



53rd Annual  
San Juan Basin Regional Science Fair  
2011 Project Guidelines

For Students in Grades Six through Twelve  
from Archuleta, Dolores, Hinsdale, La Plata, Montezuma  
and San Juan Counties

**Thursday, March 3, 2011**

Main Exhibit Hall  
La Plata County Fairgrounds  
2500 North Main Avenue  
Durango, Colorado

**MISSION STATEMENT**

The purpose of the fair is to encourage student learning and exploration and to promote interest in math, science, engineering and technology. We do this by:

- Recognizing research knowledge, ability, effort and achievement.
- Encouraging strong mentoring relationships.
- Emphasizing safety for all project designs.
- Supporting student growth through an open evaluation process.
- Providing opportunity to our most promising students to advance in competition.

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The 2010 San Juan Basin Regional Science Fair will be held on **Thursday, March 3rd** at the La Plata County Fairgrounds in Durango. The Science Fair is open to students in 6th through 12th grades from Archuleta, Dolores, Hinsdale, La Plata, Montezuma and San Juan Counties. The purpose of the fair is to encourage student learning and exploration and to promote interest in math, science, engineering and technology.

## AFFILIATIONS

### Colorado Science and Engineering Fair

The San Juan Basin Regional Science Fair is affiliated with the Colorado Science and Engineering Fair (CSEF). The top twenty projects overall will be qualified to enter the state level fair held at Colorado State University in Fort Collins **April 7-9, 2011**. Awards given at CSEF include cash prizes and scholarships. Information about CSEF is available online at [www.csef.colostate.edu](http://www.csef.colostate.edu).

### Intel International Science and Engineering Fair

The San Juan Basin Regional Science Fair will be affiliated with the Intel International Science and Engineering Fair (ISEF) for high school students grades 9-12. If the Regional Science Fair has the requisite number of high schools participating this year, then the top two individual high school projects and one high school team project may be qualified to enter the international fair held **May 8-13, 2011** in Los Angeles, CA. Please see <http://www.societyforscience.org/isef/index.asp> for more information.

## REGISTRATION

### How to Qualify

Students qualify for the Regional Science Fair by succeeding at the Science Fair held in their schools. The top projects from each school compete against each other at the San Juan Basin Regional Science Fair. Students from schools or in grades that do not hold a science fair may enter the Regional Science Fair independently. Teachers, students and parents should contact the Regional Science Fair Coordinator for details.

### Registration Fees

There is a registration fee of \$15.00 per student. Checks should be made out to San Juan BOCES. Schools each have different policies for the payment of these fees. Some collect money from individual students and some do not; students should check with their teachers about the policy for their school.

### Registration Date

The deadline for registration is **Friday, February 4th, 2011**. Due to the review process that takes place prior to the Regional event, **THERE WILL BE NO EXCEPTIONS TO THIS DEADLINE**. Please plan accordingly. The Student Registration Form is included on page 16 of these Guidelines. In addition to this registration form, all students must submit a detailed research plan and summary abstract plus other project material as outlined in the *Project Rules and Requirements* beginning on page 6 of these Guidelines. Material is typically turned in to the school science teachers who compile and forward it to San Juan BOCES.

### Permission to Publish

San Juan BOCES would like to publicly showcase our students' efforts by publishing information about the fair in press releases, programs, newsletters and bulletins, as well as in newspapers and on the San Juan BOCES website. Specific information to be published about students includes: name, grade, school,



project title, category, and awards received. San Juan BOCES would also like to include photographs of students and exhibits, though no names will be listed in captions for photos published on the website.

We are asking each participant to provide his or her permission to publish. This is included on the student registration form. Participants under age 18 must also have consent from a parent or guardian. The decision to not allow personal information or photographs of a student to be published will not disqualify the student from the fair or in any way affect the judging or awards for that student.

## **GENERAL INFORMATION**

### **Divisions by Grade**

Projects will be divided into three divisions based on grade level:

- Sixth Grade Division: 6th Grade only
- Junior Division: 7th and 8th Grades
- Senior Division: 9th through 12th Grades

### **Individual Projects**

Individual projects must represent the work of a single student with research performed over a one year maximum period within 2010-2011. Many students choose to work from May 2010 through April 2011, following the International Science and Engineering Fair calendar, but other timeframes are permitted.

### **Exhibit Categories for Individual Projects**

Individual projects will be entered into one of twelve categories that represent different scientific disciplines and specialties. Categories and descriptions are listed on page 15 of these Guidelines. Many projects could very well fit into more than one of these categories. When choosing the category that best matches the project, students should consider the original research question being asked and the overall focus of the project in addition to the specific techniques and tools being used.

