

Paterson Public Schools STEM Expo

Inventions: Engineering Innovations (9-10th Grade)

	Attempted 1	Proficient 2	Well Done 3	Score (0 if missing)
Problem (Double Points) (x2)	Addresses a local need to which there is already a common solution, or addresses an issue of little practical value.	Addresses a somewhat regional need affecting some people, which may have an expensive or uncommon solution.	Creatively addresses a global need affecting many people, which may have an expensive or uncommon solution.	
Research	Cites one or no information resource (e.g., text, encyclopedia, businesses, magazines, catalogs, internet, or interviews). Fails to mention a known similar idea in common use or material is copied rather than written in the student's own words.	Cites at least two resources, but they may not be from a reputable source. Mentions known similar ideas with some elaboration. Makes a general connection to a similar idea in the student's own words.	Cites at least four types of reputable resources. Makes a clear and well-elaborated connection with a known similar idea in the student's own words.	
Possible Solutions	Proposes three or fewer solutions, some of which may be fanciful. Solution description is limited.	Proposes at least three practical solutions with limited description.	Proposes three or more practical solutions. One or more are very innovative. Provides sufficient description for reader to understand.	
How Invention Works	Provides few details, leaving the reader unclear about how the invention works. Does not have a prototype.	Provides adequate details, giving the reader a general understanding of how the invention works. Has a prototype that may or may not function as described.	Explains the invention, addressing all details, giving the reader a clear understanding of how the invention works. Has a prototype that functions as described.	
Chart for Evaluating Invention	Student-developed criteria may be generic and do not apply specifically to the problem. Or, criteria may not be student-developed.	Criteria are student-developed. Some criteria apply to how the invention addresses the problem.	Criteria are student-developed specifically for the project and apply directly to how the invention addresses the problem.	
Obstacles	Fails to analyze obstacles related to the practical design and function of the invention (i.e., may list obstacles that refer only to shopping for materials or cosmetic issues).	Provides adequate analysis of the obstacles related to the practical design and function of the invention (i.e., may discuss durability, strength, ease of use, cost/benefit for potential customers, etc.)	Demonstrates in-depth analysis of the obstacles related to the practical design and function of the invention.	
Revised Solutions	Revised solutions do not address the obstacles mentioned, or are not practical.	Revised solutions practically address the obstacles mentioned.	Revised solutions practically address the obstacles mentioned and consider durability or other future issues.	
Science Concepts	Provides limited or no explanation of science concepts. Explanation may not apply to the project.	Provides an adequate explanation of at least one science concept, which has some application to the project.	Provides in-depth explanation of at least one science concept directly applying to the project.	
Display Presentation	Project has limited eye appeal or is not easily readable at approximately two feet distance. The project has limited organization, or contains confusing visuals, or contains major language or spelling errors.	Project is appealing and readable at approximately 2 feet distance. It is organized and clear, uses understandable visuals and/or models, and contains few language and spelling errors.	Project is appealing and neat, and is readable at approximately 2 feet distance. It is well organized and clear, makes striking use of inventive or amusing visuals and/or models, and uses language and spelling flawlessly.	

Paterson Public Schools STEM Expo Scientific Inquiry (9-10th Grade)

	Attempted (1)	Proficient (2)	Well done (3)	Score (0 if missing)
Topic Selection/ Abstract	The idea is very typical, lacking originality. The question is not provocative or striving for new knowledge. Students do not seem excited by topic.	The experiment is based on a typical experiment, but alters it or modifies in a somewhat original way. May relate to a common problem or scientific principles.	The idea for investigation is original or innovative. Offers advancement of understanding of scientific principles and/or the world around us. Students seem genuinely excited and interested in topic.	
Introduction/ Research	Does not describe how/why the inquiry was formed and/or development of a hypothesis. Hypothesis is not present or inappropriate for the experiment. Does not cite research.	Describes in some detail how/why the inquiry was formed and development of a hypothesis. Hypothesis attempts to show a relationship between independent and dependent variables. It is testable and clearly stated. Cites research that may be from sources other than scientific publications.	Describes fully how/why the inquiry was formed and development of a hypothesis. Hypothesis shows a relationship between independent and dependent variables. It is testable and clearly stated. Cites previously published, peer reviewed scientific research.	
Methods/ Procedure	Procedure meets three or less of these criterial sequential, replicable, provides a control and variables and was repeated for validity. Methods are not appropriate to test hypothesis.	Procedure meets four of these criteria: sequential, replicable, provides a control and variables and was repeated for validity. Methods are appropriate to test hypothesis.	Procedure is sequential, replicable, provides a control and variables and was repeated for validity. Methods are appropriate to test hypothesis.	
Results/Data (Tables & graphs)	There is one chart or graph, though it is not easily understood because of lack of labeling, sloppiness, or other oversights. Data is not organized and is confusing.	Either qualitative (observations) or quantitative (record data) observations are used and recorded. Graphs and charts are appropriately labeled with appropriate terms and units of measurement.	Qualitative (observations) and quantitative (record data) observations are used and recorded. Results demonstrate patterns in data. Graphs and charts are appropriately labeled with appropriate terms and units of measurement.	
Discussion/ Analysis	The results are merely displayed with very little analysis or insight. Does not attempt to explain the meaning of the data. Does not try to generalize results, does not question veracity of the results or the methods of data collection.	Attempts to explain significance of results. Might discuss some, but not all of the following: meaning of results, generalizes results, veracity of results, methods of data collection, further research, etc.	Gives very thoughtful and insightful analysis into the meaning of the results. Generalizes the meaning of the experiment and its application in scientific world. Discusses any abnormalities in the data or factors in the data collection. Proposes future experiments.	
Display	Display board is confusing or lacking in content. Might not be labeled, might be sloppy, might be missing sections of the lab report, or grammar errors.	Display board is functional. It displays all segments of the lab report neatly.	Not only does display board present all information easily and neatly, but has a higher artistic value. Much time and care is evident.	
Elocution/ Poise	Student's/group's lack of elocution skills impede understanding of project: poor oratory skills (mumbling, talking softly), lack of eye contact, fidgeting, flippancy, lack of preparation /organization etc.	Student/group succeeds in presenting all information, though presentation skills need improvement (eye contact, fidgeting, mumbling, flippancy, etc.). Might lack enthusiasm or confidence.	Student/group presents all information confidently and assuredly. There is evidence that the group has planned who will say what (if applicable). Student(s) displays enthusiasm and interest in the project. Presentation skills are nearly flawless.	