Name(s):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Science Inquiry Critical Challenge**

**Driving Question:** Why is *Science Inquiry* so important?

This assignment will demonstrate your understanding of the following learning outcomes:

* ***Demonstrate scientific literacy.***
* ***Demonstrate scientific inquiry skills.***

In grade 9 this means you can:

**Question and predict:**

* Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal interest
* Make observations aimed at identifying your own questions, including increasingly abstract ones, about the natural world
* Formulate multiple hypotheses and predict multiple outcomes

**Plan and Conduct:**

* Collaboratively and personally plan, select, and use appropriate investigation methods to collect reliable data (qualitative and quantitative)
* Assess risks and address ethical issues associated with your proposed methods
* Select and use appropriate equipment to systematically and accurately collect and record data

**Process and Analyze Data and Information:**

* Experience and interpret the local environment
* Seek and analyze patterns, trends, and connections in data, including describing relationships between variables and identifying inconsistencies
* Use knowledge of scientific concepts to draw conclusions that are consistent with evidence
* Analyze cause-and-effect relationships

**Evaluate:**

* Evaluate your methods and experimental conditions, including identifying sources of error or uncertainty, confounding variables, and possible alternative explanations and conclusions
* Describe specific ways to improve your investigation methods and the quality of the data
* Demonstrate an awareness of assumptions, question information given, and identify bias in your own work and secondary sources
* Exercise a healthy, informed skepticism and use scientific knowledge and findings to form your own investigations to evaluate claims in secondary sources
* Consider social, ethical, and environmental implications of the findings from their own and others’ investigations
* Critically analyze the validity of information in secondary sources and evaluate the approaches used to solve problems

**Apply and Innovate:**

* Contribute to care for self, others, community, and world through personal or collaborative approaches
* Co-operatively design projects with local and/or global connections and applications
* Transfer and apply learning to new situations
* Generate and introduce new or refined ideas when problem solving
* Contribute to finding solutions to problems at a local and/or global level through inquiry

**Communicate**

* Communicate scientific ideas, information, and perhaps a suggested course of action for a specific purpose and audience, constructing evidence-based arguments and using appropriate scientific language, conventions, and representations
* Express and reflect on a variety of experiences, perspectives, and worldviews of place

You or you and your partner will choose how to demonstrate your understanding of the importance science inquiry by designing a unique experiment or innovation.

You will be responsible for the background research needed for the introduction for the activity and you will be writing a research report about the scientific concepts behind the experiment.

Be sure to include an annotated list of the sources you used, with a print-out of the page. These pages should be included when you hand in your assignment. This assignment will be considered incomplete and will not be marked if a source list is not included. WHMIS information and MSDS data sheets with an interpretation of the information that is relevant to student safety **MUST** also be included with your assignment. You will be presenting your experiment multiple times, to a classmate, to another student, to your teacher, and to another teacher. If you move onto the school and/or district *Celebration of Scientific Inquiry* you will need to present to a community member and members of the public viewing your project.