### **Team Projects**

Team projects are completed and entered together by two or three students who have worked together over a one-year maximum period within the 2010-2011 school year. Team projects will be judged against all other Team Projects, separately from the individual project categories.

### **Judging**

Judges look for well thought-out, original projects that have been thoroughly researched, well executed and carefully displayed. Judging will be based on the combination of the written materials received with registrations, interviews conducted on fair day, and the material on display at the fair. Judges will be talking with students about their research to see if they have a good grasp of the project. Judges are not looking for lengthy speeches but rather the ability to clearly and concisely summarize their projects. Students should be able to speak freely and confidently about the research: answering questions, explaining what was done and why, and showing their insight into the project.

With a very limited amount of time available to thoroughly review students' written material, judges depend heavily on the interview process to gauge a student's understanding. Students should be prepared to provide a summary of their project to the judges and to answer questions related to their project. Students should be able to explain all of the terminology used and concepts presented in their project.



## **Awards**

### ***Category Awards***

Savings bonds will be awarded to the best projects in each division for each category.

### ***Nomination to CSEF***

The top twenty projects ***overall*** may be nominated to attend CSEF. With 36 potential first place awards (twelve categories each in three separate divisions), *not all first place winners can be nominated to attend the state competition.* And in some cases, students with very strong projects that are not first place winners may be considered for nomination; the twenty best projects could include several that are competing against each other within the same category. Travel expenses are the responsibility of the student and his/her parents or school. Check with your school to see if funds are available to offset travel expenses.

### ***Nomination to ISEF***

The top two projects ***overall*** and one team project in grades 9-12 may be nominated to attend ISEF.

### ***Space Camp Special Award***

Danny Jaques, with the Ignacio Space Camp, may again be sponsoring a trip to the Space Camp in Huntsville, Alabama to the best 6th Grade or Junior Division project with application to Space Sciences.

### ***Other Special Awards***

Special awards will be presented to outstanding entries identified by award sponsors. 2009 awards included:

- *Making a Difference Awards* from BP America Production Company.
- *Energy Efficiency and Conservation, Renewable Energy, Sustainable Development Awards* from Empire Electric and La Plata Electric Associations.
- *Earth and Space Science Awards* from the Colorado Geological Survey.
- *Environmental and Conservation Awards* from Ecosphere Environmental Services, Sugnet & Moore Environmental, and San Juan Citizens Alliance.
- *Spirit Awards and Scholarships* from Kiwanis or Durango.
- *From the Heart Awards and Scholarships* from San Juan Citizens Alliance.

### ***Technical Writing Awards***

Students may submit a Research Paper about their project for a Technical Writing Award that is judged separately from the regular category awards. A research paper is an organized presentation of the entire project: the question being considered, background research, hypothesis or goal, methods, data and results, conclusions, acknowledgements and bibliography references. The ISEF Student Handbook (available online at <http://www.societyforscience.org/isef/index.asp>) contains more information about writing a Research Paper. To be considered for this award, students must turn in a copy of their paper at registration on the morning of the science fair. This must be a separate copy than what is displayed with the project and will not be returned.

## **Ethics Policy**

The San Juan Basin Regional Science Fair will not condone scientific fraud or misconduct. Fabrication or falsification of data, forgery of approval signatures, or plagiarism (the use or presentation of someone else's work as one's own) will not be tolerated.



## PROJECT RULES AND REQUIREMENTS

The San Juan Basin Regional Science Fair follows the rules and requirements of the International Science and Engineering Fair. The ISEF website at <http://www.societyforscience.org/isef/index.asp> is a valuable resource that contains suggestions for projects, the full text of rules, copies of required forms and a *Rules Wizard* to help determine which rules and forms apply to any specific project.

Good science involves a thorough examination of all aspects of research to identify and minimize potential risks and hazards. All projects should be designed with safety and risk management in mind and every student's initial research plan must document appropriate safety measures to be taken.

### Appropriate Levels of Review

#### *All Projects*

All projects must have the research plan reviewed and approved by the student's parent and adult sponsor before the data collection part of research begins.

All projects registered for the San Juan Basin Regional Science Fair will be reviewed by the regional Scientific Review Committee (SRC) prior to the fair for safety and appropriateness. Projects that do not follow the rules may be disqualified. Students, teachers, parents and sponsors are encouraged to contact San Juan BOCES at any time with questions about the safety or appropriateness of a project (much preferably before research begins).

