



STL SCIENCE FAIR

Supporting the Advancement of Youth Scientists

A Program of the Academy of Science of St. Louis

Senior Regional Division SCIENCE PROJECTS

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

Project Elements	Category Weight	4	3	2	1
Research Statement	x2	Clearly and completely defines a focused, researchable scientific question, based on a problem or phenomena.	The research question being studied is unclear or too broad to be researched.	The research question being studied is unconnected to the research project.	The research question is based on scientific inaccuracies or absence.
Abstract	x2	- Provides a concise and comprehensive summary of the research. - Clearly describes the hypothesis, procedure, and a summary of the conclusions. - Clearly and completely references the scientific concepts relevant to the investigation.	- Provides a mostly comprehensive summary of the research. - Clearly describes the hypothesis, procedure, but loosely summarizes the conclusions. - Identifies the major scientific concepts relevant to the research.	- Provides some summary of the research. - Describes the hypothesis OR the procedure, and includes a vague summary of the conclusions.. - Identifies major scientific concepts that are irrelevant to the research or incorrect.	- Provides basic or no summary of the research. - Missing of vague description of all components: hypothesis, procedure, conclusions.. - No description on relevant scientific concepts.
Significance	x2	- Clearly and completely describes specific potential societal, environmental, economic, or technological impacts of the investigation. - Provides a clear justification why the scientific research is worthy of investigation and effort.	- Mostly describes specific societal, environmental, or technological impacts of the investigation. - Provides a mostly clear justification why the scientific research is worthy of investigation and effort.	- Somewhat describes the societal, environmental, or technological impacts of the investigation. - Provides some justification why the scientific research is worthy of investigation and effort.	- Incorrectly or incompletely explains the importance of the investigation. - Does not address potential impacts of the investigation. - Does not include a justification for the investigation.

Hypothesis	x2	- States a clear, testable hypothesis that identifies an expected relationship between independent and dependent variables. - The statement is clearly based on scientific reasoning and background research.	- States a clear hypothesis <u>that is not testable</u>, but identifies an expected relationship between independent and dependent variables. - The statement is mostly based on scientific reasoning and background research.	- States a hypothesis that identifies an independent and dependent variable but not an expected relationship.. - The statement is somewhat based on scientific reasoning and background research.	- Hypothesis does not identify an independent and dependent variable OR - Hypothesis is not relevant to the research being completed.
Procedure <i>*Pictures can be used to support the written procedure, but are not required.*</i>	x3	- Includes a detailed, logical, complete, and replicable experimental procedure - Includes all materials, measurements, and safety considerations necessary for replication. - Demonstrates appropriate experimental design, including iterative testing or data collection. - Includes enough detail for someone else to repeat the experiment.	- Includes a logical, mostly replicable experimental procedure. - Includes most materials, measurements, and safety considerations are included. - Demonstrates mostly appropriate experimental design, including iterative testing or data collection. - Includes enough detail for someone else to repeat most of the experiment.	- Describes a somewhat complete and replicable experimental procedure. - Some materials are listed, not all measurements are listed, safety considerations are included. - Procedure does not utilize iterative testing or data collection. - Includes enough detail for someone else to repeat some of the experiment.	- Describes some basic steps of a procedure. - Many materials or measurements are missing, or study cannot be conducted in a safe manner. - Procedure does not utilize iterative testing or data collection. - The experiment could not be repeated based on the procedure provided.
Experimental Conditions	x2	- Clearly identifies the independent, dependent, and controlled variables. - Explains how variables were controlled to minimize bias and ensure experimental validity. - Includes sufficient trials, and sample size appropriate to the investigation.	- Correctly identifies the independent, dependent variables. - Incorrect controls identified for the project. - Includes sufficient trials OR sample size for investigation.	- Clearly identifies variables as independent or dependent, however, variables identified are not the actual variables being studied in the investigation. - No controls identified. - Insufficient data collected from the investigation.	- Independent, dependent, and control variables are not identified for this investigation. - Insufficient data collected from the investigation.

