional committees' discretion.

Description of Awards
Through the generosity of MSEF donors, there are several award categories – monetary, college scholarships, experiential, educational and miscellaneous. Following is a brief description of each category:

Placement Awards
These awards are presented to the top placing students at the state fair according to combined scores from judges. The top placement awards typically are monetary awards.

Special Awards
Special awards are determined based on a combination of topic and placement and are typically sponsored by an MSEF partner or funder. These awards weigh the topic and approach of the project more heavily than overall placement. In many cases, special award judges review projects at the fair to identify a winner. In some cases, teachers submit nominations for consideration according to specific criteria.

Monetary

Cash prizes are disbursed by check within four weeks following the Fair. MSEF, Inc. will not be held responsible for cash awards if a winner does not cash award check within sixty (60) days from date of issue. Note: Team project awards are usually monetary and are divided evenly between the project participants.

Summer Program and Tuition Scholarships
MSEF is proud to offer scholarships to support students beyond the Science Fair, including:

Summer Program Scholarships
MSEF offers scholarships to help cover the cost of summer STEM programs, such as research institutes, pre-college courses, and STEM camps. Eligibility for these scholarships is determined by the guidelines of the sponsoring institutions, and students must have participated in the MSEF High School Science & Engineering Fair.

Students will be awarded summer programs at the MSEF High School State Fair.

Tuition Scholarships
MSEF partners with select colleges and universities to offer tuition scholarships to students who competed at the High School State Fair. The amount of each scholarship is determined by the partner institution, and the award is applied only if the student enrolls at that school.

For students who participated in the State Fair as juniors, the application opens in late summer or early fall of their senior year. Students may apply for a scholarship to any partner institution where they have already applied or plan to apply.

Details about participating schools and how to apply will be shared via email to eligible students.

Questions? Contact us at student@scifair.com

Alternate Winners
MSEF, Inc. selects alternate winners for some of the awards within the College Scholarship, Experience and Educational award categories. Winners are asked to notify MSEF if they do not accept/plan to use an award. MSEF, Inc. and/or the award donor will contact the alternate winner. Alternate winners should periodically contact MSEF headquarters to inquire about the status of the award

Appendix

Appendix A: Guidance for Risk Assessment: Hazardous Chemicals and Devices

Use these guidelines to perform a Risk Assessment when using POTENTIALLY Hazardous Chemicals and Devices.

A proper Risk Assessment Form 3 for chemicals must include a review of the following factors:

1. **Toxicity** – the tendency of a chemical to be hazardous to health when inhaled, swallowed, injected or in contact with the skin.
    a. *Human health toxicity* includes acute and chronic hazards when inhaled, swallowed, injected or in contact with the skin.
    b. *Environmental health* includes aquatic toxicity (both acute and chronic), toxicity to mammals and birds, and impact on ecosystems.
2. **Reactivity** — the tendency of a chemical to undergo chemical change, including instability and reactivity with other substances or conditions (i.e., reaction with water, air, temperature, pressure).
3. **Flammability** — the tendency of a chemical to give off vapors which readily ignite when used under normal working conditions (ambient temperatures).
   Combustible substances can include:
    a. **Chemical solvents** that produce vapors which readily ignite when used under normal working conditions.
    b. **Combustible solids** (small particles, powders, or substances easily ignited by fire or an ignition source)
4. **Corrosiveness** — the tendency of a chemical, upon physical contact, to harm or destroy living tissues or physical equipment.

When assessing risk, the **type** and **amount** of exposure to a chemical must be considered. For example, an individual's allergy and genetic disposition may influence the chemical's overall effect.

The student researcher must refer to Safety Data Sheets provided by the vendor (SDS) to **ensure that proper safety precautions are taken**. Some SDS sheets (e.g., Flinn) rank the degree of hazard associated with a chemical.

The risk assessment (documented on Form 3) must include **proper disposal methods** for the chemicals used in an experiment. The Flinn Catalog provides information for the proper disposal of chemicals. If applicable, the student researcher must incorporate in the research plan disposal procedure required by federal and state guidelines.

B. Hazardous Devices

The documentation of Risk Assessment Form 3 is required when a student researcher works with:

1. potentially hazardous/dangerous equipment and/or other devices that,
2. require a moderate to high level of expertise to ensure their safe usage.