#### *Projects using Human Subjects*

Projects that involve any type of research with human beings require a special safety review **before data collection may begin**. This review is done by an Institutional Review Board (IRB) that is set up at the school or industrial research location. The IRB will approve or deny the research plan based on the potential risks to human beings, including concerns about physical and emotional well being and privacy. The IRB will also specify the appropriate level of supervision required and whether people will need to document their informed consent to participate in the study.

#### *Projects using Animals, Microbes, and other Biological Agents*

Projects that involve vertebrate animals, microbes, and other biological agents require a special safety review **before data collection may begin**. This review is done by a Scientific Review Committee (SRC) set up at the school or regional level. The SRC will approve or deny the research plan based on the potential risks of the project, including concerns about student and environmental safety or animal welfare. The SRC will also specify the appropriate level of supervision required and may require that the research be conducted in a specialized facility.

### Appropriate Levels of Supervision

#### *Parent*

Parents must review and approve of all student research plans. Parents who would like to also serve as either the Adult Sponsor, Designated Supervisor or Qualified Scientist must have the required skills and training as described below.



### ***Adult Sponsor***

All projects must have an Adult Sponsor who maintains close contact with the student throughout the project to provide guidance and oversight. The Adult Sponsor should have a solid understanding of science and is ultimately responsible for the health and safety of the student and all others involved. The Adult Sponsor is also responsible for ensuring that applicable laws are followed and that science fair rules are observed and documented. Adult Sponsors can be parents, teachers, college professors, community mentors or scientists in whose lab students are working.

### ***Designated Supervisor***

Projects of a more hazardous nature also require a Designated Supervisor who is directly responsible for overseeing student experimentation. The Designated Supervisor must have a solid background in science with specific training in the student's area of research. Parents and Adult Sponsors may only serve as Designated Supervisors if they have the specialized training required. Projects that require a Designated Supervisor include:

- Projects that involve hazardous materials, activities or devices.
- Experiments involving humans and animals with a relatively low (minimal) level of risk.
- Experiments involving low-risk biological agents (Bio-Safety Level 1, see page 13)

### ***Qualified Scientist***

Projects posing the most serious risk to humans or animals require a Qualified Scientist who must hold a doctorate or advanced professional degree that is related to the student's area of research. Adult Sponsors may only serve as Qualified Scientists if they have the prerequisite credentials. The Qualified Scientist should complete ISEF Form 2 prior to the start of research, describing the planned safety precautions, training, and supervision. Projects that require a Qualified Scientist include:

- Experiments involving humans and animals with more than a minimal level of risk.
- Experiments involving moderate-risk biological agents (Bio-Safety Level 2, see page 13)

## **Required Elements for ALL Projects**

### ***San Juan BOCES Registration Form***

Each student must complete the 2011 Student Registration Form included on page 16 of these Guidelines and available online at [www.sjboces.org/sciencefair](http://www.sjboces.org/sciencefair). Parent/guardian signature is required.

### ***Research Plan***

After choosing a subject and doing some library research about their topic, students work with their adult sponsors to develop a research plan. This plan should include the question being addressed, the specific hypothesis or goal of the project, detail about the methods and materials to be used, explanation of how data will be analyzed to answer the research question or hypothesis, plus a bibliography listing at least five major references from the student's library research.

The explanation of materials and procedures must be very detailed and specific – sufficient to properly evaluate the potential risks and safety procedures of the project. Students should review the International Rules and Guidelines for specific instructions on writing a research plan. See this website for more information: <http://www.societyforscience.org/isef/index.asp>.



***Student Checklist (ISEF Form 1A)***

This form is completed by student(s) before research begins. This form serves as a very basic summary of the project listing the title, contact information, dates and locations the research will be conducted.

***Checklist for Adult Sponsor (ISEF Form 1)***

This form is completed by the adult sponsor before the experiment begins. The sponsor agrees to work with the student and indicates their review and acceptance of the research plan and risk assessment, marking any sensitive areas of research and acknowledging all required forms and approvals.

***Approval Form (ISEF Form 1B)***

This form is completed before the experiment begins. A parent or guardian must sign this form to indicate their knowledge and acceptance of the research plan and its risks. The student also signs this form to indicate his or her knowledge of the ethics statement and to certify the work will be his or her own. When committee approval from an SRC or IRB is needed for a sensitive project, the committee chair also signs this form.

***Abstract***

Students must prepare an abstract after the experiment has ended. The abstract is a precise summary of the finished research project that includes the original hypothesis or purpose of the experiment and a brief description of the procedures used, data collected, and conclusions drawn. The abstract must be typed on one single page and approximately 250 words. Great examples of abstracts are available on the CSEF and ISEF websites.

