VENTURA COUNTY OFFICE OF EDUCATION

2012 County Schools Federal Credit Union

SCIENCE FAIR

JUDGES GUIDELINES

Judging Schedule: Wednesday, March 21st, 2012; Seaside Park in Ventura (10 W. Harbor Blvd.)

8:00 A.M. All Judges Register, Continental Breakfast in Santa Rosa Hall.

8:15 A.M. Orientation: Judging Teams meet, choose leader, assign student projects, plan team actions for the day.

Life Sciences Judges:

9:00 A.M. Judges survey project displays. Begin scoring the projects at this time using the *Individual Project Scoring Worksheet.* No students present.

10:15 A.M. Meet with student groups for Oral Presentations.

11:45 A.M. Dismiss students for lunch. Judges' Lunch in Santa Rosa Hall.

1:00 P.M. Continue judging projects and filling out the *Individual Project Scoring Worksheet* as well as the *Individual Project Feedback Forms*.

2:30 P.M. Place *Individual Project Feedback Forms* on projects by 3:00 P.M. If you don't finish the Feedback forms by 3:00 P.M. bring them to the Judges' Station and we will place them with the projects.

3:00 P.M. Meet with the other judging teams in your category and division to come to a consensus on 1st, 2nd, 3rd, and Honorable Mention awards (*1 project per place please*)utilizing the *Project Comparison & Ranking Worksheet.* Record your 1st, 2nd, 3rd, and Honorable Mention winners on the *Ranking Worksheet*. All judges sign and/or initial the *Ranking Worksheet*. Lead Judge should turn this in as soon as possible to the Judges' Station. Turn in notebooks at Judges' Station when finished.

Physical Sciences Judges:

9:00 A.M. Judges survey project displays. Begin scoring the projects at this time using the *Individual Project Scoring Worksheet.* No students present. Complete *Individual Project Feedback Forms* as appropriate.

11:45 A.M. Lunch in Santa Rosa Hall.

1:00 P.M. Meet with students for Oral Presentations.

2:30 P.M. Dismiss students. Place *Individual Project Feedback Forms* on projects by 3:00 P.M. If you don't finish the Feedback forms by 3:00 P.M. bring them to the Judges' Station and we will place them with the projects.

3:00 P.M. Meet with the other judging teams in your category and division to come to a consensus on 1st, 2nd, 3rd, and Honorable Mention awards (*1 project per place please*)utilizing the *Project Comparison & Ranking Worksheet.* Record your 1st, 2nd, 3rd, and Honorable Mention winners on the *Ranking Worksheet*. All judges sign and/or initial the *Ranking Worksheet*. Lead Judge should turn this in as soon as possible to the Judges' Station. Turn in notebooks at Judges' Station when finished.

Science Fair Project Categories:

Life Sciences:

Animal Behavioral and Social Sciences: Animal behavior, social and community relationships—psychology, sociology, linguistics (ie. Dolphin communication), learning, perception, etc.

Human Behavioral and Social Sciences: Human behavior, social and community relationships—psychology, sociology, anthropology, archaeology, ethnology, linguistics, learning, perception, urban problems, reading problems, public opinion surveys, educational testing, etc.

Amgen® Biochemistry: Chemistry of life processes—molecular biology, molecular genetics, enzymes, photosynthesis, blood chemistry, protein chemistry, food chemistry, hormones, etc.

Botany: Study of plant life—agriculture, agronomy, horticulture, forestry, plant taxonomy, plant physiology, plant pathology, plant genetics, hydroponics, algae, etc.

Human Biology: Study of diseases and health of humans— genetics, physiology, dentistry, pharmacology, pathology, ophthalmology, nutrition, dermatology, allergies, speech and hearing, etc.

Microbiology: Biology of microorganisms—bacteriology, virology, protozoology, fungi, bacterial genetics, yeast, etc.

Product Science (Biological) (Junior Division Only): Comparison and testing of commercial off–the-shelf products for quality and/or effectiveness for intended use in real-world consumer-oriented applications. This category is reserved for experimental methods involving biological sciences and processes.