Examples:

- Definitely Hazardous (complete Form 3)
  high vacuum equipment, heated oil baths, NMR equipment, and high-temperature ovens
- Maybe Hazardous
  (if the student has experience with it, no Form 3 required)
  Bunsen burners, hot plates, saws, drills, etc.
- Potentially Hazardous (recommended Form 3)
  any student designed inventions or prototypes

Environmentally Responsible Chemistry

The mission of environmentally responsible (green) chemistry is to avoid the use or production of hazardous substances during the chemical process. The principles of green chemistry are described on the EPA website in the Sources of Information section. Whenever possible the following principles should be incorporated into the research plan.

- Waste prevention
- Use of the safest possible chemicals and products
- Design of the least possible hazardous chemical syntheses
- Use renewable materials
- Use catalysts in order to minimize chemical usage
- Use of solvents and reaction conditions that are safe as possible
- Maximization of energy efficiency
- Minimization of accident potential and avoiding the use of reactive substances

C. Radiation

The documentation of Risk Assessment Form 3 is required when a student researcher works with:

- radiation beyond that normally encountered in everyday life
- ionizing radiation (e.g., X rays, gamma rays)

Appendix B: Guidance for Risk Assessment: Human Participants

Use the guidelines below when designing or reviewing projects with Human Participants.
The goal is to (1) minimize risk, (2) determine how to protect privacy,
and (3) determine how to obtain consent/assent from participants.

Refer to the Companion Guide for International Rules 2026-2027 for more detailed information and explanation of rules and examples – including guidelines for **online survey consent** procedures and **making data anonymous**.

1. All human participant projects are considered to have some level of risk. The goal is to REDUCE the risk to participants.

No more than minimal risk exists when the probability and magnitude of harm or discomfort anticipated in the research are not greater than those *ordinarily encountered by a potential participant in daily life* or during performance of routine physical or psychological examinations or tests. physical, psychological or possibility of sharing a person's private information must be very small to be considered no more than minimal risk.

More than minimal risk exists when the (1) possibility of **physical or psychological harm**, (2) the harm related to **breach of confidentiality**, or (3) the risk of invasion **of privacy** is greater than what is typically encountered in everyday life. Most of these students require documented informed consent.

All projects involving students under 18 will always require minor assent with the permission of parent or guardian.

- Examples of Studies with **Greater than Minimal** PHYSICAL **Risk:**
  - Exercise other than ordinarily encountered in everyday life
  - Ingestion, tasting, smelling, or application of a substance.
    - However, *ingestion* or *tasting* projects that involve commonly available food or drink will be evaluated by the IRB which determines risk level based upon any known or potential allergies or medical conditions among any participants, the nature of the study, and local norms.
  - Exposure to any potentially hazardous material.

- Examples of Studies with **Greater than Minimal** PSYCHOLOGICAL **Risk:**
  - A research activity (e.g., survey, questionnaire, viewing of stimuli) or experimental condition that could potentially result in emotional stress:
    - answering questions *related to personal experiences* such as sexual or physical abuse, divorce, depression, anxiety
    - answering questions *that could result in feelings of* depression, anxiety, or low self-esteem
    - answering questions that have the potential to put researcher or mentor into the role of mandated reporter
    - viewing violent or distressing video images

2. **Confidentiality and Privacy Concerns**
   a. The student researcher and IRB must consider whether an activity could potentially result in negative consequences for the participant due to invasion of privacy or breach of confidentiality. Protecting confidentiality requires measures to **ensure that identifiable research data are not disclosed to the public or unauthorized individuals.**

   b. Risk level can be reduced by protecting confidentiality or **collecting data that is strictly anonymous**. This requires the collection of research in such a way that it is impossible to connect research data with the individual who provided the data.

Appendix C: Guidance for Risk Assessment: Potentially Hazardous Biological Agents

Use this information to complete PHBA Risk Assessment Form 6A.

Risk assessment defines the potential level of harm, injury or disease to plants, animals and humans that may occur when working with biological agents. The end result of a risk assessment is the assignment of a biosafety level which then determines the laboratory facilities, equipment, training, and supervision required.

Risk assessment involves:

- Studies involving a known microorganism must begin with an initial assignment of the microorganism to a biosafety level risk group based on information available through a literature search.
- The study of unknown microorganisms and the use of fresh tissues relies on the expertise of the supervising adult(s).
- Determination of the level of biological containment available to the student researcher to conduct the experimentation. (See "Levels of Biological Containment" for details.)
- Assessment of the experience and expertise of the adult(s) supervising the student.
- Assignment of a biosafety level for the study based on risk group of biological agent, level of biological containment available and the expertise of the Qualified Scientist or Direct Supervisor who will be supervising the project.
- Documentation of review and approval of study prior to experimentation:
    - If a study is conducted at a non-regulated site (e.g. school), the SRC reviews the Research Plan.
    - If the study was conducted at a Regulated Research Institution, and was approved by the appropriate institutional board (e.g. IBC, IACUC), the SRC reviews the institutional forms provided.
    - If a PHBA study was conducted at a Regulated Research Institution but the institution does not require review for this type of study, the SRC can review and indicate their approval via box 2B of Form 1B after confirming that the student received appropriate training and the project complies with the International Rules.