The abstract contains many of the same elements as the research plan attachment. One major difference is that the abstract is prepared after research has been completed, explaining and summarizing what actually happened, while the research plan is prepared before the experiment begins. The research plan also contains many details about the methods and materials to be used, but the abstract includes just a summary of these procedures plus a discussion about the conclusions.

***Research Notebook***

While not required by the Regional Fair or ISEF, a research notebook, journal or log is highly recommended and may be considered by the judges during their evaluation. The research notebook is where students record all of the day to day activities of the project, including the exact procedures used, raw data as it was collected, problems that came up, plus all observations and notes made. Careful, accurate note taking shows consistency and thoroughness to the judges.

A research notebook is a working document and no specific format is required other than entries should be dated. While the neatness of material in a research journal is not as important as the content, it should be legible and well organized.

***Original Documents or Copies***

Students must retain all original forms submitted for the project and bring them to the fair. Submit COPIES ONLY with the registration and retain the original documents for display with the project. The exception to this is the San Juan BOCES Registration form which does not need to be displayed with the project.



### **Continuation Projects**

Students may choose to continue research in the same field of study as a previous year's project. The current project must document new and different research done this year and not be just a resubmission of a past project. ISEF Form 7 must be filled out for all continuation projects.

### **Research Conducted in an Industrial Setting**

Research performed in an industrial setting requires completion of ISEF Form 1C by the scientist who supervised the student's research. Other than the student's school, almost any business location shall be considered an industrial setting, including colleges and hospitals.

### **Sensitive Areas of Research**

Research is considered sensitive when it involves:

- Hazardous Materials, Activities or Devices
- Vertebrate Animals
- Human Beings
- Biological Agents such as microorganisms, animal tissue, blood or other body fluids, recombinant DNA (rDNA)

*Before starting projects in these areas*, students must conduct a thorough risk assessment for the project and must properly address all risk and safety issues in their research plan. Examples and requirements are listed below for each sensitive area. "No Risks" is never an acceptable assessment.

### ***Hazardous Materials, Activities or Devices***

Following is a general listing of some materials, activities and devices that are considered hazardous.

- Chemicals, including farm and household agents
- Pesticides and herbicides
- Toxic or highly corrosive materials
- Flammable or explosive material
- Radioactive materials
- Welding and soldering
- Manure (for composting or fuel production)
- Yeasts and other non-cultured microorganisms
- Hot or cold temperatures that could burn
- UV lights, lasers
- Power tools and other construction equipment
- Motors and engines
- Guns, ammunition, explosives
- Model rocket charges > 62.5g
- High voltage equipment
- Anything that could be considered dangerous!

Students with projects that involve any of these hazards must prepare a thorough risk assessment and safety plan on ISEF Form 3 as part of the research plan. Depending on the particular hazards, some things to consider in the safety plan include finding an appropriate location for the project, material storage and disposal, ventilation, protective face/eyewear, gloves, lab coat or other dedicated clothing, fire extinguishers, water, hand washing and other sanitation, plus all necessary training and supervision.

A designated supervisor should review the student's full research plan and approve the risk assessment and safety plan on ISEF Form 3 *before research begins* and work with the student throughout the project to supervise hazardous activities and safety precautions as needed.



Many materials and devices routinely used in everyday life become more hazardous when used in a research setting. The hands-on nature of investigation and the close contact required for observations can increase the risk presented by an activity. And many procedures require a certain amount of training and practice in order to perform them safely. If there is any question about the possible hazardous nature of a material, activity or device, it should be considered hazardous and a risk assessment done.

Regulated substances including prescription medicines, alcohol, tobacco, DEA-controlled substances, firearms and explosives have additional requirements by law and for use in science fair. Students planning to use any of these materials should consult the full ISEF rules and/or the Regional Science Fair Coordinator before beginning the project. Additional information about hazardous chemicals, activities and devices can be found in the ISEF International Rules and Guidelines ([www.sciserv.org/isef](http://www.sciserv.org/isef)).

### ***Vertebrate Animals***

Vertebrate animals are animals with a backbone. Humans are vertebrates but are considered separately. Projects are considered to involve vertebrate animals when they include:

- Live animals, not human
- Live embryos or fetuses
- Bird or Reptile Eggs within 3 days of hatching

Animals must be treated kindly and well cared for. Proper care is required at all times and animals used for research must be checked every day, including weekends and holidays. Students should consult an appropriate animal care guide to determine proper standards for the particular species being studied such as nutritional requirements and minimum cage size. Animals may not be killed. Projects may not cause more than momentary discomfort.

