Science Inquiry Skills Framework

1	**Identify Inquiry Questions (*NGSS Practice 1: Asking questions*)**
1.1	Identify testable questions
1.2	Refine/refocus ill-defined questions
1.3	Formulate hypotheses
2	**Design Scientific Investigations (*NGSS Practice 3: Planning and carrying out investigations*)**
2.1	Design investigations to test a hypothesis
2.2	Identify independent variables, dependent variables, and variables that need to be controlled
2.3	Operationally define variables based on observable characteristics
2.4	Identify flaws in investigative design
2.5	Utilize safe procedures
2.6	Conduct multiple trials
3	**Use Tools and Techniques to Gather Data (*NGSS Practice 3: Planning and carrying out investigations*)**
3.1	Gather data by using appropriate tools and techniques
3.2	Measure using standardized units of measure
3.3	Compare, group, and/or order objects by characteristics
3.4	Construct and/or use classification systems
3.5	Use consistency and precision in data collection; evaluate accuracy of data
3.6	Describe an object in relation to another object (e.g., its position, motion, direction, symmetry, spatial arrangement, or shape)
3.7	Record observations using methods that complement investigation
4	**Analyze and Describe Data (*NGSS Practice 4: Analyzing and interpreting data*)**
4.1	Differentiate explanation from description
4.2	Construct and use graphical representations
4.3	Identify patterns and relationships of variables in data
4.4	Use mathematic skills to analyze and/or describe data **(*NGSS Practice 5: Using mathematics*)**
4.5	Use computers/calculators to analyze quantitative data **(*NGSS Practice 5: Using mathematics*)**
5	**Explain Results and Draw Conclusions (*NGSS Practice 6: Constructing explanations*)**
5.1	Differentiate observation from inference
5.2	Propose an explanation based on observation
5.3	Use evidence to make inferences and/or predict trends
5.4	Form a logical explanation about the cause-and-effect relationships in data from an experiment
5.5	Distinguish between correlation and cause-and-effect relationships in data from an investigation
5.6	Account for anomalous data; consider limitations of data analysis and data collection
5.7	Revise interpretations of data based on new information and/or data
5.8	Create a model (e.g., mental, physical, or verbal representation) of an idea, object, and/or event based on data **(*NGSS Practice 2: Developing and Using Models*)**
5.9	Recognize limitations of a model **(*NGSS Practice 2: Developing and Using Models*)**
6	**Engage in Arguments from Evidence *(NGSS Practice 7: Engaging in arguments from evidence)***
6.1	Compare and critique alternative explanations of data on a topic
6.2	Evaluate or present an argument supported by data to support or refute an explanation or model
7	**Communicate Scientific Procedures and Explanations *(NGSS Practice 8: Obtaining, Evaluating and Communicating Information)***
7.1	Communicate experimental and/or research methods and procedures
7.2	Use evidence and observations to explain and communicate results
7.3	Communicate knowledge gained from an investigation orally and through written reports, incorporating drawings, diagrams, or graphs where appropriate
7.4	Evaluate text for credibility, accuracy and possible bias in methods, data and explanation.