CLASSIFICATION OF BIOLOGICAL AGENTS RISK GROUPS

Biological agents are classified according to biosafety level risk groups. These classifications presume ordinary circumstances in the research laboratory, or growth of agents in small volumes for diagnostic and experimental purposes.

BSL-1 risk group contains biological agents that pose low risk to personnel and the environment. These agents are highly unlikely to cause disease in healthy laboratory workers, animals or plants. The agents require Biosafety Level 1 containment. Examples of BSL-1 organisms are: *Agrobacterium tumefaciens, Micrococcus leuteus, Neurospora crassa, Bacillus subtilis*.

BSL-2 risk group contains biological agents that pose moderate risk to personnel and the environment. If exposure occurs in a laboratory situation, the risk of spread is limited and it rarely would cause infection that would lead to serious disease. Effective treatment and preventive measures are available in the event that an infection occurs. The agents require Biosafety Level 2 containment. Examples of BSL-2 organisms are: *Mycobacterium tuberculosis, Streptococcus pneumoniae, Salmonella enterica (formerly Salmonella choleraesuis)*.

BSL-3 risk group contains biological agents that usually cause serious disease (human, animal or plant) or that can result in serious economic consequences. Projects in the BSL-3 group are prohibited.

BSL-4 risk group contains biological agents that usually produce very serious disease (human, animal or plant) that is often untreatable. Projects in the BSL-4 group are prohibited.

Refer to the Companion Guide for International Rules 2026-2027 for more detailed information and explanation of rules and examples

Appendix D: Guidance for Risk Assessment: Engineering and Invention Projects

Use this information to help examine the components of an Engineering Project and potential areas that will require pre-approval and/or extra safety precautions.

This has been developed as a checklist with a series of questions to consider as you begin and design an engineering or invention project.

Consider the answers to the questions below. If the response is yes, then the project may fall under more specific rules and those sections of the Rules & Guidelines should be consulted.

Hazardous Chemicals, Activities and Devices

Will your project involve any of the following?

- ☐ DEA-controlled Substances
- ☐ Firearms and Explosives
- ☐ Prescription Drugs
- ☐ Alcohol & Tobacco
- ☐ Regulated Drones
- ☐ Radiation

*If any are checked, see **Hazardous Chemicals, Activities or Devices** Rules (page 19)*

Device Testing with Human Participants

- ☐ Are you going to test your project (device, app, invention, prototype, etc.)?
  - ☐ If yes, does it require persons to interact with it other than yourself or adult sponsor/supervisor?
- ☐ Do you intend to gather background knowledge through a survey or interviews to understand the potential use and needs for your project design?
- ☐ Are you going to ask for opinions or suggestions on your project design at any point of the project?
- ☐ Does your project intend to gather personal data/have a health benefit to the user?

*If any are checked, see **Human Participant** Rules (Page 21)*

Vertebrate Animals

- ☐ Does your project include any interaction with vertebrate animals in any phase of the project?

*If any are checked, see **Vertebrate Animal** Rules (page 25)*

Potentially Hazardous Biological Agents

- ☐ Does your project include any collection, examination, or handling of microorganisms, and/or fresh or frozen tissue, primary cell cultures, blood, blood products or body fluids?
- ☐ Are you going to culture or isolate any substance, known or unknown?

*If any are checked, see **Potentially Hazardous Biological Agents** Rules (page 30)*

Appendix E: Project Categories (Last updated July 2026)

Multiple qualified judges will review each project. For the judging to be conducted fairly and accurately, it is important that students properly categorize their project. What is your project about? And then, what are the steps you would use to achieve a result? If you discover your project is misaligned by February 15st you can contact MSEF to recategorize your project. You **cannot** adjust categories between fairs. See full guidance at www.scifair.com and HERE.