Students doing research with animals must complete ISEF Form 5A and get approval from the Scientific Review Committee (SRC) ***before starting the experiment***. The SRC will consider the potential risks of the projects when deciding to approve the research plan or to require modifications. Once a plan has been accepted, the SRC signs off on both the Approval Form (ISEF Form 1B) and the Vertebrate Animal Form (ISEF Form 5A), indicating the required level of supervision for the project:

***Animal Observation Studies - No Designated Supervisor, Qualified Scientist or Veterinarian Required***  
Projects that only involve observation with no interaction between the animals and the researcher may be approved without a designated supervisor or qualified scientist.

***Minimal Risk Animal Projects - Designated Supervisor Required***  
Projects of a minimal risk involve only activities and nutrition that are encountered during the animals' normal life. These projects should be conducted under the supervision of a designated supervisor and the welfare of the animals must be checked every day.

***Moderate Risk Animal Projects - Qualified Scientist and/or Veterinarian Required***  
Projects that introduce new activities or a different nutrition pose a higher risk and should be reviewed by a qualified scientist and/or veterinarian. Some of the most aggressive projects, such as those involving surgical procedures, may only be conducted in a specialized, regulated facility.



The designated supervisor, qualified scientist, and/or veterinarian must review the full research plan and indicate their approval on ISEF Form 5A before research begins. Additional information about animal studies can be found in the ISEF International Rules and Guidelines ([www.sciserv.org/isef](http://www.sciserv.org/isef)).

### ***Human Subjects***

Projects that involve human subjects are those where the researcher obtains data or samples through interaction or intervention with living human beings or their identifiable personal information. This includes asking friends, family, or other people questions and doing experiments on yourself. Human subject projects must carefully consider and minimize all potential risks, both physical and emotional. Students may not administer medication to human subjects or perform invasive procedures.

The following projects are not considered human subject projects and do not need special review:

- Studies using publicly available records and data sets, such as sports teams or crime statistics.
- Product testing that is not expected to pose significant risk.
- Behavioral observations of people in unrestricted public settings where the researcher does not interact with the people being observed, does not manipulate the environment in any way and does not record any personally identifiable data.

All other projects that involve human beings do require special review and risk assessment. Most projects require a statement from each person that they voluntarily agree to participate in the study, that they understand and accept the risks associated with participating, and that they understand they may withdraw from the study at any time. This important part of human subject research is called “informed consent.” Informed consent is almost always required for human subjects.

As outlined below, some projects with only “minimal risk” may be conducted without obtaining informed consent. Minimal risk means that the probability and magnitude of harm is not anticipated to be any greater than that ordinarily encountered in routine daily life and activities. Minimal risk projects do not involve ingesting any substances, exposure to potentially hazardous materials, or activities that could cause emotional stress or result in negative consequences including breaches of privacy.

Students doing research that involves human subjects must provide a thorough risk assessment on ISEF Form 4 and need approval from an Institutional Review Board (IRB) **before starting research**. The IRB will approve or deny the research plan based on the potential risks to human beings, including concerns about physical and psychological well being and privacy. The IRB will specify whether informed consent is required or waived and whether review or supervision by a qualified scientist is needed.

### ***Minimal Risk Human Subject Projects - Informed Consent Waived (Not Required)***

The IRB must review all human subject projects but may waive informed consent for minimal risk projects that have anonymous data collection and meet one of the following conditions:

- Research involving normal educational practices
- Research on the behavior or characteristics of individuals or groups where the researcher does not manipulate the subjects’ behavior.
- Surveys and questionnaires that involve perception, cognition or game theory and do not have the potential to cause emotional distress or involve gathering any personal information.



- Studies involving physical activities where the probability and magnitude of harm is not anticipated to be any greater than that ordinarily encountered in daily life or during routine physical activities.

*Minimal Risk Human Subject Projects - Informed Consent Required*

Human Subjects participating in research projects must be informed of all potential risks and benefits of participating in the study and must provide their informed consent before the research is conducted. ISEF Form 4 has a section at the bottom that can be used to document informed consent. Consent for people under the age of 18 must be given by both the participant and a parent or guardian.

*More than Minimal Risk Human Subject Projects - Qualified Scientist and Informed Consent Required*

Any projects where human beings ingest any substance or otherwise engage in an activity that could potentially result in physical harm or emotional distress have more than minimal risk and must be carefully reviewed for safety. Similarly, projects that involve the collection of people's personal or confidential information have more than minimal risk associated with the potential breach of privacy.

