Scientific Inquiry Using Scientific Practices Mission Folder Rubric

Use of Scientific Inquiry

Suggested file attachments: bibliography, experimental procedure, photos of experiment, data spreadsheets, charts, graphs, PowerPoint presentations if used as part of experiment
Total maximum points in this section: 350

Mission Folder Questions and Answers	*Judging Criteria*	*Max Points*	*Scoring Details*	*Score*
Problem Statement				
What problem in your community will your team be investigating through scientific inquiry using scientific practices? Specifically, based on this problem, what question will you be trying to answer?	Selected problem deals with an interesting or challenging community issue	*15*	*0 Points: Does not state a problem* *3 Points: Statement, but is not a community-based problem* *5 Points: States a community-based problem but not clearly* *7 Points: States a community-based problem, but rather generic in nature* *10 Points: States an interesting or challenging community-based problem* *15 Points: States a very unique community-based problem*	
	Clear question to be answered	*10*	*0 Points: Does not state a question to be answered* *3 Points: Question is stated but not related to problem* *7 Points: Question is stated, related to problem but not clear* *10 Points: Question is stated, related to problem and clear*	
Research your problem. You must learn more about the problem you are trying to solve and also what testing has already been done. Find AT LEAST 10 different resources and list them here. They should include books, periodicals (magazines, journals, etc.), websites, experts, and any other resources you can think of. Be specific when listing them, and do not list your search engine (Google, etc.) as a resource.	Literature search is extensive and scholarly sources are reputable and varied	*20*	*Add 1 Point for EACH generic resource (i.e. name of website but not a specific page, etc.)* *Add 2 Points for EACH specific resource*	
What did you find out about your problem that you didn't know before? What kinds of experiments have been done by other people before you? Be sure to put this in your OWN words, do not just copy and paste information. Also, be sure to cite your sources.	Describes relevant information that relates to the selected problem	*25*	*0 Point: Does not answer either question* *10 Points: Answers only one of the questions* *20 Points: Answers both questions* *25 Points: Answers both questions and all sources cited throughout*	

Mission Folder Questions and Answers	Judging Criteria	Max Points	Scoring Details	Score
Experimental Design				
Based on the question you are trying to answer, and your research, what is your team's hypothesis for this investigation? Be sure to include the independent and dependent variables and how they are related along with evidence of your research.	Develops a logical hypothesis based on an analysis of all research	*30*	*0 Points: Does not provide a hypothesis* *5 Points: An independent variable is stated* *10 Points: An independent and dependent variable are stated* *15 Points: The independent and dependent variables are stated and related* *20 Points: Both variables are stated and related and evidence of research is present* *25 Points: Both variables are stated and related, research is evident, and hypothesis is written in a proper format* *30 Points: Both variables are stated and related, research is evident, hypothesis is properly formatted, and is able to be tested*	
Identify the independent and dependent variables in your investigation.	Correctly identifies the independent and dependent variables	*25*	*0 Points: Does not correctly identify either variable* *15 Points: Correctly identifies either the independent or dependent variable, but not both.* *25 Points: Both variables are correctly identified*	
What are the constants in your investigation?	Correctly identifies the constants	*15*	*0 Points: Does not identify any constants* *5 Points: Identifies only incorrect constants* *10 Points: Identifies some correct and some incorrect constants* *13 Points: Identifies correct constants but leaves some out* *15 Points: Appears to correctly identify all constants*	
Will your investigation have a control group? If so, describe the control group. If not, why not?	Indicates whether a control group is necessary and correctly identifies any required controls	*15*	*5 Points: Incorrectly indicates whether a control group is necessary or not* *10 Points: Correctly indicates whether a control group is necessary or not, but does not correct identify the control OR does not correctly explain why one is not required.* *15 Points: Correctly indicates whether a control group is necessary or not AND correctly identifies the control group OR correctly explains why one is not required.*	

Mission Folder Questions and Answers	*Judging Criteria*	*Max Points*	*Scoring Details*	*Score*
Experimental Process				
List all of the materials you used in your experiment. Be sure to include all physical materials as well as any technology or websites used to collect data (not websites you used in your research).	Accurately identifies all materials necessary for the experiment	*25*	*0 Points: Lists no materials necessary for the experiment* *8 Points: List some materials, but some are clearly missing* *17 Points: Includes most materials necessary for the experiment* *25 Points: Appears to have a complete list of all materials necessary for the experiment*	
Explain your experimental process. Be sure to list all of the steps and ALL SAFETY PRECAUTIONS for your experiment. Remember to write it so someone else could follow the steps and recreate your experiment.	The proposed experiment is conducted sufficiently (qualitatively and quantitatively) and is a valid test of the hypothesis	*60*	*0 Points: Does not list an experimental process* *5 Points: Lists an experimental process that does not relate to the problem stated.* *10 Points: An experimental process that is related to the problem stated is listed, but is largely incomplete.* *20 Points: An experimental process that is related to the problem stated is listed, but is not able to be followed step-by step* *30 Points: An experimental process that is related to the problem stated is listed step-by-step but is missing safety requirements* *40 Points: An experimental process that is related to the problem stated is listed step-by-step including safety requirements but does not adequately test the hypothesis stated previously* *50 Points: An experimental process that is related to the problem stated is listed step-by-step including safety requirements and adequately tests the hypothesis previously stated but is missing some steps* *60 Points: An experimental process that is related to the problem stated is listed step-by-step including safety requirements and adequately tests the hypothesis stated*	