- **Behavioral and Social Sciences:**
  The study of thought processes, emotions, behavior, or learning of humans or other animals studied through observational and experimental methods. *Includes: cognitive psychology, social psychology, behavioral neuroscience, development, sociology, and anthropology.*
- **Biochemistry:**
  The study of the chemical basis of processes occurring in living organisms, including the processes by which these substances enter into, or are formed in, the organisms and react with each other and the environment. *Includes: analytical biochemistry, general biochemistry, structural biochemistry,* and *medicinal biochemistry*.
- **Biology: Cellular, Molecular, or Microbiology:**
  The study of cells, microorganisms, and the molecular processes that support life. Projects explore the structure, function, and interactions of cells and microbes, as well as the biological mechanisms that occur at the molecular level. *Includes: cell physiology, cellular immunology, neurobiology, genetics, molecular biology, antimicrobial and antibiotics, applied microbiology, bacteriology, environmental microbiology, microbial genetics, and virology.*
- **Biology: Evolution, Plant and Animal Science:**
  The study of plants and animals, including their structure, function, growth, development, evolution, and interactions with each other and their environment. Projects may investigate genetics, physiology, behavior, ecology, nutrition, disease, or biodiversity. *Includes: animal behavior, cellular studies, development, ecology, nutrition and growth, physiology, systematics and evolution, agriculture and agronomy, genetics and breeding, and pathology.*
- **Chemistry:**
  The study of the composition of substances, their structure, their behavior, reactions, analysis and synthesis. Includes: *physical chemistry, organic chemistry, materials chemistry, inorganic chemistry, analytical chemistry, computational chemistry,* and *environmental chemistry*.
- **Earth, Environmental, and Energy Sciences:**
  The study of Earth systems, the environment, and the production, storage, and use of energy. *Includes: atmospheric science, climate science, environmental effects on ecosystems, geoscience, solar processes, materials, and design, energy storage, wind and water movement power generation, hydrogen generation and storage, thermal generation and design, triboelectricity, electrolysis, and water science.*
- **Physics and Astronomy:**
  The study of matter, energy, forces, motion, and the interaction between them, as well as the objects and phenomena of the universe beyond the Earth. *Includes: atomic, molecular, and optical physics, astronomy and cosmology, biological physics, condensed matter and materials, mechanics, nuclear and particle physics, theoretical, computational, and quantum physics.*
- **Materials Science:**
  The study of material properties, structure, processing, and performance. Projects explore how materials are developed, improved, or used in products and technologies by examining how their composition and structure affect their behavior. *Includes: nanomaterials, biomaterials, composites, polymers, ceramics and glasses, electronic, optical, and magnetic materials, and computational modeling of materials.*
- **Computer Science and Technology:**
  The study or development of computer systems, software, and intelligent technologies used to analyze data, solve problems, automate processes, or control devices. Projects may focus on software development, algorithms, artificial intelligence, robotics, embedded systems, cybersecurity, communications, or information processing. *Includes: circuits, Internet of Things, microcontrollers, networking and data communications, optics, sensors, signal processing, algorithms, cybersecurity, databases, human/machine interface, languages and operating systems, mobile apps, online learning, biomechanics, cognitive systems, control theory, machine learning, and robot kinematics.*
- **Engineering: Biomedical**
  This category is for projects that apply engineering principles and design concepts to solve biological or medical problems. Projects may create methodologies and/or construct apparatus or biomolecules to obtain data, take measurements, or build understanding of biomedical systems. *Includes: biomaterials, regenerative medicine, biomechanics, biomolecular engineering, biomedical devices, synthetic biology, or biomedical sensors or imaging. Note: Student projects may not independently diagnose disease.*
- **Engineering: Environmental**

This category is for projects that apply engineering practices to develop processes or infrastructure to solve environmental problems in water systems, waste, systems, pollution control, or climate resilience. *Includes: bioremediation, pollution control, water resources management, land reclamation, recycling and waste management.*

- **Engineering: Mechanical, Statics and Dynamics:**
  The study of science and engineering of structure or movement as a result of forces. *Includes: aerospace and aeronautical engineering, civil engineering, computational mechanics, control theory, ground vehicle systems, industrial engineering processing, mechanical engineering, naval systems.*
- **Computational Biology and Bioinformatics:**
  The study of biological systems using computer science, mathematics, and data analysis. Projects in this category develop or apply computational methods, mathematical models, simulations, or data analysis techniques to better understand biological systems. *Includes: computational biomodeling, epidemiology, evolutionary biology, neuroscience, pharmacology, and genomics.*
- **Mathematics and Computational Modeling:**
  This category is for both theoretical and applied mathematics projects. This includes the study of measurement, properties, and relationships of quantities and sets, using numbers and symbols. Students may use both inductive or deductive reasoning. *Includes: computational modeling, data science, number theory, probability and statistics, and game theory.*

