



2006

*Southeast Missouri
Regional
Science Fair*



REGISTRATION FORMS

2006 Southeast Missouri
Regional Science Fair
Tuesday, March 14, 2006

at the

Show Me Center
on the campus of

Southeast Missouri State University

Cape Girardeau, MO

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2006 Southeast Missouri Regional Science Fair Sponsors

The Cape Girardeau Southeast Missourian

Southeast Missouri State University

Drury Southwest

Hathaway Consulting

2006 Southeast Missouri Regional Science Fair Committee

Directors:	Dr. Chris McGowan, Southeast Missouri State University Kim McDowell, Southeast Missourian
SRC Chair:	Dr. Stephen Overmann, Southeast Missouri State University
Chief of Judges	Dr. David Probst, Southeast Missouri State University
Members:	Ruth Hathaway, Hathaway Consulting, L.L.C. Marilyn Peters, St. Vincent de Paul, Cape Girardeau Wanda Throop, Sikeston Senior High School Dennis Vollink, Drury Southwest Wilma Huffman, Southeast Missouri State University

Dear Southeast Missouri Science and Mathematics Teachers:

As the new school year gets underway, it is time to begin preparing for the Science Fair. The 50th Annual Southeast Missouri Regional Science Fair will be held at the Show Me Center on the campus of Southeast Missouri State University on Tuesday, March 14, 2006. The 57th Intel International Science and Engineering Fair (ISEF) will be held May 7-13, 2006 in Indianapolis, Indiana.

As you begin preparing for the 50th Regional Science Fair, I strongly emphasize that you READ THE RULES FIRST. If you have questions after reading the rules, please call. The rules, which are enclosed, contain all the forms that will be needed. Any of the forms may be duplicated as many times as needed. Although the rules are restrictive, the Regional Science Fair must abide with them in order to ensure our continued affiliation with the ISEF.

Let me remind you of the one rule change in the Junior Division last year. In the past, we did not allow students in the Junior Division to use human subjects; however, there were always a large number of experiments that involved interaction with human subjects. These experiments were technically in violation of the rules although most of them were largely risk free. The Science Fair committee has decided to allow experiments that involve interaction with human subjects if these experiments are pre-approved by an Institutional Review Board. This would require that Form 4 be signed prior to the beginning of experimentation. Form 4 must be signed for each human subject even when the experimenter is the human subject. This may mean that schools with only Junior Division students will need to form an Institutional Review Board.

The fair will again be held on one day only – March 14. A tentative calendar of events is enclosed. Deadline for entry forms is Tuesday, February 14, 2006. Local fairs must be held far enough before this date to meet the deadline. An entry fee of \$10.00 per exhibit (not student) will be charged; \$15.00 per exhibit if electricity is required. This fee may be paid by the student, student's family, or school and must be included with the entry form.

There are no restrictions on how many projects a school may send; the only request is that your school provides one person to judge for every ten entries you enter in the Junior category. This can be a high school teacher. These names must be submitted to Dr. David Probst, Department of Physics and Engineering Physics, Southeast Missouri State University, One University Plaza, Cape Girardeau, MO 63701 (or by fax: 573-651-2223) by Tuesday, February 14, 2006.

All signatures must have a date that is BEFORE the experimentation starts.

We are anticipating another great year with the Science Fair. Student attendance is mandatory during the two hours of interview/judging on Tuesday afternoon - there are no exceptions. Attendance at the Awards Ceremony is mandatory for acceptance of any awards unless prior arrangements have been made. No awards will be announced prior to the awards ceremony. The ceremony will last approximately 90 minutes.

See you in March,

Dr. Chris McGowan, Director
Southeast Missouri Regional Science Fair
regscifair@semo.edu

Calendar of Events

Science Fair Entry Form Deadline - February 14, 2006

Tuesday, March 14, 2006

- 9:30 a.m. Set-up begins
- 11:00 a.m. Set-up must be completed
- 12:00 p.m. Judging begins – *no students present*
- 1:00 p.m. Judging continues – *students must be present*
Fair Director to meet with Teachers
- 3:00 p.m. Students dismissed; final judging – *no students present*
- 3:30 p.m. Science Fair open to public viewing
- 6:30 p.m. Award Reception for exhibitors, their families and teachers
- 7:30 p.m. Awards Program – *students must be present*
- 9:00 p.m. Science Fair closed to public viewing
Project removal (*No exhibits can be removed prior to 8:30 p.m.*)
- 9:30 p.m. all projects must be removed.

