# Worthington Science Day Judging Guidelines

Science days are occasions for the display and evaluation of student-oriented, inquiry-based scientific research projects. A successful science day program will achieve several student-learner objectives:

1. enhances self-concept
2. develops inquiry and problem-solving skills
3. develops creativity
4. improves organizational ability
5. develops communication skills
6. improves in-depth knowledge of science

Teachers have rated science projects overwhelmingly and consistently positive on each of eight contemporary educational goals:

1. exploration of real world issues important to the student
2. hands-on/minds-on
3. scientific knowledge
4. scientific inquiry
5. higher order thinking
6. habits of mind
7. integration
8. social skills

The attitudes and conduct of the judges determine the success of any Science Day activity. Therefore, it is vital that each judge understand thoroughly their duties and obligations. All judges need to have a genuine interest in young students combined with a desire to offer encouragement and guidance in their efforts to pursue learning in the various fields of science.

1. Students have an opportunity to present their project to two professionals, at least one of whom should have a background in education. This is achieved as a team with the scores of the judges being averaged.
2. Judges should introduce themselves upon approaching a student and attempt to establish a friendly rapport to help reduce the participant's tension.
3. The participant should first be asked to give the oral presentation of the project and then to answer questions about his/her work on the specific problem. It is also proper to ask questions within the discipline or subject matter involved at the student's level of learning.
4. The participant should be put at ease, especially one who appears nervous during questioning. Judges should take an active part in the evaluation; silence may be interpreted as disinterest or boredom that can have a very discouraging effect on the participant.
5. Judges should feel free to question the participant on the materials and tools, the methods of construction, terms, the sources of information, and the amount and type of assistance enlisted in the preparation of the project.
6. Judges are required to check through the abstract and research paper to determine their quality, spot errors in spelling and grammar, and word-for-word copying. A check of the references will assist in making a fair determination of the scope and depth of the literature research.
7. Judges should determine the span of sustained interest in the particular field of science, as well as the approximate amount of time spent in developing the project being evaluated. Some premium should be granted for considerably extended interest and effort to encourage this quality of persistence.
8. Judges should note the number of subjects or specimens used. Is the number adequate to generalize to the larger group what the sample is intended to represent?
9. Grade level of the student should be considered.
10. Discussion and final scoring of the project should be at a considerable distance from the participant, since disclosure of scores is delayed until judging is completed. It helps if the judges

first establish an overall rating (superior, excellent, good, or satisfactory) and then individually score the student to total points in the respective category. Comments indicating reasons for the rating may be written on the score card to be given subsequently to the students. If a team of judges or an individual judge does not feel adequate or competent to judge a project, another judge should be asked to share in the evaluation, or another team or judge should be assigned.

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# Science Fair

JUDGING CRITERIA

| Category | **Superior** | **Excellent** | **Good** | **Satisfactory** |
|---|---|---|---|---|
| **Knowledge Achieved** | 10 - 9 | 8 - 7 - 6 | 5 - 4 - 3 | 2 - 1 |
| **Effective use of scientific method** | 10 - 9 | 8 - 7 - 6 | 5 - 4 - 3 | 2 - 1 |
| **Clarity of expression** | 10 - 9 | 8 - 7 - 6 | 5 - 4 - 3 | 2 - 1 |
| **Originality and creativity** | 10 - 9 | 8 - 7 - 6 | 5 - 4 - 3 | 2 - 1 |

1. Minimum number of points for each rating:
   Superior = 36, Excellent = 24, Good = 12, Satisfactory = 4
2. To receive a superior award at local, district, or state science days, the students shall have an abstract and a written report which documents that the student has searched relevant literature, stated a question and/or tested a hypothesis, collected and analyzed data, and drawn conclusions. A student shall receive a minimum of 36 points based on the four criteria of knowledge achieved, effective use of scientific method, clarity of expression, and originality and creativity.
3. The following paragraphs interpret the various criteria on which the project or exhibit will be judged.

A. **Knowledge Achieved** (considering student's age and grade level)

- Has there been a correct use of scientific terms? Does he or she understand these terms?
- Is there evidence of an acquisition of knowledge (depth) through the research or has he or she merely acquired a manipulative technique?
- Does he or she show evidence of knowing what the underlying principle(s) is (are)?
- In brief, has he or she actually learned something through his/her study and research above and beyond the level of classroom work?

**B. Effective use of scientific method**

- Does the student have a clear-cut idea of the purpose of his/her project, or is it something thrown together and manipulated? While the mere assembly of a "kit" is frowned upon, there can be a definite research approach wherein there may be an effective use of scientific method(s). However, it should not be the principal element of the display.
- Is he or she aware of other approaches or theories relative to this problem or project? Is there evidence of literary and/or experimental research?
- Has he or she been thorough and have there been prolonged or sustained experimentation? Has he or she observed any basic phenomena?
- Has he or she experimented sufficiently to collect any data?
- Has he or she analyzed his/her observations in a logical manner and drawn valid

conclusions? Has he or she used an adequate sample to make generalizations?