Appendix F: Glossary

- **abstract:** A brief (200-250 words) summary of the background, methodology, results, and conclusions of a project.
- **Adult Sponsor:** An adult under whose close supervision the student is working in a lab. The Adult Sponsor may be a teacher, parent, professor, or scientist/engineer, but must have a solid background in science/engineering. The Adult Sponsor may also be a **Qualified Scientist**, but if the Adult Sponsor is not familiar with local, state, or federal regulations that affect the project, an individual with the necessary expertise should serve in this role as the Qualified Scientist. The Adult Sponsor may also serve as the **Direct supervisor.**
- **APA format:** (High School) Writing and citation style for academic documents determined by the American Psychological Association.
- **anonymity:** Human subjects that participate in research should have their identities protected. If participants are kept anonymous, even the researcher cannot link data collected to individual subjects. See also **confidentiality**.
- **appendix:** A section at the end of a lab report that contains additional information. A final science and engineering fair lab report may include none, one, or several appendices. Examples of information that may be included in an appendix include copies of tests or surveys given to participants, scripts of directions, or other protocols not included in the procedure.
- **background research paper:** A summary of the important scientific principles behind the student's project. The purpose of the research is for the student to develop strong understanding of relevant science content to develop a strong experimental question or engineering goal, construct a sound hypothesis or select relevant design criteria, analyze data, and draw valid conclusions. This is different from a research plan or project proposal.
- **confidentialit**y: If a student researcher collects data in a way that could link that data to a specific individual subject, this information must be protected. Raw data should be de-identified and thus anonymous when analyzed by the student researcher. Consent forms should also be kept separate from the collected data and only be accessible to the student, adult sponsor, and/or Qualified Scientist. Do not submit completed consent forms to an IRB or SRC, only a blank sample copy. See also **anonymity**.
- **controlled substance:** Controlled substances are those controlled by the DEA, the BATF, or the FDA such as alcohol, tobacco, illegal or prescription drugs, firearms, fireworks, explosives, etc. High school students working with controlled substances must work under direct supervision of a **Qualified Scientist**. See also **hazardous activities** and **hazardous chemicals and devices**.
- **Direct supervisor:** An adult who directly supervises a student's project work. The **Adult Sponsor** may serve as the Direct supervisor. The Direct supervisor must be familiar with and trained in the student's area of research. The Adult Sponsor may serve as the Direct supervisor.
- **Direct Supervisor Form:** (Form D in Middle School, Form 2B in High School) completed and signed by the **Qualified Scientist, Direct supervisor,** or **Adult Sponsor** where the potential risks involved in the student's project are described and the steps taken to reduce risks and ensure safety are detailed. See also **Risk Assessment Form** for High School.
- **display board: A visual presentation of the most important highlights of the student's science fair project, used as a support during the oral presentation.** The display board is usually on a standard 3-foot by 4-foot tri fold board, or two display boards stacked together.
- **ethics statement:** A statement signed by the student, parents, adult sponsors and qualified scientist where they agree to abide by the MSEF and ISEF rules and regulations, which include requirements that students are honest about their work, document their research, cite sources, give credit, and present work (including research, experimentation, and documentation) only done by the student.
- **human subjects:** Project plans that include human subjects must include details of how potential subjects will be identified, where and how subjects will be recruited, how **informed consent** will be obtained, and how subjects' **anonymity** or **confidentiality** will be maintained. These plans must include copies of any surveys, tests, images, videos, etc. that will be used. In high school these research plans must be reviewed by an IRB at their school.

- **hazardous activities:** Any activity that entails more than normal risk. Examples include working with high voltage, open flames, radiation, lasers, high temperature ovens, power tools etc. High school students may engage in some hazardous activities but must first complete a **Risk Assessment Form** under the supervision of a **Direct supervisor** or **Qualified Scientist**.

- **hazardous chemicals and devices:** Any chemical or device that involves more than normal risk. These include substances and devices that are controlled by local, state, federal, and/or international laws and regulations. Examples include illegal and prescription drugs, corrosive chemicals, toxic, highly reactive, flammable, or carcinogenic chemicals, alcohol, tobacco, firearms, explosives, radioactive materials, high vacuum devices, etc. High school students may work with other hazardous chemicals and devices but must first complete a **Risk Assessment Form** (Form 3) under the supervision of a **Direct supervisor** or **Qualified Scientist**.