Data	x2	● Collects accurate, complete, and organized quantitative and/or qualitative data according to the described procedure. ● Presents all data using appropriate tables, graphs, figures, or statistical summaries. ● Labels all data displays clearly and correctly with units, titles, and legends.	● Collects mostly organized quantitative and/or qualitative data usually using the described procedure. ● Presents data using mostly correct tables, graphs, figures, or statistical summaries. ● Most of the data labels are correct, minor errors present that do not impact understanding.	● Collects quantitative and/or qualitative data that sometimes follows the described procedure. ● Presents data using a mix of correctly and incorrectly applied tables, graphs, figures, or statistical summaries. ● Some data labels are correct, errors present that do impact understanding.	● Collects quantitative and/or qualitative data using different methods than the described procedure. ● Data is presented using incorrect, inaccurate, or incomplete tables, graphs, figures, or statistical summaries. ● Data labels are confusing, misleading or missing. .
Results	x2	● Clearly and completely interprets the data using scientific reasoning and evidence. ● Correctly identifies specific patterns, relationships, trends, or anomalies in the data collected. ● Applies appropriate and correct mathematical calculations and statistical analysis (when applicable) to strengthen conclusions.	● Interprets the data using mostly scientific reasoning and evidence, with some opinions. ● Correctly identifies patterns, relationships, trends, or anomalies but not how they are supported by the data. ● Applies mathematical calculations and statistical analysis (when applicable) but they are not used to support conclusions..	● Interprets the data using some scientific reasoning and evidence, and some opinions. ● Generally discusses the existence of patterns, relationships, trends in the data; does not include specific examples. ● Applies inappropriate OR incorrect mathematical calculations and statistical analysis (when applicable) to strengthen conclusions.	● Interprets the data using little scientific reasoning and evidence, with mostly opinions. ● Incorrectly or does not address patterns, relationships, trends in the data. ● Does not attempt to use mathematical calculations or statistical analysis, to strengthen conclusions..

Conclusions	x4	- Clearly restates the hypothesis and states whether the hypothesis was supported or not supported by the data. - Completely explains the conclusion in detail using specific evidence from the experiment. - Discusses at least two possible sources of error or unexpected results.	- States that the hypothesis was TRUE or FALSE. - Explains the conclusion using general statements about the evidence from the experiment but not specific data points. - Discusses unexpected results but incorrectly identifies possible sources of error.	- Incorrectly states whether the hypothesis was supported or not supported by the data. - Explains the conclusion using opinions instead of data collected in the experiment. - Does not discuss unexpected results or identify possible sources of error.	- Does not state whether the hypothesis was supported or not supported by the data. - Does not explain the conclusion OR - Conclusion is explained using only opinions. - Does not discuss unexpected results or identify possible sources of error.
Future Work	x1	- Recommends meaningful improvements to the experimental design or methodology based on the results of the investigation. - Proposes logical extensions of the research or additional investigations. - Explains how future studies could increase reliability and validity of the results, or further scientific understanding.	- Recommends improvements to the experimental design or methodology not based on anything in the investigation. - Proposes unrelated future investigations. - Suggests that future studies are needed without giving a reason.	- Suggests changes to the investigation that are not relevant to the study. - Proposes future investigations that do not build on the existing project.	Does not provide ideas or information about the future of the study.
Works Cited	x1	- Lists the books, websites, or people used to learn about the topic. <i>(Includes 5 or more 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 3-4 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 (12)</u> sections: title, research statement, abstract, significance, hypothesis, procedure, experimental conditions, data, results, conclusions, 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.	• Project includes between <u>11-9</u> sections: title, research statement, abstract, 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 the project.	• Project includes between <u>8-6</u> sections: title, research statement, abstract, 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 not negatively impact understanding..	• Project includes <u>less than 6</u> sections: title, research statement, abstract, 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 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.