**C. Clarity of expression**

- Can he or she orally explain the project concisely and answer questions well? Discount a "glib tongue," but try to weigh evidence of nervousness when talking to a professional, as you are considered. Watch out, however, for a memorized speech with little understanding of principles.
- Has the participant expressed himself or herself well in all written material, such as the abstract and research report? Consider that this material might have been copied or written by another person.
- Is the physical display neat and sufficiently definitive? Discount printed posters and a professional placard unless you have evidence that the participant has made them and has a depth of knowledge of such material.
- Beware of misspelled words.
- Does the research report include a literature review, experimental data, statistics, results, and conclusions? Does it follow an accepted form of technical reporting?

**D. Originality and Creativity**

- Is the problem or the approach to the problem developed in a particularly significant or unique manner? It is true that the approach may not be new to the judge, but does the participant show an enthusiasm that one less versed in the subject of phenomena might think it was "brand new"?
- Has he or she investigated a new approach to an old subject?
- Has he or she a unique presentation or organization of materials?
- The assembly of a "kit" may not be original or creative, but again, it may be a new and unique approach to a problem and may economize on time and effort.
- Is there evidence of initiative? Place a premium on the ingenious uses of available materials and handmade elements. Collections and manufactured apparatus can be creative if they are assembled and used to achieve, show, or prove a stated purpose.

# Worthington Invention Convention Scoring Rubric

| Communication (20 points) | | | | | |
|---|---|---|---|---|---|
| Invention Process | Followed **all** aspects of an invention process | Followed **most** aspects of an invention process | Followed **some** aspects of an invention process | Followed **few** aspects of an invention process | **Did not** follow any aspects of an invention process |
| Delivery of information | **Very** clear and concise | **Mostly** clear and concise | **Somewhat** clear and concise | **Little** clarity and not concise | Not clear or concise |
| Response to questions | **Thoughtful** answers to questions | **Acceptably** answered questions | **Poor** answers to questions | Answered **different** questions than what was asked | **Unable** to answer questions |
| Display board and prototype (Information, process, well planned display, has prototype) | All **4** present and **high** quality | All **4** present but **average** quality | **3** of the 4 items present | **1 or 2** of the 4 items present | **None** of the 4 items present |

| Process (30 points) | | | | | |
|---|---|---|---|---|---|
| Originality | **Extremely** original | **Creative** new twist on an existing idea with **great** improvement | New twist on an existing idea with **good** improvement | **Small** variation on an existing idea with **little** improvement | Already exists |
| Statement of the problem | **Clearly** identifies the problem and why it is a problem | Identifies the problem but **not** why it is a problem | Somewhat identifies the problem but **not** why it is a problem | Loosely identifies the problem | Problem not identified |
| Statement of the solution | Show a **Clear** and **robust** solution | Shows a **Clear** solution | Shows a **partial** solution | Shows a **poor** solution | Shows **no** solution |
| Creativity | **Extremely** creative | **Highly** creative | **Good** creativity | **Poor** creativity | **No** creativity |
| Writing presentation<br>A. Clear<br>B. Descriptive<br>C. Appealing<br>D. Complete<br>E. Description of the project | **All 5** sections (A-E) met and of **high** quality | **All 5** sections (A-E) met and of **average** quality | **Missing** section(s) (A-E) **but good** quality | **Missing** section(s) (A-E) **and not good** quality | **Missing** section(s) (A-E) **and poor** quality |
| Complexity and Details | **Highly** complex and **great** attention to details | Complex **and good** attention to details | Complex **or** has **some** attention to details | **Not** very complex or **low** attention to details | Not present |

| Research (10 points) | | | | | |
|---|---|---|---|---|---|
| Citations | **All** work was properly cited | **Most** everything was properly cited | **Some** citations present | **Limited** citations | **Nothing** is cited |
| Other versions | Invention was a **unique** idea | Invention **a little bit** like another invention | Invention was **like** another invention **but** improves upon the design | Invention was **a lot like** another invention | No invention present |

| Results (30 points) | | | | | |
|---|---|---|---|---|---|
| Efficiency | No extra parts and minimal costs | Extra parts or more costly materials | A number of extra parts or high cost materials | Largely unused parts or very high cost materials | No invention present |
| Ease of use | Simple and easy to use | Minor instructions needed | A lot of instructions needed | Only the inventor could use it. | Unusable or no project |
| Construction and Materials | **Very** sturdy and durable | **Mostly** sturdy and durable | **Not sturdy** or durable | **Fell apart** | **No invention** present |
| The Problem | **Definitely** solves the problem | **Likely** solves the problem | **Somewhat** solves the problem | **Slightly** solves the problem | **Does not** solve the problem |
| Customer needs | Meets **all** of a customer's needs | Meets **most** of a customer's needs | Meets **some** of a customer's needs | Meets a **few** of a customer's needs | Meets **none** of a customer's needs |
| Presence of the work: (journal, display and invention) | **All** items present | | **Two** of the items are present | **One** item present | **No items** present |