- **informed consent:** All human subjects must be given the opportunity to decide if they are willing or not willing to participate in a research project. The written form for Informed Consent that the student researcher creates must include a summary of what participants will be asked to do, any risks or discomforts that may occur, and the statement that they are free to withdraw their participation at any time. Potential participants younger than 18 must also have a parent or guardian sign their consent. (**For high school, see Form 4.).**

- **Institutional Animal Care and Use Committee (IACUC):** The institutional animal oversight review and approval body for all animal studies that occur at a Regulated Research Institution. Students working at an outside lab or institution and using vertebrate animals, or their tissues and cells must provide a certificate of approval from the IACUC for that research institution.

- **Institutional Review Board (IRB):** A group of qualified individuals from the student's school that review any science fair projects that involve human participants. The IRB checks projects to ensure that **informed consent** is obtained from each subject, and that participation in the project does not endanger subjects or the student researcher physically or psychologically.

- **ISEF:** (High School) The Regeneron International Science and Engineering Fair, owned and operated by Society for Science. Students who earn top prizes at affiliated regional and state competitions are eligible to compete in ISEF.

- **laboratory notebook (see project notebook)**

- **lab report:** The complete project report, including a title page, abstract (high school), table of contents (high school), research question or engineering goal, variables (experimental projects), hypothesis or design criteria, background research, materials list, procedure, results and data analysis (including relevant tables and graphs), conclusion, acknowledgements, and works cited.

- **Materials: A list of specific materials, tools, and equipment used for the project.**

- ***methodology (see procedure)***

- ***MSEF:*** *Massachusetts Science & Engineering Fair*

- **procedure:** A step-by-step sequence that describes in detail how the experiment will be conducted or how the engineering prototype will be constructed. In an experimental project, the procedure includes how the **experimental group(s)** and the **control group** will be set up, how the **independent variable** will be manipulated, how **controlled variables** will be kept constant, and how the **dependent variable** will be measured. In an engineering project, the procedure includes detailed instructions on how to construct the first prototype and how it will be tested and compared to the engineering goal and design criteria. (See also **methodology**).

- **project logbook or project notebook:** An often handwritten, detailed documentation of the student's project from start to finish, including the student's original thoughts on the selection of the project, background research, plan, data, and reflections. The project logbook should be in a bound notebook, and each page is numbered and dated. Digital notebooks are accepted but not encouraged.

- **Qualified Scientist:** A qualified scientist/engineer with an advanced degree (PhD, MD, or Masters with additional experience/expertise) who supervises the student's compliance with local, state, or federal regulations related to the

student's research. The Qualified Scientist may be the same person as the **Adult Sponsor.** If the Qualified Scientist is not local to the student, then a **Direct supervisor** must oversee the student's research.

- **research plan:** A detailed summary of the background research, relevance, and rationale for the project, research question or engineering goal, expected outcomes, hypothesis(es), planned procedures, and potential risks and planned safety procedures, to be submitted to the **Scientific Review Committee (SRC)** prior to beginning the project.

- **Risk Assessment Form:** Before beginning a project that involves hazardous chemicals, activities, or devices, the student researcher, together with the **Direct supervisor/Qualified Scientist** must complete form 2 and form 3 to detail the potential risks involved in the project as well as the steps that will be taken to minimize risks and dispose of chemicals safely. (See also **Direct supervisor Form**).

- **Scientific Review Committee (SRC):** A group of qualified persons who are responsible for reviewing student science and engineering fair project proposals and research plans to ensure that the proposed projects meet legal and safety standards and regulations.

- **SRC pre-approval:** Certain types of research will be designated as requiring "SRC pre-approval". For these projects, the student must submit a complete research plan along with the required forms BEFORE they begin their experiment or collect data. This review is to ensure that the student meets all rules and requirements for safety and ethics. This review is done by the statewide SRC. Once given approval, the student can begin their experiment. In some cases, the SRC may require further explanation from the student on a form or in the research plan to ensure safety or to make a project compliant with rules. Once the edits or amendments are made, the project is re-submitted for review and pre-approval.

- **SRC final approval:** This stage of project review occurs after the project is completed and is part of entry into a science fair competition (Regional, State, and International). This review is for projects that did not require SRC pre-approval as well as projects that were already reviewed for pre-approval. Projects are reviewed for compliance with rules and regulations and will either "qualify" or "fail to qualify" for the science fair competition.

- **vertebrate animals:** Animals that have backbones, including fish, amphibians, reptiles, birds, and mammals, their embryos, fetuses, tadpoles, and newly hatched eggs. *High school students who choose to use vertebrate animals or their tissues and cells, must include either a Form 5A or 5B with their research plan to detail their justification of the use of vertebrate animals rather than a nonvertebrate alternative, the benefits of the research, and the humane care and treatment of the animals. No experiments that cause pain, distress, or death to vertebrate animals may be conducted.*

  Projects that involve non-intrusive, non-invasive observational studies of vertebrate animals in homes, farms, ranches, schools, or in the field may be conducted in High School.

