



STL SCIENCE FAIR

Supporting the Advancement of Youth Scientists

A Program of the Academy of Science of St. Louis

Junior Regional Division MAKER PROJECTS

All projects are required to have a [signed approval document](#) and must follow the [STL Science Fair Rules and Regulations](#).

Project Elements	Category Score	4	3	2	1
Research Statement	x2	- Clearly and completely identifies the question or problem being studied. - Uses all correct vocabulary to define the question or problem.	- Mostly identifies the question or problem being studied. - Uses mostly correct vocabulary to define the question or problem.	- Identifies the question being studied, but it is a different research question than what the project is about. - Uses some correct vocabulary to define the question or problem.	- No research statement present. - OR - Incorrect vocabulary used to define the question or problem.
Overview	x2	- Gives a clear and complete summary of the project. - Completely explains the problem being addressed and the proposed solution. - Clearly and completely communicates the goals of the project.	- Gives a mostly clear summary of the project. - Mostly explains the problem being addressed and the proposed solution. - Mostly identifies the goals of the project.	- Gives some summary of the project. - Some explanation of the problem being addressed or the proposed solution is provided, but with incomplete information. - Somewhat shares the goals of the project.	- Does not give a project overview. - OR - Explains the problem being addressed or the proposed solution using incorrect information. - Does not share the goals of the project.
Significance	x2	- Clearly and completely explains how the design could benefit people, society, or the environment. - Clearly and completely explains why solving this problem matters.	- Mostly explains how the project could benefit people, society, or the environment but includes incorrect information. - Tells why the <i>science of the project</i> is interesting or important, but does not	- Somewhat explains how the project could benefit people, society, or the environment but includes incorrect information. - Somewhat explains why solving this problem matters.	- No description of how the project could benefit people, society, or the environment. - No descriptions of why solving this problem matters.

			connect the science to the project.		
Defining the Problem	x2	- Clearly and completely identifies the specific engineering problem or need. - Clearly and completely defines the design criteria (what the solution must accomplish). - Clearly and completely identifies constraints such as cost, materials, time, safety, or other limitations.	- Mostly identifies the specific engineering problem or need. - Mostly defines the design criteria (what the solution must accomplish). - Mostly identifies the constraints such as cost, materials, time, safety, or other limitations.	- A general engineering problem or need is stated. - Some of the design criteria are defined. - Some of the constraints are noted such as cost, materials, time, safety, or other limitations.	- The engineering problem or need is not stated. - Design criteria are missing or missing too much information to be understood. - No discussion of the constraints is provided.
Research the problem	x1	- Clearly and completely summarizes important, relevant information from sources about the existing solutions to this or similar problems. - Clearly summarizes relevant scientific or engineering concepts. - Clearly and completely explains how the research helped with the design.	- Summarizes some information relevant from sources about the existing solutions to this or similar problems and includes some personal opinions. - Mostly clear summary of relevant scientific or engineering concepts. - Mostly explains how the research helped with the design.	- Summary of existing solutions is made up of primarily opinions. OR - Vague summary of relevant information. - Some summary of irrelevant scientific or engineering concepts. - Some explanation of how research helped with the design.	- Extremely vague or missing summary of existing solutions. - Incorrect summary of scientific or engineering concepts. - No mention of how research helped with the design.
Imagine Solutions	x2	- Develops more than one possible solution and settles on a final design. - Clear and complete comparison of advantages and disadvantages of different solutions. - Gives a clear and	- Discusses previous designs but does not share them. Settles on a final design. - General comparison of advantages and disadvantages of different solutions. - Gives a mostly clear explanation as to why the	- Develops only one solution to the problem. - General consideration of what could be an advantage or disadvantage but nothing specific.	- No evidence of brainstorming possible solutions. - Design is a previous design solution, not an original solution.

		complete explanation as to why the final design was chosen based on the design criteria and constraints.	final design was chosen based on the design criteria and constraints.		
Plan the Design	x3	- Clearly develops a detailed design plan before construction. - Includes all labeled sketches, diagrams, or digital models, when appropriate. - Lists all materials, dimensions, and construction methods clearly enough for another person to understand and replicate the design.	- Develops a design plan before construction but with unexplained changes between the design and final build. - Includes most labeled sketches, diagrams, or digital models, when appropriate. - OR - Labels are present on all sketches, diagrams, and digital models, but may be confusing. - Lists all materials, but has incomplete dimensions, and construction methods so another person would be able to understand and replicate most of the design.	- Develops a vague design plan before construction. - Includes some sketches, diagrams, or digital models, but the labels are inaccurate. - Lists most materials, but has incomplete dimensions and construction methods, another person would be able to understand and replicate some parts of the design.	- Did not provide a plan for the design. - Some sketches or diagrams are included but are irrelevant to the final design. - Basic materials list, missing significant materials. - Based on the information provided, the design could not be replicated.
Create and Construct	x2	- Evidence (pictures or physical design if small enough) that complete design was built following the design plan. - Clearly and completely documents any changes made during construction and explains why they were necessary. - Uses all appropriate	- Evidence (pictures or physical design if small enough) that most of the design was built, following most of the construction plan. - Mostly follows the plan but does not explain minor changes that were made between the plan and the final design. - Uses all appropriate tools, and employs safe	- Evidence (pictures or physical design if small enough) that some of the design was built, loosely follows the construction plan. - Somewhat follows the design plan but the build has major changes that were made between the plan and the final design. - Employs safe	- No evidence of a build attempt. - OR - Safe engineering processes were not used.

