MSSEF

MIDDLE SCHOOL DIVISION

MASSACHUSETTS STATE SCIENCE & ENGINEERING FAIR

2018 | Middle School MANUAL

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SPECIAL ACKNOWLEDGMENTS

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Worcester Technical High School, Worcester

ABOUT THE MSSEF STATEWIDE SCIENCE FAIRS

MIDDLE SCHOOL DIVISION

The Massachusetts State Science & Engineering Fair, Inc. (MSSEF) hosts two annual statewide Science & Engineering Fairs for students with the most outstanding research and invention projects from across the state. The MSSEF Middle School Science Fair is an annual one-day showcase event and competition for qualifying students in grades 6, 7, and 8 attending public, private, parochial schools or home schooled in the Commonwealth. The MSSEF Middle School Science Fair is sponsored by Cabot Corp., Boston and hosted by Worcester Technical High School. The MSSEF Middle School Fair is one of the two statewide fair programs under the auspices of Massachusetts State Science & Engineering Fair, Inc. (MSSEF). The other science fair is for high school students and held annually on the MIT campus in Cambridge.

Entrants have spent months developing their projects, and at these culminating year-end events, they exhibit their projects to their peers, a team of judges and the public. This experience provides a unique opportunity for students to actively engage in the "real world" professional practices of scientists and engineers while investigating a question or problem in which he or she is interested.

General Information and Requirements

Students may work on their project individually or as part of a team of two or three members. Students with the top 40 winning projects from each of the MA Regional Science Fairs may enter the MSSEF State Science Fair. Regional Science Fairs are held in the following six regions: North Adams, Worcester, Fall River, Lowell, Weston and Boston. In addition, each middle school in Massachusetts may send/enter one project to the State Science Fair. Click on this link for regional information, http://scifair.com/regional-fairs

All required safety forms and student registration forms, described in the Research and Registration Forms section of this Manual, are also available on the MSSEF website: "The Fairs" tab, and then on drop-down menu click on Regional Fairs/Middle School Contacts Required forms must be submitted by the dates included in the Timelines section of this Manual.

Note: The location of the student's school determines which will be the correct Regional Science Fair.

SPECIAL NOTES

- Only new research projects done in the current school year will be eligible for participation, no continuation projects.
- Individual projects must be entirely the work of the individual student and team projects must be entirely the work of the team.
- Students are expected to keep a bound logbook with original, hand-written, and dated entries that record each step taken in the development of the project.
- Students must have a lab report complete with bibliography.

INFORMATION FOR TEACHERS & STUDENTS

Choosing a Project

Students' projects should be of an experimental nature –either investigating a research question or solving a design challenge. Although judges consider the aesthetics of a student's exhibit, the main areas for evaluation are the scientific or engineering design approach, and the thought processes used in completing the project. While the topic is important, the most critical aspect is the manner in which the student explores and manages the project. A simple project can offer a great experimental challenge to the imaginative student. The role of the teacher, mentor or parent should be one of guidance, encouragement and, as needed, constructive criticism. In some cases, supervising a safety-related component of the project will be required.

The Student's Research Plan

Prior to beginning an independent research project for a regional or state science fair, each student is required to complete a Research Plan (Forms 1A and 1B) for safety approval. Some projects may require additional Forms if the project involves human subjects (Form C) or if it requires a supervisor (Form D). All required forms are then sent to the Regional Safety Review Committee (RSRC) for approval. Contact information for the RSRCs is found in the Regional Contacts section of this Manual and is also on the MSSEF website. The RSRC must approve each student's research plan before she/he may begin the project. Once approved, the RSRC will return these forms to the student who will then submit the forms along with the Registration Form if they are invited to participate in the MSSEF (statewide) Middle School Science Fair. If during project completion the research plan changes significantly, a new research plan must be resubmitted. Any project that has not received approval by the RSRC will not be eligible to compete at the State or Regional Level. Research Plan Forms 1A, 1B, Form C & Form D are found in the Research and Registration Forms section and on the MSSEF website.

For questions about research approvals that cannot be answered by the RSRC, contact:
Sandy Mayrand, sandy.mayrand@gmail.com or Karin Lebeau, klebeau@scifair.com

Research Regulations

ALL PROJECTS MUST BE APPROVED FOR SAFETY PRIOR TO STARTING THE EXPERIMENT! FORMS 1A & 1B (C & D IF NECESSARY) MUST BE FILLED OUT AND SENT TO RSRC SAFETY COMMITTEE PRIOR TO STARTING YOUR EXPERIMENT!