- **works cited:** An alphabetical, formatted listing of all the sources used for information in a paper. The works cited is a separate page at the end of the **background research paper**, or, if the research paper is included in the **lab report**, at the end of the lab report. Also known as a **bibliography**. Students should have 3-5 works cited. Science and engineering fair works cited are usually formatted using **APA style**. See also **APA format**.

Appendix G: Approval FORM DECISION GRID: High School

This chart should be used as a reference when determining that the student/project complies with official requirements of the Massachusetts Science & Engineering Fair and the International Science and Engineering Fair. To access up-to-date forms, please use the International Science and Engineering Fair website to preview the forms. Once you have a research plan, you can create an account and fill out these forms digitally in the zFairs platform. See https://scifair.com/fairs/high-school/ for the **full manual and research templates.**

The following forms are required for ALL projects. Teachers and Adult Sponsors (if different) must review and approve all student projects before experimentation begins.

Form 1	Form 1A	Form 1B	Form 3	Form 2A
Teacher Checklist	Student Checklist & Research Plan (uploaded separately)	Approval Form (MSEF Modified) – 1 per student	Risk Assessment Recommended for all projects, required for some (see below)	Student Support Disclosure Submit as required for transparency or by request of the SRC. Required for ISEF participants.

Projects that involve the following materials or categories, **need additional forms** (to those above) as indicated in the chart below. This likely signals that the project requires **PRE-APPROVAL** of all forms by the **STATEWIDE SRC** before experimentation begins. NOTE: Projects that occur in an **outside lab or industrial setting** will need **form 2C**, but form 2C does not need pre-approval unless other restricted areas below apply. *Note: Some reviewers may ask for details from Form 2C or Form 7 (Continuation) for approval.*

	Form 2B	Form 3	Form 4	Form 5A Form 5B	Form 6A	Form 6B	Other
	Qualified Scientist	**Risk Assessment, recommended for all projects**	**Human Subjects**	**Vertebrate Animal**	**Potentially Hazardous Biological Agents**	**Human/ Animal Tissue**	
Human Subjects	Yes	If applicable	Yes, with signatures from local "IRB"				sample of Informed Consent form, survey, test, etc
Vertebrate Animals	Yes	If applicable		Yes	*if applicable to experiment*	*if applicable to experiment*	
Potentially Hazardous Biological Agents	Yes	use in the case of PHBA that are exempt from pre-approval			Yes	*if applicable to experiment*	
Hazardous Chemicals, Activities, or Devices	Yes	Yes*					all require supervision by Direct supervisor

**Form 3: Potentially hazardous devices that students use often at home or in classrooms MAY be exempt from pre-approval. Contact src@scifair.com.*

Appendix H: Changes to the International Rules for Pre-Collegiate Research for 2026-2027

Final Changes for 2026-2027

The following items were the key changes made to the International Rules for 2026-2027.

All Projects

In Eligibility/Limitations (page #8):

- Artificial Intelligence (AI) may be used as a resource but must be cited and given proper acknowledgment. A student is expected to do independent work and all materials presented must be in the researcher's own words. A student may not use generative AI to write the research plan, abstract, poster or to create citations (it is known to hallucinate and falsify references).

Under Documentation and Approval, #1 was edited:

1. Student researchers must have a Research Plan that includes:
    a. Rationale
    b. Research Question/Hypothesis(es), Engineering Goal(s), Expected Outcomes c. List of Materials
    d. Procedures
    e. Risk and Safety
    f. Data Analysis
    g. Bibliography

Human Participant Rules

Under Prohibited, #1 b. was edited to include #1 d.:

- Students are prohibited from disclosing research data from their study and/or from providing advice, diagnostic or medical information to participants ~~without direct supervision and involvement of a medical professional.~~

Under Rules, #2c:

- For studies involving minors, if the study includes a survey, the survey must be attached to the consent form as part of the written parental permission process and parental permission obtained prior to the minor accessing the survey.

Under Rules, #6:

- Studies that involve recruitment and interaction with human participants online or via the internet are allowed if they adhere to all of the human participant rules above regarding consent processes and restrictions, including obtaining written parental permission for studies involving minors. This written parental permission must include a copy of the survey and be obtained prior to a minor accessing the online survey. In order to protect the confidentiality of the participants, it is extremely important that IP addresses, as well as the data provided, be safeguarded.

