3-5 Grade Science Curriculum

The Practice of Science and Engineering

On-Going

Big Ideas:

- Close observation can lead to good questions
- Models help simplify and clarify how to solve a problem
- Good questions suggest useful models
- There are many different types of models
- Before we measure anything, we need to understand "what?, Why?, and How?

Essential Questions :

- Who uses the scientific method?
- What is a good question?
- What is the link between what we already know and the question(s) we ask?
- How do we decide which instrument to use for a valid measurement?
- What do we mean by "valid"?
- How do we make meaningful sense from the data?
- How do the elements of an experiment follow the logic of the scientific method?

Vocabulary: Experiment, evidence, hypothesis, inference, inquiry, investigation, microscope, observe, predict, procedure, reference manual, scientific methods, three-dimensional, two-dimensional

Students who demonstrate understanding can:

3-5-EST1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-EST1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-EST1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to	**ESS2.D: Weather and Climate** • Scientists record patterns of the weather across different	**Patterns** • Patterns of change can be used to make predictions. (3-

collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. (3-ESS2-1)

Engaging in Argument from Evidence

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world (s).

- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-ESS3-1)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.

- Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2)

times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1)

- Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)

ESS3.B: Natural Hazards

- A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1) *(Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)*

ESS2-1),(3-ESS2-2)

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1)

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Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). (3-ESS3-1)

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Connections to Nature of Science

Science is a Human Endeavor

- Science affects everyday life. (3-ESS3-1)

Common Core State Standards Connections:

ELA/Literacy —

RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. *(3-ESS2-2),(3-ESS3-1)*

W.3.7 Conduct short research projects that build knowledge about a topic. *(3-ESS3-1)*

W.3.8 Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-ESS2-2)

Mathematics —

MP.2 Reason abstractly and quantitatively. (3-ESS2-1),(3-ESS2-2),*(3-ESS3-1)*

MP.4 Model with mathematics. (3-ESS2-1),(3-ESS2-2),*(3-ESS3-1)*

MP.5 Use appropriate tools strategically. *(3-ESS2-1)*