1. **Students' Science Fair projects may <u>not</u> involve, at any stage of the project, the following:**

- •Blood products, fresh tissue, skin, teeth or bodily fluids
- • Nonhuman vertebrate animals and their parts, exception unfertilized eggs shells
- •Ingestion, absorption or inhalation of any substance by humans subjects (no smelling/wafting or eating/chewing of ANYTHING)—NOTHING in or on parts of mouth or skin—including but not limited to teeth, tongue, lips.
- • Pathogenic agents*
- • Recombinant DNA
- • Carcinogenic or mutagenic chemicals
- • Compressed gas (exception: helium, CO2, air, purchased for home use)
- • Controlled substances*
- • Explosive chemicals
- •Hazardous substances or devices (including, but not limited to BB guns, paint ball guns, potato cannons, air cannons)
- • High voltage equipment
- • Highly toxic chemicals
- • Lasers (any strength) exception: infared thermometer with Supervision Form D
- • Ionizing radiation X-rays or nuclear energy
- • Radioactive materials
- • Composting

FURTHER EXPLANATIONS

<u>Controlled Substances</u>

Controlled substances, including DEA-classed substances, prescription drugs, alcohol and tobacco are not allowed.

<u>Pathogenic Agents</u>

- • Pathogenic agents are disease causing, or potential disease-causing organisms such as bacteria, viruses, viroids, prions, rickettsia, fungi, mold and others.

• Organisms collected, isolated and/or cultured from any environment (e.g., air, soil, water) are considered potentially pathogenic and experiments using these procedures will not be allowed. ***All plant projects must use sterile, bagged potting soil.***

• Raw or partially processed human/animal waste is considered to contain potentially pathogenic agents.

Please refer any safety questions to:

Middle School Safety Review Committee
Karin Lebeau klebeau@scifair.com, 508-517-7863
Sandy Mayrand sandy.mayrand@gmail.com

2. **All human research projects must have an Informed Consent Form (Form C) attached.**

• All human research projects-- including surveys, professional tests questionnaires, and studies in which the human subject used is also the researcher -- require Regional Science Review Committee (RSRC) approval. Copies of standardized and/or student prepared tests, surveys, etc. to be used must also be attached to the Research Plan for approval. Questions 1, 2, and 3 on the Informed Consent Form must be filled out by the student researcher before submission to the RSRC for approval.

• After safety approval, Informed Consent Form (C) must be signed by all subjects involved in human research projects prior to the experimentation. Copies of all signed Informed Consent Forms must be submitted with the Registration Form to enter the MSSEF statewide Science Fair. If a participant/human subject is under 18 years old, the parent/guardian signature is required.

3. **Experiments with non-pathogenic microorganisms***
All projects with non-pathogenic microorganism must have a Designated Supervisor Form (Form D) completed and submitted for RSRC approval before experimenation.

All projects with any non-pathogenic organisms may only be conducted in a laboratory setting (not in the home) with the following capabilities:

• The laboratory work is to be supervised by an individual with general training in microbiology.

• Standard practices for sterile technique must be observed.

• Work is to be done on an open bench or fume hood.

• Purchased microorganisms must be identified and certified as non-pathogenic from the supply house with full name of microorganism, source of purchase and catalog number.

• Lab coats must be worn.

• Culture plates/tubes of bacteria must be sealed and not opened in the laboratory after culturing and growth.

• Sub-culturing is not allowed.

• Decontamination must be achieved by either chemical disinfectants or steam autoclaving.

*Two exceptions: Baker's and Brewer's yeast do not need Form D.

Special Safety Concerns
Other situations such as use of power tools, chemicals, etc. will require adult supervision of the middle school student's project and need to be documented on Form D, Designated Supervisor.

DAY OF FAIR

GENERAL REQUIREMENTS

- Students must remain with their projects during judging and exhibition times.
- Parents, advisors, mentors, teachers and guests must wait outside the project area until public display begins.
- Cell phone use is not allowed during the judging period.
- Once a student is accepted for the State Fair, the teacher will receive additional fair information for the student.

PROJECT DISPLAY GUIDELINES

Students must adhere to all display guidelines provided in this Manual. If the Middle School State Safety Review Committee considers the presence or operation of any equipment or material to be dangerous or unsafe, it shall have the right to prohibit the presence or operation of such equipment or material. The purpose of the science fair is not to demonstrate the experiment to the judge, but to explain through the safe use of materials through photographs, videotapes, charts, diagrams and other simulations.

