Buffalo Academy of Scholars Science Standards

(Based off of Next Generation Science Standards)

High School Levels (9-12)

Science and Engineering Practices: Students who demonstrate understanding can:

1. Formulate, refine, and evaluate empirically testable questions and design problems using models and simulations.
    a. Evaluate questions that challenge the premise of an argument, the interpretation of a data set, or the suitability of a design.

2. Use and synthesize models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

    a. Investigating or designing new systems or structures requires detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem.

3. Plan and carry out investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.
    a. Plan and carry out an investigation individually and collaboratively to produce data to serve as the basis of evidence, and in the design: decide on types, quantity and accuracy of data required to produce reliable measurements and consider limitations on the precision of the data, and refine the design accordingly.

4. Use computational thinking and mathematical representations of phenomena to support claims.
    a. Algebraic thinking and analysis, linear and non-linear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis will be used to analyze, represent, and model data.

5. Analyze and interpret data using logical reasoning, detailed statistical analysis, the comparison of data sets, and the use of models to make sense of natural phenomena.
    a. Analyze data using tools, technologies, and/or models in order to make valid and reliable scientific claims or determine an optimal design solution.
    b. Organizing information such as conservation of energy and matter, stability and change, patterns and scale, and systemic models are used to evaluate data and support a claim.

6. Obtain, evaluate, and communicate information to evaluate the validity and reliability of the claims, methods, and designs.
    a. Communicate scientific and technical information in multiple formats including orally, graphically, textually, and mathematically.
    b. Information about phenomena should be properly obtained and cited from physical experimentation, print, or digital sources.

7. Engage in argument supported by appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed worlds. Arguments may come from current scientific or historical episodes in science.
    a. Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments.

8. Construct explanations and design solutions that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles and theories.

    a. Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources and the assumption that theories and laws that describe the natural world are consistent.
    b. Refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.
    c. Apply scientific ideas to solve a design problem, taking into account possible unanticipated effects.