Questions?

Call Dr. Chris McGowan at (573) 651-2163, Fax (573) 651-2223,
or by e-mail regscifair@semo.edu

OR

Dr. Steve Overmann,
Regional Science Fair Scientific Review Committee Chairperson
at 573-651-2386

Checklist for the 50th Annual Southeast Missouri Regional Science Fair

(items to be sent on or before February 14, 2006)

Junior Division

- _____ Application Form
- _____ Entry fee (\$10.00/exhibit; \$15.00 if exhibit requires electricity)

Senior Division

- _____ Entry Form
- _____ Abstract (no longer than 250 words)
- _____ Entry fee (\$10.00/exhibit or \$15.00/exhibit requiring electricity)
- _____ Form 1 - Safety Assessment Form (Checklist for Adult Sponsor)
- _____ Form 1A - Research Plan (All signatures must be before proposed start date)
- _____ Form 1 B - Approval Form
- _____ Form 1 C - Research Performed in an Institutional/Industrial Setting (if required)
- _____ Form 2 - Qualified Scientist Form (if required)
- _____ Form 3 - Designated Supervisor Form (if required)
- _____ Form 4 - Human Subjects Form (if required)
- _____ Copy of Questionnaire (if used)
- _____ Form 5A - Nonhuman Vertebrate Animal Form (if required)
- _____ Form 5B - Nonhuman Vertebrate Animal Form (if required)
- _____ Form 6 - Human and Vertebrate Animal Tissue Form (if required)
- _____ Form 7 - Continuation Projects Form

Category Descriptions

Behavioral & Social Sciences (BSS)

Any study such as is done by sociologists, anthropologists, psychologists, linguists, etc. that examines animal activities to discover recurrent patterns. For example: trigger of fear, learned behavior, actuality of prejudice, effect of color on choice, pecking order, group size. Because of protocol restrictions it is better to do observational studies in natural settings.

Biochemistry (BIO)

The chemistry of life processes such as respiration, photosynthesis, enzymes, diffusion etc. Study focuses on the chemicals and their reactions. For example: reactants or products of processes, conditions which enable or regulate rate of reaction. All types of investigation design is possible in this category: collection, observation, model, experiment, and invention.

Botany (BOT)

Studies of plants, their life cycle, structure, growth, processes, and classification. Sciences of agriculture, agronomy, taxonomy, etc. For example: algae growth, leaf gas exchange, power of swelling seeds, germination, development sequence, tropism responses. All types of investigation design are possible; collection, observation, model, experiment and invention.

Chemistry (CHM)

Study of matter, its composition and its interactions. Includes inorganic and organic matter, natural and man-altered materials. For example: pH of household substances, controlling rate of reaction, producing a desired substance. All five types of studies are possible: collection, observation, model, experiment, and invention. Be careful of dangerous chemicals.

Earth & Space Sciences (ESS)

Deals with the soil, water and air of our planet and objects in space. Includes geology, meteorology, astronomy. For example: identify rocks or stars, forecast weather. All five types of studies are possible.

Engineering (ENG)

Deals with putting scientific knowledge to work. Includes civil, chemical, electrical, or mechanical engineering. For example: building robots, new electrical switches, faster pine wood derby cars, etc. All five types of studies are possible. Models and inventions are frequently used.

Environmental Sciences (ENV)

Response of living organisms to man-altered or to nature-altered environment. For example: pollution effects, disaster effects, profile of organism density in a

specific environment. The experiment type of investigation is generally done in this category.

Mathematics & Computer Sciences (MCS)

Deals with numbers: types, relationships, and manipulation. Includes algebra, geometry, calculus. For example: abacus design, pattern of repeating decimals, families of numbers. Also includes studies which modify or use the computer hardware or computer software in a new way. For example: using an application in a new way. Collections, models, and inventions are used frequently.

Medicine & Health (MED)

Studies of diagnosing, improving, and preserving health. Includes disciplines such as medicine, dentistry, ophthalmology, nutrition, speech, hearing, etc. For example: monitoring health aspects of persons enrolled in diet or body-building programs, checking for hearing or sight loss. Because of protocol the types of investigations which are most often done are collections, observations, or models.