All Science Fair participants must adhere to the safety aspects of their projects as follows:

- Projects must fit into a 40" x 26" table space.** Wall space for posters is not available. Students must design their exhibits so that all posters, charts and displays are free standing.
  Due to the popularity of projects needing electricity, these projects will get less than 40" depending on amount of projects*
- No aisle space for project displays is allowed
- No laser pointers allowed.
- Glass is prohibited from display area but may be either encased in a break-resistant container or replaced by a break-resistant container. The exception is glass light bulbs. Mercury thermometers are prohibited.
- No compressed gas or other pressurized systems may be displayed.
- No liquids may be displayed, exception water and saline may be displayed in a sealed plastic container
- Knives and other sharp objects may not be displayed.
- Microorganisms may not be displayed.
- Drugs, over-the-counter medications, antibiotics, and vitamins may not be displayed.
- All power driven parts must be suitably guarded to prevent unauthorized or accidental access.
- Access to electrical outlets is limited, so please bring a heavy-duty/three-pronged extension cord. Please check the appropriate space on the registration card if electricity is needed.
- All exhibits that require an external source of electricity for operation must be designed for a standard 110-125 volt AC supply.
- No exposed wires, switches, joints, or un-insulated fasteners will be permitted.

- The power supply cord for the electrical apparatus must terminate in a three-prong grounded outlet. All power supplies and electrical equipment must be grounded.
- Approved standard enclosed switches are required for all other electrical installations.
- There must be no open flame, torch or burner in the display area.
- Robotics projects should have interlocks or other controls.
- No Form C's, Human Consent Forms, should be displayed.

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TOPICS FOR CONSIDERATION IN JUDGING

The judging process will focus on what the student has learned about his or her chosen project and the process used in completing the project. In addition, the project will be judged on the basis of the student's ability to discuss intelligently the overall scope and significant results of his or her work. Judging criteria for team and individual projects are identical.

1. **Scientific or Engineering Approach - Possible 25 points**
   - A. Did the student start with a clearly stated hypothesis or statement of an engineering goal?
   - B. Was the student orderly and logical with the setup and follow through of the project?
   - C. Were the student's conclusions consistent with the data he or she collected?

2. **Knowledge of Project Area - Possible 20 points**
   - A. How effectively did the student conduct preliminary research?
   - B. What was the extent of the student's knowledge of material related to project?
   - C. Was the student aware of both the scope and limitations of the project?

3. **Thoroughness - Possible 20 points**
   - A. Did the student do sufficient research in the literature before starting the project?
   - B. Was thorough use made of data and observations?
   - C. Was the original plan successfully followed through to completion?

4. **Written Records and Reports - Possible 15 points**
   - A. Did the student keep an original handwritten, bound logbook with all plans, procedures, observations, and conclusions for failures as well as successes?
   - B. Did the student put together an accurate written report, complete with a bibliography?

5. **Ingenuity and Creativity - Possible 15 points**
   - A. Was the explanation of the project clear and precise?
   - B. How well did the student use his or her materials in the solution of problems?
   - C. Did the student present any new unique ideas?

6. **Visual presentation - Possible 5 points**
   - A. Was the project displayed in a logical and organized manner?
   - B. Did the display and posters effectively convey the message in an understandable manner?

TIMELINES

Regional & State Middle School Science & Engineering Fairs

Due Dates -- 2018 Forms

Due prior to start of experimentation

The following Forms must be sent to either the student's Middle School Regional Safety Review Committee (see contact information in this Manual and on the MSSEF website – the correct region will be determined by the location of the student's school) or to the MSSEF Middle School State Safety Review Committee:

- Research Plan Forms 1A and 1B
- If necessary, human Informed Consent Form (Form C) that will be given to subjects before experimentation, and
- Designated Supervisor Form (Form D)
- **Student must retain a copy of any/all forms.**

Due prior to MSSEF Middle School Science & Engineering Fair

Deadline: May 5, 2018 or before

- Registration Form (Approved Research Plan, Forms1A and B included), and
- Approved Forms C and D, if necessary

Student must retain a copy of these forms.