Zoology: Study of animals—animal genetics, ornithology, ichthyology, herpetology, entomology, animal ecology, paleontology, cellular physiology, circadian rhythms, animal husbandry, cytology, histology, animal physiology, invertebrate neurophysiology, studies of invertebrates, etc.

Physical Sciences:

Chemistry: Study of nature and composition of matter and laws governing it—physical chemistry, organic chemistry (other than biochemistry), inorganic chemistry, materials, plastics, fuels, pesticides, metallurgy, soil chemistry, etc.

Earth, Space and Environmental Sciences: Study of earth and celestial bodies with regard to geology, mineralogy, physiography, oceanography, meteorology, climatology, astronomy, speleology, seismology, geography, study of pollution (air, water, and land) sources and their control; ecology etc.

HAAS® Engineering: Technology; projects that directly apply scientific principles to manufacturing and practical uses—civil, mechanical, aeronautical, chemical, electrical, photographic, sound, automotive, marine, heating and refrigerating, transportation, environmental engineering, etc.

Mathematics, Computer Science and Electronics: Development of formal logical systems, numerical and algebraic computations, and their applications, semiconductors, development of hardware and/or software for communications, graphics, simulations, and information theory…

Product Science (Physical) (Junior Division Only): Comparison and testing of commercial off-the-shelf products for quality and/or effectiveness for intended use in real-world consumer-oriented applications. This category is reserved for experimental methods involving non-biological, physical sciences and processes.

Physics: Theories, principles, and laws governing energy and the effect of energy on matter—solid state, optics, acoustics, particle, nuclear, atomic, plasma, superconductivity, fluid and gas dynamics, thermodynamics, semiconductors, magnetism, quantum mechanics, biophysics, etc.

The Judge/Student Relationship:

Do not ask students for their phone numbers, contact a student without going through the Science Fair Committee, or make inappropriate comments of a personal nature. Such behavior is sufficient grounds for barring a judge from future fairs. It is important to remember that students participating in the Ventura County Science Fair are of junior high school and high school age. They are not adults. The relationship of student to judge is that of a minor to an adult in a position of authority. It is the responsibility of all judges to ensure that all interactions between themselves and the students are in the best interests of the students.

Treat each student with respect. This should be self-evident, but is sometimes overlooked. While these students are young, they are aspiring, although inexperienced, scientists. Acknowledge them and their projects with due consideration, even if the science is flawed. Introduce yourself, be polite, and try to put the student at ease. Be encouraging and make it fun.

The Judging Process:

In order to make the best use of your time we will be using the following procedure:

1. You will sit with all of the judges for your division and category. *Example: Junior (grades6-8): Physics.*
2. Decide upon a "Category Judging Team Leader".
3. Each Project Notebook on average contains 10 projects for your division and category to be judged.
4. Your task is to evenly distribute your Project Notebooks to judging teams. For example, here is what *you might do:*
   A. On your table will be the Project Notebooks you are to assign judging teams to.
   B. Count the number of judges present for your category and division. *Example: 12 judges*.
   C. Divide the number of judges by 2 or 3. The result will be the number of teams. *Example: 12 judges/3 = 4 teams of 3 judges or 12/2 = 6 teams of 2 judges.*
   D. Each "Judging Team" should then be assigned a specific Project Notebook. If this does not work out evenly for your Division and Category let someone know at the judges' desk and we will come around to your table to insure that the Project Notebooks are evenly distributed.
5. Some general parameters:
   A. *If at all possible*, try to have each student speak to all of the judges on the team. This is a very difficult goal to achieve. Try to be creative.
   B. If there are college student judges present, try to place no more than one college student judge per team of judges.
6. Make a general plan of action for the day. Due to time constraints, judging must be completed by 4:00 P.M.
7. Review all projects to which your team is assigned.
8. Form an idea about the top four projects from those you were assigned in your Division and Category.
9. Use the *Individual Project Scoring Worksheet* as your evaluation tool in the judging process. This can also be used to help you fill out the *Individual Project Feedback Forms.* You will have the opportunity to place the *Individual Project Feedback Forms* with the projects between 2:30 and 3:00 P.M. These are very important feedback forms for the students. This is your opportunity to share your expertise and knowledge with the student.
10. Use the Judging Team *Project Ranking Worksheet,* to prioritize your teams top four projects from those to which your team was assigned.
11. Once these four projects have been prioritized, collaborate with the other judging teams in your Division and Category to develop mutual consensus on the 1st, 2nd, 3rd and honorable mention winners (Revisit the top projects if you need to). Use the *Final Four Ranking Worksheet***, PICK-UP FROM JUDGES STATION** in the Santa Rosa Hall to do this. **All judges must sign or initial this *Final Four Ranking Worksheet*.**
12. The category team leader will then turn in the *Final Four Ranking Worksheet* at the **JUDGES STATION** in the Santa Rosa Hall along with the Project Notebook and *Individual Project Scoring Worksheets*.