|  |
| --- |
| **SCIENCE RUBRIC****Science Inquiry** |

|  |  |  |
| --- | --- | --- |
| **CRITERIA** | **Meeting** | **Approaching** |
| **√+** | **√** | **√+** | **√** |
| **Questioning and Predicting** | I can demonstrate a sustained intellectual curiosity about a topic of interest.I can ask multiple insightful and compelling questions.I can formulate many hypotheses that are significant using accurate scientific terminology.I can predict significant outcomes.I am able to collect perceptive qualitative and valid quantitative evidence that supports my prediction. | I can demonstrate an intellectual curiosity about a topic of interest.I can ask multiple meaningful and convincing questions.I can formulate some hypotheses that are relevant using scientific terminology.I can predict relevant outcomes.I am able to collect pertinent qualitative and precise quantitative evidence that supports my prediction. | I can demonstrate curiosity about a topic of interest.I can ask multiple appropriate and plausible questions.I can formulate one or two hypotheses that are superficial using some scientific terminology.I can predict outcomes.I am able to collect suitable qualitative and useable quantitative evidence that supports my prediction. | I can demonstrate some curiosity about a topic of interest.I can ask multiple superficial questions.I can formulate a prediction that is relevant.I can predict superficial outcomes.I am able to collect marginal qualitative and quantitative evidence that supports my prediction. |
| **Planning and Conducting** | I can plan, select, and use focused investigation methods and equipment to collect reliable data. I can fully assess risks associated with my proposed methods. | I can plan, select, and use purposeful investigation methods and equipment to collect reliable data. I can fully assess risks associated with my proposed methods. | I can plan, select, and use appropriate investigation methods and equipment to collect reliable data. I can assess risks associated with my proposed methods. | I can plan, select, and use incomplete investigation methods and equipment to collect reliable data. I can assess risks associated with my proposed methods. |
| **Processing and Analyzing Data and Information** | I have an innovative description of the relationships between variables.I have a comprehensive list of the sources of error.I use astute knowledge of scientific concepts to draw conclusions that are consistent with my evidence. | I have a credible description of the relationships between variables.I have a thorough list of the sources of error.I use probable knowledge of scientific concepts to draw conclusions that are consistent with my evidence. | I have a predictable description of relationships between variables.I have a list of the sources of error.I use plausible knowledge of scientific concepts to draw conclusions. | I have an unrelated description of the relationships between variables.I have a partial list of the sources of error.I use inaccurate knowledge of scientific concepts to draw conclusions. |
| **Evaluating** | I have an insightful evaluation of my methods and experimental conditions, including identifying sources of error or uncertainty, I can comprehensively describe specific ways to improve my investigation methods and the quality of the data | I have a thoughtful evaluation of my methods and experimental conditions, including identifying sources of error or uncertainty, I can thoroughly describe specific ways to improve my investigation methods and the quality of the data | I have a predictable evaluation of my methods and experimental conditions, including identifying sources of error or uncertainty, I can partially describe specific ways to improve my investigation methods and the quality of the data | I have a simplistic evaluation of my methods and experimental conditions, including identifying sources of error or uncertainty, I can simplistically describe specific ways to improve my investigation methods and the quality of the data |
|  | **Meeting** | **Approaching** |
| **√+** | **√** | **√+** | **√** |
| **Evaluating continued** | I can demonstrate a skillful awareness of assumptions, and identify bias in my own work and secondary sourcesI can exercise a healthy, informed skepticism and perceptively use scientific knowledge and findings to form my own investigations.I purposefully consider social, ethical, and environmental implications of the findings from my investigationsI critically analyze the validity of information in secondary sources. | I can demonstrate a logical awareness of assumptions, and identify bias in my own work and secondary sourcesI can exercise a healthy, informed skepticism and thoughtfully use scientific knowledge and findings to form my own investigations.I completely consider social, ethical, and environmental implications of the findings from my investigationsI fully analyze the validity of information in secondary sources. | I can demonstrate an awareness of assumptions, and identify bias in my own work and secondary sourcesI can exercise a healthy, informed skepticism and appropriately use scientific knowledge and findings to form my own investigations.I appropriately consider social, ethical, and environmental implications of the findings from my investigationsI analyze the validity of information in secondary sources. | I can demonstrate a simplistic awareness of assumptions, and identify bias in my own work and secondary sourcesI can exercise a healthy, informed skepticism and superficially use scientific knowledge and findings to form my own investigations.I superficially consider social, ethical, and environmental implications of the findings from my investigationsI partially analyze the validity of information in secondary sources. |
| **Apply and Innovate** | I can efficiently contribute to care for self, others, community, and world through personal or collaborative approachesI design projects with innovative local and/or global connections and applicationsI can explicitly transfer and apply learning to new situationsI can explicitly generate and introduce new or refined ideas when problem solvingI insightfully contribute to finding solutions to problems at a local and/or global level through inquiry | I can practically contribute to care for self, others, community, and world through personal or collaborative approachesI design projects with credible local and/or global connections and applicationsI can thoughtfully transfer and apply learning to new situationsI can thoughtfully generate and introduce new or refined ideas when problem solvingI thoughtfully contribute to finding solutions to problems at a local and/or global level through inquiry | I can viably contribute to care for self, others, community, and world through personal or collaborative approachesI design projects with predictable local and/or global connections and applicationsI can partially transfer and apply learning to new situationsI can partially generate and introduce new or refined ideas when problem solvingI predictably contribute to finding solutions to problems at a local and/or global level through inquiry | I can contribute to care for self, others, community, and world through personal or collaborative approachesI design projects with unrelated local and/or global connections and applicationsI can minimally transfer and apply learning to new situationsI can minimally generate and introduce new or refined ideas when problem solving.I minimally contribute to finding solutions to problems at a local and/or global level through inquiry |
| **Communicating** | I can explain predictions, observations and results that are significant using accurate scientific terminology from previous knowledge.I can accurately express and reflect on a variety of experiences, perspectives, and worldviews of place | I can explain predictions, observations and results that are relevant using scientific terminology from previous knowledge.I can reasonably express and reflect on a variety of experiences, perspectives, and worldviews of place | I can explain relevant predictions, observations and results using some scientific terminology.I can express and reflect on a variety of experiences, perspectives, and worldviews of place | I can explain a superficial prediction, observations and results.I can partially express and reflect on a variety of experiences, perspectives, and worldviews of place |