Microbiology (MIC)

Studies of microorganisms such as algae, fungi, protozoans, virus and bacteria and their life processes. For example: bacteria in milk, water or soil, growth rates, identity of organisms. Five types of studies can be done in this category. Be careful of pathogenic agents which require protocol.

Physics (PHY)

Deals with the energy of matter interactions. Includes motion, mechanics, electricity, sound, light, etc. For example: forces on a falling object, trajectory of an object, electrical circuits, etc. All five types of investigations are used.

Zoology (ZOO)

Study of animals, life cycle, anatomy, classification. Includes herpetology, entomology, husbandry, etc. For example: identify, classify, earthworm growth, butterfly life cycle, unique structure. All five types of studies can be done. Beware of protocol required for vertebrates.

Determining Project Categories

Please Note: It is impossible to develop category descriptions that apply to any and all projects absolutely. The increasingly interdisciplinary nature of science and engineering means that many projects will draw on more than one field. To determine a project category, it may be necessary to identify the primary emphasis. For example, limnology is defined as the scientific study of the physical, chemical, meteorological, and biological conditions in fresh water. The primary emphasis of a limnology project should be examined, and placed accordingly.

Instruments: The design and construction of a telescope, bubble chamber, laser, or other instrument would be Engineering if the design and construction were the primary purpose of the project. If a telescope were constructed, data gathered using the telescope, and an analysis presented, the project would be placed in Earth and Space Sciences.

Marine Biology: Behavioral and Social Sciences (schooling of fish), Botany (marine algae), Zoology (sea urchins), or Environmental Sciences (plant/animal life of river, pond).

Fossils: Botany (prehistoric plants), Chemistry (chemical composition of fossil shells), Earth and Space Sciences (geological ages), or Zoology (prehistoric animals).

Rockets: Chemistry (rocket fuels), Earth and Space Sciences (use of a rocket as a vehicle for meteorological instruments), Engineering (design of a rocket), or Physics (computing rocket trajectories).

Genetics: Biochemistry (DNA studies), Botany (hybridization), Microbiology (genetics of bacteria), or Zoology (fruit flies).

Vitamins: Biochemistry (how the body deals with vitamins), Chemistry (analysis), or Medicine and Health (effects of vitamin deficiencies).

Crystallography: Chemistry (crystal composition), Mathematics (symmetry), or Physics (lattice structure).

Speech and Hearing: Behavioral and Social Sciences (reading problems), Engineering (hearing aids), Medicine and Health (speech defects), Physics (sound), or Zoology (structure of the ear).

Radioactivity: Biochemistry, Botany, Medicine and Health, and Zoology could all involve the use of tracers. Earth and Space Sciences or Physics could involve the measurement of radioactivity. Engineering could involve design and construction of detection instruments.

Space-related Projects: Note that many projects involving space do not go into Earth and Space Sciences. Botany (effects of zero G on plants), Medicine and Health (effects of G on humans), or Engineering (developing closed environmental system for space capsule).

Computers: If a computer is used as an instrument, the project should be considered for assignment to the area of basic science on which the project focuses. Physics (used to calculate rocket trajectories), Chemistry (calculate estimates of heat generated from a specified inorganic chemical reaction), or Behavioral and Social Sciences (used as a teaching aid).

Display Regulations (Clarifications and Explanations)

Unacceptable for Display (Not allowed on project or in booth)

- 1) living organisms
- 2) dried plant materials unless sealed in acrylic or other similar material
- 3) taxidermy specimens or parts
- 4) preserved vertebrate or invertebrate animals
- 5) human or animal food
- 6) human/animal parts or body fluids (blood, urine) (Exceptions: teeth, hair, nails, dried animal bones, histological dry mount sections, and completely sealed wet mount tissue slides)
Clarification: Human or other animal fluids other than blood and urine also are not allowed.
- 7) soil or waste samples
Clarification: Soil or waste samples are allowed if they are permanently encased/sealed and if they are not hazardous or dangerous in the judgment of the Display and Safety Committee.
Clarification: If, in the opinion of the Display and Safety Committee, the composition of rocks and the manner in which they are displayed do not pose a hazard or risk, the rocks will not be considered soil or chemicals and will be allowed.
- 8) laboratory/household chemicals including water (Exceptions: amounts integral to an enclosed apparatus or water supplied by the Display and Safety Committee)
- 9) poisons, drugs, controlled substances, hazardous substances or devices (for example, firearms, weapons, ammunition, reloading devices)
Clarification: The items in the parentheses are examples, and this is not an all-inclusive list.
- 10) dry ice or other sublimating solids (solids which vaporize to a gas without passing through a liquid phase)
- 11) sharp items (for example, syringes, needles, pipettes)
Clarification: The items in the parentheses are examples, and this is not an all-inclusive list.
- 12) flames or highly flammable display materials
- 13) empty tanks that previously contained combustible liquids or gases, UNLESS certified as having been purged with carbon dioxide
- 14) batteries with open top cells