What to Expect from the Students

Judges should expect the students to be able:

- To define scientific or engineering terms and describe any methodology or equipment used during the course of the project.
- To explain the thought processes and steps taken at each stage. The depth of these descriptions and explanations should be commensurate with the age of the student and the level of sophistication of the project.

What Students Expect:

- The students want feedback from you about their projects, and judges are encouraged to give the students constructive criticism.
- While a student may use the information learned from one judge in responding to another, this usually becomes apparent during the team deliberations as judges compare student interviews.

Project Evaluation

The projects represent a wide range of student abilities and sophistication. The quality of the student abstracts and project displays should be judged together with the student interview. Each project should be judged against other projects in the category, not against projects from other years, or in other categories.

Students will usually prepare a statement or speech for the judges describing their project. The students may use note cards and visual aids. These aids might help to alleviate nervousness and organize thoughts. Occasionally these statements can go on for several minutes and judges will have to interrupt the student to ask questions. Some judges prefer to start by asking questions from the abstract or the project display itself.

Many judges will interrupt the student once a question has been answered to their satisfaction. While this is a common technique, judges should be aware that students competing for the first time, in particular, may be upset by this interruption. An interruption *may be* taken by the student as an indication that the judge is not interested in what they have to say. Some assume (occasionally correctly) that the judge does not understand the project since they were not given a chance to give a complete explanation. This is less likely to occur if judges are patient and polite.

Judging the Science

It is important that judges keep in mind that all projects, regardless of the number of participants, are to be evaluated primarily on the quality of the personal contribution(s) of the student(s) to the science in evidence. In order for the judge to be able to evaluate the level of science of a team project, it is essential that all students in the team participate in the interview (unless otherwise acknowledged). All students on the team, like the individual, should have general and specific knowledge of the project, such as how the question was conceived and subsequently attempted to be answered. The judge has the freedom to ask a question of anyone on the team. However, the judge should be aware that team members have the equivalent freedom to choose a spokesperson and may refer a particular question to a specialist.

- The only written records required from each judge are his or her initials and/or signature where appropriate on the final, *Project Comparison & Ranking Worksheet* (included on page 5), that will be turned in at the judges table at the end of the day, and the comments on the *Individual Project Feedback Form* to be left at the student's project.

Guidelines for Judging the Interviews

Two of the purposes of the Ventura County Science Fair are to stimulate an active interest in science and engineering in students, and to provide an educational experience through exposure to expert judges. This year, projects are to be set up in clusters to allow for easier movement, viewing, sharing, and judging. If we have enough judges, then most judging teams can stay at the cluster for the orals and will not have to move outside. Should the groups be too large to stay at the cluster and need to move outside, please be sure all of the students are present before leaving the area. It is very difficult to find the judging groups once they leave.