Projects with more than minimal risk must be reviewed by a qualified scientist and all participants in such studies must provide their informed consent in writing prior to participating. ISEF Form 4 has a section at the bottom that can be used to document informed consent. Informed consent for people under the age of 18 must be given by both the participant and a parent or guardian.

Additional information about human subject studies, minimal risk, and informed consent can be found in the ISEF International Rules and Guidelines (<http://www.societyforscience.org/isef/index.asp>).

***Biological Agents: Microbes, rDNA or Tissue from Humans or Animals***

Potentially hazardous biological agents may be present in human or animal tissue, blood and body fluids, recombinant DNA, or microorganisms including bacteria, viruses and mold. Projects involving any of these must go through a rigorous risk assessment documented on ISEF Form 6A. The student should identify the laboratory site, procedures, safety precautions, and Biosafety Level appropriate for the project. The designated supervisor or qualified scientist should review the full research plan plus this risk assessment and indicate their approval on Form 6A ***before research begins***.

The Scientific Review Committee (SRC) reviews the research plan and risk assessment ***before the student starts the experiment***. The SRC will consider the potential risks and safety precautions when deciding to approve the research plan or to require modifications. Once a plan has been accepted, the SRC signs off on both the Approval Form (ISEF Form 1B) and the Biological Agents Form (ISEF Form 6A), indicating the appropriate Biosafety Level needed for the project.

Projects with any potentially hazardous biological agents **MAY NOT** be conducted in a home environment. A separate, non-living quarters portion of the residence may sometimes be acceptable for use as a Biosafety Level 1 Laboratory for those projects with minimal risk.

Projects that involve culturing any microorganisms in the presence of antibiotics carries the potential for generating antibiotic resistant organisms and must be considered Biosafety Level 2 (even if the original microorganism is a low risk, Level 1 organism).

The following chart summarizes types of biological hazards, designated Biosafety Levels, required safety precautions, and forms. These are general guidelines, and should be used in conjunction with ISEF’s guidelines, available here: <http://www.societyforscience.org/Document.Doc?id=25>. ISEF rules will supersede this chart in the event of a discrepancy.

	<b>Generally Not Considered Hazardous</b>	<b>Potentially Hazardous Biosafety Level 1</b>	<b>Potentially Hazardous Biosafety Level 2</b>	<b>Biosafety Level 3 or 4</b>
<b>Projects that involve:</b>  Note – if obtaining these materials directly involves humans or animals, further review is required under those separate sections of the ISEF rules.	Fossils Fixed Tissue Slides Meat or meat by-products from stores, restaurants, or slaughter houses Established cultures (with documentation of sources) Hair Teeth - if properly sterilized Brewers yeast or baking yeast Manure for fuel production or composting that does not involve culturing	Low Risk – known agents unlikely to cause diseases, such as E.Coli K12 or lactobacillus acidophilus Body fluids and tissue, other than blood, from non-infectious source with a low likelihood of hazardous microorganisms Blood or blood products from domestic animals Domestic Animal Milk Unknown – samples collected and permanently sealed rDNA projects with host vectors and organisms that are all Level 1	Moderate Risk – agents that may cause disease but risk of spread is limited, such as streptococcus pneumonia or salmonella Blood or blood products from humans or wild animals Human Milk (unless certified) Unknown – samples collected from the environment then opened for further analysis. Samples cultured in the presence of antibiotics rDNA projects with either host vectors or organisms that are, or may convert to, Level 2 agents	High Risk – infectious agents that pose a high risk of life-threatening disease, serious economic consequences, or that can be spread casually or by inhalation
<b>SRC approval required?</b>	No	Yes	Yes	Projects not allowed at all
<b>Designated Supervisor required?</b>	No. Adult Sponsor may need to confirm exact source or disposal of materials	Yes	Yes (can be the Qualified Scientist)	NA
<b>Qualified Scientist required?</b>	No	No	Yes	NA
<b>Can experiment be conducted in a home environment?</b>	Most likely; Use common sense	Generally No - Basement or Garage areas may sometimes be considered for Biosafety Level 1 projects.	No	NA
<b>Required Safety Precautions and Containment Measures</b>	If indicated by the Adult Sponsor	Decontamination by autoclave, chemical disinfection or other approved method Lab Coats Face Protection (Safety Glasses) Gloves are recommended and often appropriate Training in and use of Standard Microbiological Practices Proper Supervision	Decontamination by autoclave Lab Coats Face Protection (Safety Glasses) Gloves Training in and use of Standard Microbiological Practices Proper Supervision Biological Safety Cabinets Restricted access Letter from Institution or Biosafety Committee	NA
<b>Required Forms</b>	ISEF Form 3	ISEF Form 6A ISEF Form 6B (only for body fluid and tissue projects)	ISEF Form 2 ISEF Form 6A ISEF Form 6B (only for body fluid and tissue projects)	NA
<b>Comments</b>	<b>There are no boxes to check on ISEF forms for these projects. Please just include the requested information.</b>	<b>Microbiology projects where unknown samples are collected must be permanently sealed before incubation in order to be considered Biosafety Level 1</b>	<b>Microbiology projects that involve opening culture dishes of unknown samples after incubation for any purpose are Biosafety Level 2</b>	NA