- 15) Personal photographs, accomplishments, acknowledgments, addresses, and phone and fax numbers are not permitted on handouts but may be included in the research/data book.

Clarification: Addresses as used in this rule includes e-mail and Web page addresses.

Clarification: Acknowledgments may be included in the research paper or in the data book but not elsewhere at the project or in the booth.

Clarification: Since the items listed in this regulation are not allowed at the Finalist's booth, none of these items may be handed out during judging or public exhibition times.

- 16) Photographs or other visual presentations depicting vertebrate animals in surgical techniques, dissections, necropsies, other lab techniques, improper handling methods, improper housing conditions, etc.

Clarification: This rule applies to ALL photographs and visual depictions at the Finalist's booth or on the project.

Clarification: The only photographs or visual depictions of identifiable or recognizable people allowed in the booth are photographs of the Finalist, the Finalist's family, or persons for which consent forms [Human Subjects Form 4] are readily visible on the table or in front of the vertical display board.

Clarification: No photographs or any other visual depictions may be included in any manner at the Finalist's booth or on the Finalist's project if they are deemed visually offensive by the Scientific Review Committee or the Display and Safety Committee. This includes, but is not limited to, visually offensive photographs or visual depictions of invertebrate or vertebrate animals, including humans. The decision by any one of the groups mentioned above is FINAL.

Acceptable for Display Only (cannot be operated)

- 1) projects with unshielded belts, pulleys, chains, and moving parts with tension or pinch points
- 2) class III and IV lasers

Acceptable for Display and Operation (with restrictions)

- 1) Class II lasers:
 - a) must be student-operated
 - b) posted sign must read "Laser Radiation: Do Not Stare Into Beam"
 - c) must have protective housing that prevents access to beam
 - d) must be disconnected when not operating
- 2) Large vacuum tubes or dangerous ray-generating devices must be properly shielded.

- 3) Pressurized tanks that contained non-combustibles may be allowed if properly secured.
- 4) Any apparatus producing temperatures that will cause physical burns must be adequately insulated.
- 5) High-voltage (over 12 volts) equipment must be shielded with a grounded metal box or cage to prevent accidental contact.
- 6) High-voltage (over 12 volts) wiring, switches, and metal parts must have adequate insulation and overload safety devices, and must be inaccessible to others.
- 7) To reach electrical outlets, those requiring 125/220 volt AC electrical circuits must provide an extension cord which is no more than nine-feet in length. All cords must have sufficient load-carrying capacity and must be approved by Underwriters Laboratories.
- 8) Electrical connections in 125/220 volt circuits must be soldered or made with UL approved connectors. Wires must be insulated. (Maximum are 500 watts @ 130 VAC/60 hertz or 250 watts @ 220 VAC/60 hertz).
- 9) Bare wire and exposed knife switches may be used only in circuits of 12 volts or less; otherwise, standard enclosed switches are required.

GENERAL

No changes, modifications, or additions to projects may be made after approval by the Display and Safety Committee and the Scientific Review Committee.

A project data book and research paper are not required but are recommended.

The only acceptable informed consent form for use at the Intel ISEF is the official Intel ISEF Form 4 or equivalent provided by a registered research institution.

Prior years' written material or visual depictions may not be displayed on the vertical display board.

Students using audio-visual or multi-media presentations (for example, 35 mm slides, videotapes, images, graphics, animations, etc., displayed on computer monitors, or other non-print presentation methods) must be prepared to show the entire presentation to the Display and Safety inspectors before the project is approved.

If a project fails to qualify and is not removed by the Finalist, Science Fair Officials will remove the project in the safest possible manner but is not responsible for damage to the project.

Project sounds must not be distracting to surrounding students or judges.

No food or drinks, except small containers of bottled water for the Finalist's consumption during judging, are allowed in the exhibit hall.

Photography is no longer part of the Display and Safety process.