Include **all students in all discussions. Each student presentation should last three to four minutes and then be open for questions from judges and peers**. This format results in a win-win situation:

- It ensures that each project is seen by all judges to ascertain its potential for winning.
- It generates a mix of judges' knowledge and personalities.
- As judges interview all students, they will be able to more accurately determine the quality of projects in the category. It ensures that each judge interviews each finalist in order to come to a *consensus* regarding placement awards.
- Students have an opportunity to meet with and learn from professional scientists and engineers. They benefit from comments from both judges and peers, regardless of the caliber of the project.
- Students respond better in a group; they get involved and learn more.
- These discussion/interviews multiply and diversify the experiences of students and judges.

While your group of students gives their oral presentations, there are some general guidelines that must be followed:

1. If your team stays in the building for presentations, then **all** teams in that category need to do the same in order for the judging to be fair.
2. Your group of students **must** stay together and not wander around.
3. If your group of students is through with their oral presentations before the scheduled dismissal time, you may dismiss them to the designated waiting area. This will cut down on wandering students.

Logistically, time must be limited and controlled in most categories. Brief interviews may not satisfactorily determine the extent of a student's knowledge of a project, while extended interviews can slow the judging process and result in some students not being given adequate time to present.

Criteria and Standards for Judging:

Scientific Research Projects should demonstrate the Scientific Method. Students should design projects that produce quantitative data through experimentation, followed by an analysis of that data. The Scientific Method may be described differently in different sources but the underlying approach has these steps:

1. State the problem.
2. Research the topic.
3. Form a hypothesis.
4. Test the hypothesis.
5. Collect and record observations.
6. Summarize your observations and data into charts, tables, and graphs.
7. Form a conclusion.
8. Communicate the findings.

Engineering projects which involve designing and developing a device or process with specific objectives should demonstrate the Engineering Goals. Engineering Goals involve repeated testing and refining as the final goal is approached. A good engineering project should

1. Identify the potential user's needs and state the objective(s) clearly
2. Research what has already been done
3. Prepare preliminary designs and a materials list considering costs, manufacturing and user requirements
4. Build and test a prototype. Consider reliability, repair and servicing.
5. Analyze the performance and compare it the original objectives..
6. Improve design or construction and retest as necessary.
7. Document the results of each step and compile into a report.

The following numerical guidelines should be taken as indications of the importance of each criterion. Always remember, the project is being judged as a whole. Written and oral communication describing the project should clearly demonstrate the depth and breadth of the student's understanding of the topic and his or her conclusions, based on sound scientific investigation.

30%: **Research:** Originality of the problem, content, logical presentation, support of hypothesis and bibliography.

30%: **Experimental Procedure:** Procedure and materials, illustrations, data collection, data analysis and conclusion.

15%: **Oral Presentation:** Expressed knowledge of subject and background information. Stated value of the project. Demonstrates understanding of scientific or technical procedure. Overall quality of presentation and ability to answer questions effectively.

15%: **Display:** Creatively designed. Complete. Neat and organized.

10%: **Completeness and Overall Quality:** Written and oral communication describing the project. Clearly demonstrates the depth and breadth of the students understanding of the topic and his or her conclusions based on sound scientific investigation.

Determining the Winners:

- Maintain balance in evaluating the project and the student's accomplishments.
- Judges should agree on a method of choosing the winner. It is suggested that you use the CRITERIA AND STANDARDS FOR JUDGING listed above as a guideline.
- After the orals, judges should meet together to decide on the winners.
- One trophy is available for each place and medals for honorable mention in each category. Ties are difficult to manage. Should the category feel strongly that there is a tie, the production of another trophy may be considered.
- Every judge in your category and division must initial the final, *Ranking Worksheet*. This should be turned in at the Judges' Station as soon as it is completed.
- Winners should not be told. They will be announced at the Awards Ceremony on Thursday. Please make sure every student in your category gets at least one *Individual Project Feedback Form*.

Individual Project Scoring Work Sheet **Project ID#:**

Division:

Category:

Title:

Circle the number representing the standard of each aspect of the project. Total the circled numbers to arrive at the section score, then total the section scores to arrive at an overall score. The overall score can be used to rank the projects in a category/division and **should not** be communicated to the student(s).

