Grades K, 1, 2

Adopted 2013

Appendix F: Science and Engineering Practices

1. **Asking Questions and Defining Problems** AF.1
    1. Ask questions based on observations to find more information about the natural and/or designed world(s). K-2.AF.1.1
    2. Ask and/or identify questions that can be answered by an investigation. K-2.AF.1.2
    3. Define a simple problem that can be solved through the development of a new or improved object or tool. K-2.AF.1.3

2. **Developing and Using Models** AF.2
    1. Distinguish between a model and the actual object, process, and/or events the model represents. K-2.AF.2.1
    2. Compare models to identify common features and differences. K-2.AF.2.2
    3. Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s). K-2.AF.2.3
    4. Develop a simple model based on evidence to represent a proposed object or tool. K-2.AF.2.4

3. **Planning and Carrying Out Investigations** AF.3
    1. With guidance, plan and conduct an investigation in collaboration with peers (for K). K-2.AF.3.1
    2. Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. K-2.AF.3.2
    3. Evaluate different ways of observing and/or measuring a phenomenon to determine which way can answer a question. K-2.AF.3.3
    4. Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons. K-2.AF.3.4
    5. Make observations (firsthand or from media) and/or measurements of a proposed object or tool or solution to determine if it solves a problem or meets a goal. K-2.AF.3.5
    6. Make predictions based on prior experiences. K-2.AF.3.6

4. **Analyzing and Interpreting Data** AF.4
    1. Record information (observations, thoughts, and ideas). K-2.AF.4.1
    2. Use and share pictures, drawings, and/or writings of observations. K-2.AF.4.2
    3. Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems. K-2.AF.4.3
    4. Compare predictions (based on prior experiences) to what occurred (observable events). K-2.AF.4.4
    5. Analyze data from tests of an object or tool to determine if it works as intended. K-2.AF.4.5

5. **Using Mathematics and Computational Thinking** AF.5
    1. Decide when to use qualitative vs. quantitative data. K-2.AF.5.1
    2. Use counting and numbers to identify and describe patterns in the natural and designed world(s). K-2.AF.5.2
    3. Describe, measure, and/or compare quantitative attributes of different objects and display the data using simple graphs. K-2.AF.5.3
    4. Use quantitative data to compare two alternative solutions to a problem. K-2.AF.5.4

6. **Constructing Explanations and Designing Solutions** AF.6
    1. Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. K-2.AF.6.1
    2. Use tools and/or materials to design and/or build a device that solves a specific problem or a solution to a specific problem. K-2.AF.6.2
    3. Generate and/or compare multiple solutions to a problem. K-2.AF.6.3

7. **Engaging in Argument from Evidence** AF.7
    1. Identify arguments that are supported by evidence. K-2.AF.7.1
    2. Distinguish between explanations that account for all gathered evidence and those that do not. K-2.AF.7.2
    3. Analyze why some evidence is relevant to a scientific question and some is not. K-2.AF.7.3
    4. Distinguish between opinions and evidence in one's own explanations. K-2.AF.7.4
    5. Listen actively to arguments to indicate agreement or disagreement based on evidence, and/or to retell the main points of the argument. K-2.AF.7.5
    6. Construct an argument with evidence to support a claim. K-2.AF.7.6
    7. Make a claim about the effectiveness of an object, tool, or solution that is supported by relevant evidence. K-2.AF.7.7

8. **Obtaining, Evaluating, and Communicating Information** AF.8

    1. Read grade-appropriate texts and/or use media to obtain scientific and/or technical information to determine patterns in and/or evidence about the natural and designed world(s). K-2.AF.8.1
    2. Describe how specific images (e.g., a diagram showing how a machine works) support a scientific or engineering idea. K-2.AF.8.2
    3. Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question and/or supporting a scientific claim. K-2.AF.8.3
    4. Communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about scientific ideas, practices, and/or design ideas. K-2.AF.8.4