Mission Folder Questions and Answers	*Judging Criteria*	*Max Points*	*Scoring Details*	*Score*
Data Collection and Analysis				
Present the data you collected form your experiment. Be sure to include all of the data you collected from your observations and measurements. Use of graphs and charts is HIGHLY encouraged. Explain how your data supports or refutes your hypothesis.	A sufficient amount of data is collected and well-presented	*35*	*0 Points: No data presented* *9 Points: Data presented but not clearly* *18 Points: Data presented but not related to supporting hypothesis* *26 Points: Data presented clearly and related to supporting hypothesis but incomplete* *35 Points: Data presented clearly, related to supporting hypothesis and complete*	
What are your potential sources of error? Remember, this doesn't mean "Did everything work?" All tests have potential sources of error, so make sure you understand what that means. Explain how these sources of error could have affected your results.	Lists sources of error and explains how these could have affected the results	*25*	*0 Points: Does not list any errors* *5 Points: Incomplete list of sources of error* *10 Points: Lists sources of error only, no explanation* *15 Points: Lists sources of error, explains how affected the results, but vague* *20 Points: Lists sources of error, explains how affected the results, lacks some detail* *25 Points: Lists sources of error, explanation very thorough and free from spelling and grammar errors*	

Mission Folder Questions and Answers	*Judging Criteria*	*Max Points*	*Scoring Details*	*Score*
Drawing Conclusions				
What conclusions can you draw based on the data you gathered during your experiment(s)? Be sure to include data and how it relates to the experiment(s) and the original question. Your conclusion should be related to your original problem and your experiment, include the data you collected, and discuss if your hypothesis was supported or refuted by your experiment.	Provides thorough explanation of conclusions drawn based on their experiment	*50*	*0 Points: No conclusion provided* *5 Points: General conclusion provided* *10 Points: Conclusion is related to experiment conducted* *20 Points: Conclusion is related to the experiment and includes data collected* *30 Points: Conclusion is related to the experiment, includes data collected and refers to hypothesis stated* *40 Points: Conclusion is related to the experiment, includes data collected, refers to hypothesis stated and refers to original problem/question stated* *50 Points: Conclusion is related to the experiment, includes data collected, refers to hypothesis stated, refers to original problem/question stated and is well written and clear and free from spelling and grammar errors*	
			Use of Scientific Inquiry using Scientific Practices Subtotal	

Benefit to the Community

Suggested file attachments: brochures, fliers, posters, website links
Total maximum points in this section: 90

Mission Folder Question and Answer	*Judging Criteria*	*Max Points*	*Scoring Details*	*Score*
Explain how investigating the problem your team chose will help the community. Be sure to include the impacts your research will have on individuals, businesses, organizations, and the environment in your community (if any). Make it very clear why solving this problem would help your community.	Indicates how this project can help the community	*30*	*0 Points: Does not answer the question* *10 Points: How this project helps the community is vague* *15 Points: States the problem, but not how the investigation could help* *20 Points: Includes the problem and the benefits of the investigation but lacks some detail* *25 Points: Is complete and very detailed with some spelling/grammar errors* *30 Points: Is complete and very detailed with no spelling/grammar errors*	
	Indicates the impacts of the project on members of the community	*30*	*0 Points: No impacts are identified* *10 Points: Impacts are identified but some are missing* *20 Points: Impacts are identified but lack some detail* *25 Points: All impacts are identified and very detailed with some spelling grammar errors* *30 Points: All impacts are identified and very detailed with no spelling/grammar errors*	
	Provides clear explanation of benefit to the community	*30*	*0 Points: The benefit to the community is not clear* *15 Points: Benefit to the community is somewhat clear* *20 Points: Benefit to the community is clear with some spelling/grammar errors* *30 Points: Benefit to the community is made very clear with no spelling/grammar errors*	
			Benefit to Community Subtotal	

Team Collaboration

Suggested file attachments: Breakdown of team responsibilities, team plan, experiment schedule
Total maximum points in this section: 60

Mission Folder Question and Answer	*Judging Criteria*	*Max Points*	*Scoring Details*	*Score*
How was your team formed? Was your team assigned or did you choose to work with each other?	Explains how the team was formed	*5*	*0 Points: Does not explain how team was formed* *3 Points: Explains how team was formed but lacks detail* *5 Points: Fully explains how team was formed*	
Provide a detailed description of each team member's responsibilities and jobs during your work on the Mission Folder.	Clear description of the responsibilities of each team member	*20*	*10 Points: Includes an assigned role for each team member* *20 Points: Includes an assigned role for each team member and includes a description of each team member's role*	
Did your team face any problems working together? If so, how did you solve them? If not, why do you think you were able to work together so well?	Explains the problems (or lack thereof) faced by the team and how they were overcome (or not)	*15*	*0 Points: Does not answer the question* *5 Points: Lists problems but not how they were solved OR says they faced no problems but does not explain why* *10 Points: List problems and how they solved them but lacks detail OR explains why they worked well together but lacks detail* *15 Points: Explains problems and solutions in detail OR provides detailed explanation as to why they worked well together*	
What were some possible advantages to working together as a team on this project? How would working as individuals have made this project more difficult?	Explains how working together was helpful	*20*	*0 Points: Does not answer either question* *10 Points: Advantages to working as a group provided OR how working as individuals would have been more difficult provided* *20 Points: Both questions are answered*	
			Team Collaboration Subtotal	
			Mission Folder Total Score	