## DISPLAY REGULATIONS

To protect the health and safety of all participants, students are encouraged to not bring their actual science fair projects to the regional fair. Rather, students should bring **THE RESULTS** of their projects.

The visual display should be neat, easy to read and well organized. The title of the project should be clearly visible at a glance. The experiment, results and conclusions should be logically organized and presented, such that anyone looking at the display can easily assess the study and the results obtained. Graphs and charts should be well labeled and understandable without further explanation. Spelling and grammar should be perfect. Maximum dimensions for the exhibit are 9' tall, 2 ½' deep, and 4' wide. The exhibit should be self-supporting.

Below are restrictions for what can and cannot be displayed at the Regional Fair. These are very often materials that were used to conduct the research but they cannot be brought to display at the fair.

Photos can be used to display parts of the project that may not be allowed on exhibit at the fair. All pictures and images must have credit lines explaining their origin: "Pictures taken by ..." or "Image taken from ...". Projects using pictures of identifiable people (other than the student submitting the project) must have informed consent in writing from the people photographed. ISEF Form 4 has boxes on the bottom that can be used for this purpose.

- No living organisms are allowed including plants, insects or pets.
- No preserved animals, vertebrate or invertebrate, are allowed.
- No plant material, whether living, dead or preserved, is allowed. Manufactured materials are allowed.
- Any soil or waste samples must be permanently encased in a slab of acrylic.
- No food is allowed – human or animal.
- No human or animal parts are allowed except teeth, hair, nails, dried animal bones, histological dry mount sections and completely sealed wet mount tissue slides.
- No human or animal body fluids, such as urine, blood or saliva, are allowed.
- No hazardous substances, including dry ice, household chemicals, or laboratory chemicals are allowed.
- No water is allowed except water that is integral to the operation of an apparatus and is fully enclosed.
- No controlled substances are allowed including drugs, alcohol or tobacco.
- No hazardous devices including firearms, weapons, ammunitions or reloading devices are allowed.
- No sharp items including needles, knives or scalpels are allowed.
- No flames or highly flammable materials are allowed.
- Any apparatus producing temperatures that will cause physical burns must be adequately insulated.
- No batteries with open-top cells are allowed.
- Large vacuum tubes or dangerous ray-generating devices must be properly shielded.
- Empty tanks that used to contain combustible materials must be certified as purged with carbon dioxide.
- Pressurized tanks must be properly secured.
- Any apparatus with unshielded belts, pulleys, chains or moving parts with tension or pinch points may not be operated. The only exception is at the request of judges during judging.
- Class II, III or IV lasers may not be operated. The only exception is for Class II lasers that may be operated at the request of judges, during judging, with prior approval.
- No active internet or e-mail connections are allowed as part of the project or display.
- No depictions of vertebrate animals in surgical procedures are allowed, including dissections or necropsies.
- No awards, medals, business cards, flags, endorsements or advertisements may be displayed.
- Nothing offensive or inappropriate is allowed, as determined by the Science Fair Coordinator.



The definitions listed for each category below are not all-inclusive. For more definitions, visit:  
[http://www.societyforscience.org/isef/students/research\\_categories.asp](http://www.societyforscience.org/isef/students/research_categories.asp).

Please note that Regional Science Fair has fewer available categories than listed on the ISEF site.

#### **ANIMAL SCIENCES**

- Animal Husbandry
- Behavior, Development, Genetics, Health
- Disease Prevention, Diagnosis, Treatment; Pathology
- Ecology
- Physiology, Molecular Biology, Biochemistry

#### **BEHAVIORAL & SOCIAL SCIENCES**

- Anthropology, Archaeology, Ethnology
- Learning, Perception
- Linguistics
- Psychology, Social /Emotional Development
- Sociology

#### **CHEMISTRY**

- Analytical Chemistry, Measurement
- Food Chemistry
- Inorganic and Physical Chemistry
- Materials: Dyes, Plastics, Textiles
- Organic Chemistry, Synthesis