Mail to:

Karin Lebeau, Co-Chair
MMSSEF
PO Box 134, WMB
Dudley, MA 01571

For Further Information

Massachusetts Middle School Science & Engineering Fair (MMSSEF)
Contact: Karin Lebeau at klebeau@scifair.com or middleschool@scifair.com , 508-517-7863

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2018

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Massachusetts Middle School Science & Engineering Fair Site (MMSSEF)

Karin Lebeau, klebeau@scifair.com or Sandy Mayrand, sandy.mayrand@gmail.com

MSSEF, Inc. is incorporated in Massachusetts as a not-for-profit corporation and is a Federal tax-exempt organization. Tax ID # 042707499

MSSEF Regional Districts' Cities and Towns

Region I: Western Massachusetts

Adams
AgawamHolyoke
Alford
Amherst
Ashfield
Becket
Belchertown
Bernardston
Blandford
Buckland
Charlemont
Cheshire
Chester
Chesterfield
Chicopee
Clarksburg
Colrain
Conway
Cummmgton
Dalton
Deerfield
Easthampton
East Longmeadow
Egremont
Erving
Florida
Gill
Goshen
Granby
Granvflle
Great Barrington
Greenfield
Hadley
Hampden
Hancock
Hatfield
Hawley
Heath
Hinsdale

Huntington
Lanesborough
Lee
Lenox
Leverett
Leyden
Longmeadow
Ludlow
Middlefield
Monroe
Monson
Montague
Monterey
Montgomery
Mt. Washington
New Ashford
New Marlboro
New Salem
North Adams
Northfield
Northampton
Orange
Otis
Palmer
Pelham
Peru
Petersham
Pittsfield
Plainfield
Richmond
Rowe
Russell
Savoy
Sandisfield
Sheffield
Shelburne
Shutesbury
South Hadley
Southampton
Southwick
Springfield
Stockbridge
Sunderland
Toland
Tyringham
Ware
Warwick
Washington
Wendell
Westfield
Westhampton
West Springfield
West Stockbridge
Whately
Wilbraham
Williamsburg
Williamstown
Windsor
Worthington

Regional High Schools
Amherst
Frontier
Gateway
Hampshire
Hoosac Valley
Mount Everett
Pathfinder Reg. Voc.
Taconic
Wahconah
Ralph C. Mahar
Minnechaug
Mohawk Trail
Monument Mountain
Mount Greylock
Pioneer Valley
Turners Falls

Region II: Central Massachusetts

Ashburnham
Ashland
Athol
Auburn
Barre
Berlin
Blackstone
Bolton
Boylston
Brimfield
Brookfield
Charlton
Clinton
Douglas
Dudley
East Brookfield
Fitchburg
Framingham
Gardner
Grafton
Hardwick
Harvard
Holden
Holland
Holliston
Hopedale
Hopkinton
Hubbardston
Hudson
Lancaster
Leicester
Leominster
Lunenberg
Marlborough
Maynard
Mendon
Milford
Millbury
Millville
New Braintree
Northborough
Northbridge
North Brookfield
Oakham
Oxford
Paxton
Phillipston
Princeton
Royalston
Rutland
Shrewsbury
Southborough
Southbridge
Spencer
Sterling
Stow
Sturbridge
Sudbury
Sutton
Templeton
Upton
Uxbridge
Wales
Warren
Webster
Westborough
West Boylston
West Brookfield
Westminster
Whitinsville
Winchendon
Worcester

Regional High Schools
Algonquin
Assabet Valley
Bay Path
Blackstone-Millville
Lincoln-Sudbury
Montachusett
Narragansett
Nashoba
Nipmuc
Oakmont
Quabbin
Quaboag
Shepherd Hill
South Middlesex
Tahanto
Tantasqua
Wachusett

Region III: Southwestern Massachusetts

Acushnet
Attleboro
Berkeley
Dartmouth
Dighton
Fairhaven
Fall River
Foxborough
Franklin
Lakeville
Mansfield
New Bedford
Norfolk
North Attleboro
Norton
Plainville
Raynham
Rehoboth
Seekonk
Somerset
Swansea
Taunton
Westport
Wrentham

Regional High Schools
Apponequet
Bristol-Plymouth
Dighton-Rehoboth
Diman Regional
King Philip

