## Kindergarten through Second Grades

### Nature of Science

Use a scientific notebook to record predictions, questions and observations about data with pictures, numbers or in words.
Conduct investigations that may happen over time as a class, in small groups, or independently.
Generate questions and make observations about natural processes.
Make predictions based on observations.
Discuss observations with peers and be able to support your conclusion with evidence.
Make and use simple equipment and tools to gather data and extend the senses.
Recognize a fair test.

### Design Process

Identify a need or problem to be solved.
Document the design throughout the entire design process.
Brainstorm potential solutions.
Select a solution to the need or problem.
Select the materials to develop a solution.
Create the solution.
Evaluate and test how well the solution meets the goal.
Communicate the solution with drawings or prototypes.
Communicate how to improve the solution.

## Third through Fifth Grades

### Nature of Science

Make predictions and formulate testable questions.
Design a fair test.
Plan and carry out investigations—often over a period of several lessons—as a class, in small groups or independently.
Perform investigations using appropriate tools and technologies that will extend the senses.
Use measurement skills and apply appropriate units when collecting data.
Test predictions with multiple trials.
Keep accurate records in a notebook during investigations and communicate findings to others using graphs, charts, maps and models through oral and written reports.
Identify simple patterns in data and propose explanations to account for the patterns.
Compare the results of an investigation with the prediction.

### Design Process

Identify a need or problem to be solved.
Brainstorm potential solutions.
Document the design throughout the entire design process.
Select a solution to the need or problem.
Select the most appropriate materials to develop a solution that will meet the need.
Create the solution through a prototype.
Test and evaluate how well the solution meets the goal.
Evaluate and test the design using measurement.
Present evidence by using mathematical representations (e.g., graphs, data tables).

Communicate the solution (including evidence) using mathematical representations (graphs, data tables), drawings or prototypes.
Communicate how to improve the solution

## Sixth through Eighth Grades

### Nature of Science

Make predictions and develop testable questions based on research and prior knowledge.
Plan and carry out investigation—often over a period of several class lessons—as a class, in small groups or independently.
Collect quantitative data with appropriate tools or technologies and use appropriate units to label numerical data.
Incorporate variables that can be changed, measured or controlled.
Use the principles of accuracy and precision when making measurements.
Test predictions with multiple trials
Keep accurate records in a notebook during investigations.
Analyze data, using appropriate mathematical manipulation as required, and use it to identify patterns.
Make inferences based on these patterns.
Evaluate possible causes for differing results (i.e., valid data).
Compare the results of an experiment with the prediction.
Communicate findings through oral and written reports by using graphs, charts maps and models.

### Design Process

Identify a need or problem to be solved.
Brainstorm potential solutions.
Throughout the entire design process, document the design with drawings (including labels) in a portfolio or notebook so that the process can be replicated.
Select a solution to the need or problem.
Select the most appropriate materials to develop a solution that will meet the need.
Create the solution through a prototype.
Test and evaluate how well the solution meets the goal.
Evaluate and test the design.
Present evidence using mathematical representations like graphs and data tables.
Communicate the solution (including evidence) using mathematical representations (e.g., graphs, data tables), drawings or prototypes.
Redesign to improve the solution based on how well the solution meets the need.

## High School Courses

Develop explanations based on reproducible data and observations gathered during laboratory investigations.
Recognize that their explanations must be based both on their data and other known information from investigations of others.
Clearly communicate their ideas and results of investigations verbally and in written form using tables, graphs, diagrams and photographs.
Regularly evaluate the work of their peers and in turn have their work evaluated by their peers.

Apply standard techniques in laboratory investigations to measure physical quantities in appropriate units and convert quantities to other units as necessary.
Use analogies and models (mathematical and physical) to simplify and represent systems that are difficult to understand or directly experience due to their size, time scale or complexity. Recognize the limitations of analogies and models.
Focus on the development of explanatory models based on their observations during laboratory investigations.
Explain that the body of scientific knowledge is organized into major theories, which are derived from and supported by the results of many experiments and allow us to make testable predictions.
Recognize that new scientific discoveries often lead to a re-evaluation of previously accepted scientific knowledge and of commonly held ideas.
Describe how scientific discoveries lead to the development of new technologies and conversely how technological advances can lead to scientific discoveries through new experimental methods and equipment.
Explain how scientific knowledge can be used to guide decisions on environmental and social issues.