#### **EARTH AND SPACE SCIENCES**

- Climatology, Meteorology
- Geology, Mineralogy
- Geography, Geophysics, Tectonics
- Oceanography
- Paleontology

#### **ENERGY AND TRANSPORTATION**

- Aerospace/Aeronautical Engineering, Aerodynamics
- Alternative Fuels
- Fossil Fuel Energy
- Vehicle Development
- Renewable Energies

#### **ENGINEERING**

- Bioengineering, Biomedical Engineering
- Civil and Structural Engineering, Construction
- Chemical Engineering
- Industrial Engineering, Processing
- Electrical Engineering, Computers, Controls
- Mechanical Engineering, Robotics

#### **ENVIRONMENTAL SCIENCES**

- Pollution Sources and Controls
- Conservation
- Ecosystems Management
- Natural Resource Management
- Waste Management

#### **MATH AND COMPUTER SCIENCES**

- Analysis, Algorithms, Data Bases
- Artificial Intelligence
- Computer Language, Programming, Networks, Systems
- General, Theoretical and Applied Mathematics
- Probability and Statistics

#### **MEDICINE AND HEALTH**

- Disease Prevention, Diagnosis, Treatment; Pathology
- Epidemiology
- Genetics
- Physical Development, Health, Nutrition
- Physiology, Molecular Biology, Biochemistry

#### **MICROBIOLOGY**

- Bacteria, Fungi, Viruses, Yeasts
- Microbial Genetics

#### **PHYSICS**

- Acoustics
- Thermodynamics
- Magnetism and Electromagnetics
- Nuclear, Particle and Theoretical Physics
- Optics, Lasers

#### **PLANT SCIENCES**

- Agriculture, Agronomy, Horticulture
- Development, Health
- Disease Prevention, Diagnosis, Treatment; Pathology
- Ecology, Forestry, Genetics
- Photosynthesis
- Physiology, Molecular Biology

**TEAM PROJECTS:** Projects completed by two or three students in any discipline



**Please send this Registration with copies of research plan, abstract, and all ISEF Forms to:**

Science Fair Coordinator  
San Juan BOCES  
825 Valentine Dr  
Durango, CO 81301

**Or Fax to: 970-247-9646  
Questions? Phone: 970-385-9545**

**Please Type or Print neatly in INK.**

**Registration Deadline: February 4, 2011 (Sorry, no exceptions).  
No refunds will be issued if student does not attend the fair.**

Student Name: \_\_\_\_\_ Student Email: \_\_\_\_\_

Project Title: \_\_\_\_\_

School: \_\_\_\_\_

Science Teacher: \_\_\_\_\_

Mentor (if any) \_\_\_\_\_

Grade: 6 7 8 9 10 11 12

Home Address: \_\_\_\_\_

Circle One: Male Female

State, City, Zip \_\_\_\_\_

T-Shirt Size: Adult S M L (Circle One)

Home Phone: \_\_\_\_\_

Ethnic Background (optional) Caucasian \_\_ Asian \_\_

Parent Email: \_\_\_\_\_

Hispanic \_\_ Native Amer \_\_ African Amer \_\_ Other \_\_

**Project Category (check one):**

\_\_\_\_\_ Animal Sciences

\_\_\_\_\_ Math & Computer Sciences

\_\_\_\_\_ Behavioral & Social Sciences

\_\_\_\_\_ Medicine & Health

\_\_\_\_\_ Chemistry

\_\_\_\_\_ Microbiology

\_\_\_\_\_ Earth & Space Sciences

\_\_\_\_\_ Physics

\_\_\_\_\_ Energy & Transportation

\_\_\_\_\_ Plant Sciences

\_\_\_\_\_ Engineering

\_\_\_\_\_ Team Project – with Team Members:

\_\_\_\_\_ Environmental Sciences

\_\_\_\_\_

**Do you require personalized assistance on the day of Science Fair? If yes, please explain:**

\_\_\_\_\_

**Does the display require an Electrical Outlet?**

**Will the display be set on a**

No \_\_\_\_\_ Yes \_\_\_\_\_

Table \_\_\_\_\_? or stand on the Floor \_\_\_\_\_?

**Permission to Publish Personal Information:**

\_\_\_\_\_ Yes, I give permission for San Juan BOCES to publish my information and photograph as described in the 2010 San Juan Basin Regional Science Fair Guidelines (available at [www.sjboces.org/sciencefair](http://www.sjboces.org/sciencefair)).

\_\_\_\_\_ No, please do not publish my information.

\_\_\_\_\_  
Student Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Parent Signature (required for participants under age 18)

\_\_\_\_\_  
Date