Region IV: Northeastern Massachusetts

Acton
Amesbury
Andover
Arlington
Ashby
Ayer
Bedford
Belmont
Beverly
Billerica
Boxborough
Boxford
Burlington
Cambridge
Carlisle
Chelmsford
Chelsea
Concord
Danvers
Dracut
Dunstable
Essex
Everett
Georgetown
Gloucester
Groton
Groveland
Hamilton
Haverhill
Ipswich
Lawrence
Lexington
Lincoln
Littleton
Lowell
Lynn
Lynnfield
Malden
Manchester
Marblehead
Medford
Melrose
Merrimac
Methuen
Middleton
Nahant
Newbury
Newburyport
North Andover
North Reading
Peabody
Pepperell
Reading
Revere
Rockport
Rowley
Salem
Salisbury
Saugus
Shirley
Somerville
Stoneham
Swampscott
Tewksbury
Topsfield
Townsend
Tyngsboro
Wakefield
Waltham
Watertown
Wenham
Westford
West Newbury
Wilmington
Winchester
Winthrop
Woburn

Regional High Schools
Acton-Boxborough
Concord-Carlisle
Greater Lawrence
Greater Lowell
Groton-Dunstable
Hamilton-Wenham
Masconomet
Metropolitan
Nashoba Valley Tech
Northeast
North Middlesex
Pentucket
Shawsheen Valley
Triton
Whittier Regional

Region V: Southeastern Massachusetts

Abington
Avon
Barnstable
Bellingham
Bourne
Braintree
Brewster
Bridgewater
Brockton
Brookline
Canton
Carver
Chatham
Cohasset
Dedham
Dennis
Dover
Duxbury
East Bridgewater
Eastham
Easton
Falmouth
Freetown
Halifax
Hanover
Hanson
Harwich
Hingham
Holbrook
Hull
Hyannis
Lakeville
Marion
Marshfield
Martha's Vineyard
Mashpee
Mattapoisett
Medfield
Medway
Middleborough
Millis
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Newton
Norwell
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Orleans
Pembroke
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Provincetown
Quincy
Randolph
Raynham
Rochester
Rockland
Sandwich
Scituate
Sharon
Sherborn
Stoughton
Truro
Walpole
Wareham
Wayland
Wellesley
Wellfleet
West Bridgewater
Weston
Westwood
Weymouth
Whitman
Yarmouth

Regional High Schools
Apponequet
Blue Hills
Bridgewater-Raynham
Cape Cod Regional
Dennis-Yarmouth
Dover-Sherborn
Martha's Vineyard
Nauset
Old Colony Regional
Old Rochester
Silver Lake
Southeastern Regional
Upper Cape Cod Regional
Whitman-Hanson

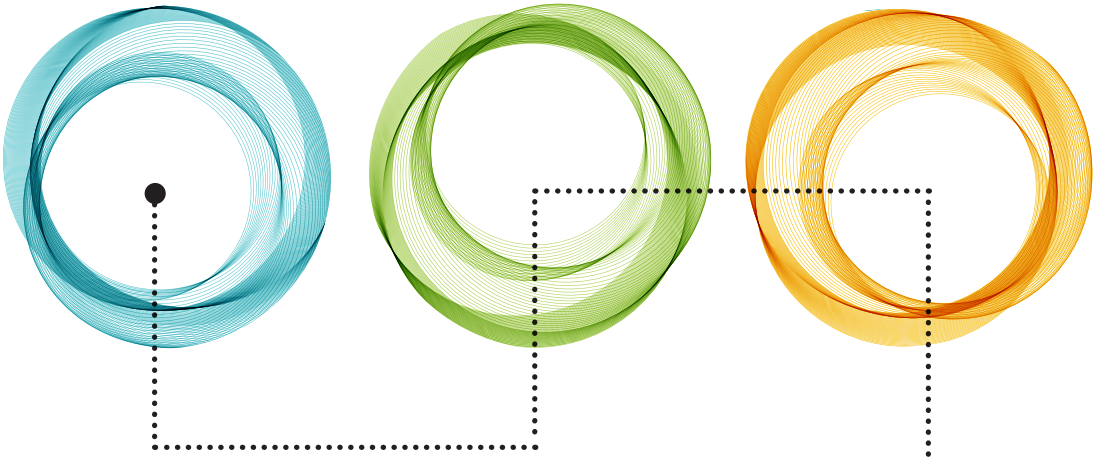
All Boston parochial and private schools.

Region VI Boston

Boston Public Schools Regional Science Fair

Includes all public schools within the City of Boston. Private and parochial schools within the City of Boston are included in Region V.

Special Note: These six regions are the same for both the Middle School and High School Divisions.



Developing future thought leaders through experiences in science and engineering practices using well-proven programs and novel approaches that empower students and educators to learn, in and beyond the classroom.

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