Research: 30 points possible An account of the information that the student has gathered on which the hypothesis or engineering project is based. A well-presented, original problem described in detail (depth), with an appreciation of context (scope), drawn from a variety of sources (bibliography), supporting a testable hypothesis or resolvable problem would score the full 30 points.

Originality	**1**	**2**	**3**	**4**	**5**	
Depth of Research	**1**	**2**	**3**	**4**	**5**	
Scope of Research	**1**	**2**	**3**	**4**	**5**	
Clarity and Organization	**1**	**2**	**3**	**4**	**5**	
Hypothesis or Engineering Goal Addressed	**1**	**2**	**3**	**4**	**5**	
Bibliography	**1**	**2**	**3**	**4**	**5**	**Points:** _____

Experimental Procedure: 30 points possible Describes the experiment or engineering process, presents the data and its analysis together with a conclusion that addresses the hypothesis or problem. The materials and procedure should be clearly listed together with any necessary diagrams or pictures of the equipment. The independent and dependent variables, experiment constants and any control should be identified. The experiment data should be organized into tables showing sufficient repeated trials. Graphs and charts should have labeled axes and titles. All units should be metric. The conclusion should describe the relationships discovered in the data and relate these to the hypothesis or the problem to be solved.

Procedure and materials list	**1**	**2**	**3**	**4**	**5**	
Identified variables, constants and/or control	**1**	**2**	**3**	**4**	**5**	
Use of diagrams, illustrations, photos	**1**	**2**	**3**	**4**	**5**	
Use of data	**1**	**2**	**3**	**4**	**5**	
Data analysis	**1**	**2**	**3**	**4**	**5**	
Conclusion	**1**	**2**	**3**	**4**	**5**	**Points:** _____

The Oral Presentation: 15 points possible The student has about three minutes to convey their understanding of the project. A good presentation will include relevant background knowledge, appropriate technical vocabulary and clear understanding of how the project's results are of use (value of the project). The ability to give a concise description of the procedure in a well-rehearsed manner and to answer questions adroitly will receive a high score.

Topic Knowledge & appropriate vocabulary	**1**	**2**	**3**	**4**	**5**	
Understanding of project's value and applications	**1**	**2**	**3**	**4**	**5**	
Procedural understanding & ability to answer questions	**1**	**2**	**3**	**4**	**5**	**Points:** _____

The Display: 15 points possible This creates the first impression of the project and so the student must balance creativity with communication. A neat and logically organized board should state the problem, describe the experiment, show the data analysis and explain the results. The display should show competent use of word processing and software tools such as spreadsheets and graphing programs. Helpful diagrams and photographs should be included.

Use of diagrams, illustrations, photos	**1**	**2**	**3**	**4**	**5**	
Display Organization	**1**	**2**	**3**	**4**	**5**	
Use of Word Processing & Spreadsheets	**1**	**2**	**3**	**4**	**5**	**Points:** _____

Completeness and Overall Quality: 10 points possible In order to be complete the project must show a consistent development. The research must match the original problem and lead to the hypothesis or solution. The experiment should be designed such that the hypothesis or problem and the conclusion or resolutions are framed in terms of it. The quality of the project is judged by that expected of the grade level. The student should consider further work arising from this project and be able to suggest future investigations.

Original Hypothesis Addressed & Further Research Indicated	**1**	**2**	**3**	**4**	**5**	
Overall Quality	**1**	**2**	**3**	**4**	**5**	**Points:** _____

Total Points: _____

JUDGING TEAM PROJECT RANKING WORK SHEET

Division: ❑ **Junior** ❑ **Senior** **Category:** _____

Project Placement:	Project ID Number	Project Title
1st Place		
2nd Place		
3rd Place		
Honorable Mention		

Please compare your teams Top 4 projects with the Top 4 Projects of the other judging teams in your Division and Category then select the FINAL 4 using the FINAL FOUR PROJECT RANKING WORKSHEET available at the Judges Check-in Table.

Once the Final 4 for your entire Division and Category have been selected please return the FINAL FOUR PROJECT RANKING WORKSHEET to the Judges Check-in table.

Thank you.