		tools, materials, and safe engineering practices.	engineering practices.	engineering practices but does not use the appropriate tools.	
Test <u><i>*Points should NOT be deducted for prototype failure.</i></u> <i>We encourage open-ended problem solving as students nurture their ability for creative innovative solutions.*</i>	x2	• Completely develops and follows a fair testing procedure to evaluate the design. • Collects quantitative and qualitative data during testing. • Performs repeated trials, when appropriate, to improve reliability.	• Develops and follows a mostly fair testing procedure to evaluate the design. • Collects quantitative OR qualitative data during testing. • Performs repeated trials, when appropriate, to improve reliability.	• A different procedure is used for each test. • Collects inconsistent data during testing. • Limited trials are performed.	• Did not test the design. • Observations and measurements were not collected for every test.
Evaluate	x3	• Clearly and completely how well the design met the established criteria <u>AND</u> worked within the constraints. • Uses only test data to explain the strengths and weaknesses of the design. • Identifies all design flaws, unexpected results, or challenges encountered during testing.	• Mostly explains how well the design met the criteria <u>OR</u> worked within the constraints. • Uses mostly test data and some opinions to explain the strengths and weaknesses of the design. • Identifies most design flaws, or unexpected results, but does not address any challenges encountered during testing.	• Somewhat explains how well the design met the criteria <u>OR</u> worked within the constraints. • Uses some test data but mostly opinions to explain the strengths and weaknesses of the design. • Identifies some design flaws, but does not address any unexpected results or any challenges encountered during testing.	• Does not explain how well the design met the criteria <u>OR</u> worked within the constraints. • Does not use any test data to explain the strengths and weaknesses of the design. • Does not identify design flaws, any unexpected results or any challenges encountered during testing.
Future Work	x1	• Recommends specific improvements to the design based on testing results. • Clearly and completely explains how the design	• Recommends specific improvements to the design NOT based on testing results. • Mostly explains how the design could be made	• Recommends minimal improvements to the design not based on testing results. • Minimal suggestions of how the design could be	• Does not address future work

		could be made more effective, efficient, or reliable. • Suggests future engineering questions that could further improve the design solution.	more effective, efficient, or reliable, with no specific recommendations. • Suggests future engineering questions that are mostly relevant to the results of the project.	made more effective, efficient, or reliable. • No suggestions of future engineering questions that could further improve the solution are evident.	
Works Cited	x1	• Lists the books, websites, or people used to learn about the topic. <i>(More than 3 sources)</i> • Includes enough information so someone else can easily find the source. • Uses the same format for each source.	• Lists the books, websites, or people used to learn about the topic. <i>(Includes 3 sources)</i> • Includes most relevant information so someone else can find the source. • Uses a similar format for each source.	• Lists the books, websites, or people used to learn about the topic. <i>(Between 1-2 sources)</i> • Includes some information, but would be difficult to verify the source. • Uses a different format for each source.	• No sources are included.
Display Items	x1	• Project includes <u>all</u> (13) sections: title, research statement, overview, significance, defining the problem, research, imagine solutions, plan the design, create/construct, test, evaluate, future work, and works cited. • Includes a complete and clear acknowledgment if someone outside the family, such as a mentor or scientist, helped with the project. • Pictures, graphs, logbook, models, and other visuals are relevant and help explain the	• Project includes between <u>12-10</u> sections: title, research statement, overview, significance, defining the problem, research, imagine solutions, plan the design, create/construct, test, evaluate, future work, and works cited. • Includes an mostly clear acknowledgment if someone outside the family, such as a mentor or scientist, helped with the project. • Most of the pictures, graphs, logbook, models, and other visuals are relevant and help explain	• Project includes between <u>9-7</u> sections: title, research statement, overview, significance, defining the problem, research, imagine solutions, plan the design, create/construct, test, evaluate, future work, and works cited. • Includes a somewhat clear acknowledgment if someone outside the family, such as a mentor or scientist, helped with the project. • Some pictures, graphs, logbook, models and other visuals are minimally relevant but do	• Project includes <u>6 or less</u> sections: title, research statement, overview, significance, defining the problem, research, imagine solutions, plan the design, create/construct, test, evaluate, future work, and works cited. • Assistance is mentioned throughout the project but does not include an acknowledgement. • Pictures, graphs, logbook, models, and other visuals are not relevant and

		project.	the project.	not negatively impact understanding..	negatively impact understanding of the project.
Originality	x1	• Project is based on a unique question, idea, or way of solving a problem that has deep significance to the student. • Clearly identifies all help received from adults, AI, teachers, or mentors while showing the student's own work and ideas and that the student completed the project themselves.	• Project is based on an interesting or creative (but not unique) idea or question that has significance to the student. • Mostly identifies what help was received from adults, AI, teachers, or mentors while showing that the student did most of the thinking and that the student completed most of the project themselves.	• Project is based on an interesting or creative (but not unique) idea or question that has no significance to the student. • Identifies some, but not all, help, resources, or use of AI or mentors, while showing that the student did some of the thinking and that the student completed some of the project themselves, but had significant assistance.	• Project is an exact replica of an existing activity. (ie. popsicle stick harmonicas). • Does not clearly identify any help, resources, or use of AI or mentors, but does reference assistance throughout the project.