Vertebrate Animal Rules (page 10-12)

Under Prohibited Studies, #4 b. was added:

- b. For agricultural/aquacultural projects raised for food see “After Experimentation/Euthanasia" section.

Potentially Hazardous Biological Agents (PHBA) Rules (page 13-15)

Under Prohibited Studies, #5 was edited to clarify the prion rule:

- All studies involving the use of prions or commercially available purified prion-like proteins are prohibited. This includes studies working with amyloid-beta (Ab), tau, alpha-synuclein, transactive response DNA-binding protein of 43kDa, amyloid fibrils, and Huntingtin protein. Studies involving plasmids that contain genes encoding prion-like proteins are also prohibited.

Under Prohibited Studies, #8 was edited:

- Students are prohibited from collecting water samples during a Harmful Algal Bloom (HAB). Qualified personnel may collect the water samples and provide the student with the samples for testing. All water testing must be done in a BSL-2 lab, under BSL-2 conditions.

Under Rules, #8 was edited for clarity:

- Studies involving animal models that have been bred to express prion-like proteins, including but not limited to C. elegans and Drosophila, are permissible in a BSL-1 laboratory, if the studies are behavioral only and do not involve lysing or dissection of cells or purification of proteins. Work involving the lysis of cells or cell lines and/or purification of prion-like proteins must be conducted in a BSL-2 laboratory, under BSL-2 conditions.

Under Projects Involving Unknown Microorganisms:

- a. was deleted as it was a repetition of b.

Under Exempt Studies (no SRC pre-approval required):

- Studies involving Lactobacillus, Bacillus thuringiensis, nitrogen-fixing bacteria (excluding cyanobacteria), oil-eating bacteria, and algae-eating bacteria introduced into their natural environment (not exempt if cultured in a petri dish environment)

Tissue & Body Fluid Rules (page 16-17)

Under Rules, #7 was re-arranged for clarity:

- 7. Studies involving blood and/or blood products:

a. If involving human blood, research must be considered BSL-2 and done under the supervision of a Qualified Scientist. If only the blood of the student researcher, it is exempt from this requirement.

b. If involving wild animal blood, research must be considered BSL-2 and done under the supervision of a Qualified Scientist.

c. If involving domestic animal blood, the study may be considered a BSL-1 study.

d. All blood must be handled in accordance with OSHA and APHIS standards and guidelines. Any tissue or instruments with the potential of containing blood-borne pathogens (e.g. blood, blood products, tissues that release blood when compressed, blood contaminated instruments) must be properly disposed of after experimentation. Studies of human body fluids, where the sample can be identified with a specific person, must have IRB review and approval, and informed consent.

Under Exempt Tissues, b. and d. were edited for clarity:

- b. Plant and vertebrate ~~non-primate~~ established cell lines and tissue culture collections (e.g., obtained from the American Type Culture Collection). The source and/or catalog number of the cultures must be identified in the Research Plan/Project Summary and on ~~forms 6A and 6B~~ Form 3.
- Collection and/or study without culturing of eggs, pasteurized milk or fresh/frozen meat and meat by-products obtained from food stores, restaurants, or packing houses. ~~and eggs or pasteurized milk~~

Hazardous Chemicals, Activities, or Devices Rules (page 18-19)

Under CHEMICALS, #2 was edited.

- Projects involving chemicals that are listed as carcinogenic, teratogenic, or reproductive system damaging on the SDS must be conducted at an RRI or in a restricted access fume hood outside of the regular classroom (i.e. school lab). The qualified scientist and direct supervisor must have training in the usage, safe handling, and disposal of the chemicals.

Under DEA Controlled Substances, #2 was edited to remove marijuana, as it's federal designation changed.

- All studies using DEA Schedule 1 substances ~~(including marijuana)~~ must have the research protocol approved by DEA before research begins. Schedule 2, 3 and 4 substances do not require protocol approval by DEA.

Forms

All form headers were edited for clarity and consistency.

Student Support Disclosure Form (2A)

- This is a new form that is required for all projects. It can be filled out before or after experimentation by the finalist.

Qualified Scientist Form (2B)

- Renumbered to be 2B
- Question 5 was added
  - Please describe your anticipated role in this project and the duration of your support.

Regulated Research Institutional/Industrial Setting Form (2C)

- Renumbered to be 2C
- Question 2b. was added
  - What was the duration of your support of this student project?

Human and Vertebrate Animal Tissue Form (6B)

- Checkboxes were added to question 1 to provide more tissue options.