DRAFT: Marblehead Community Charter Public School Criteria for Success: Science & Engineering

Principles of Science and Engineering

- Ask questions and define problems.
- Develop and use models.
- Plan and carry out investigations.
- Analyze and interpret data.
- Use mathematics and computational thinking.
- Construct explanations and design solutions.
- Engage in argument from evidence.
- Obtain, evaluate, and communicate information.

Crosscutting Concepts of Science and Engineering

- Observe patterns and describe relationships and the influencing factors.
- Explore situations of cause and effect and explain their underlying mechanisms.
- Recognize the importance of scale, proportion, and quantity.
- Define systems and design models to understand and test ideas.
- Understand the flow of energy and matter in various systems.
- Understand the relationship between structure and function.
- Examine the stability of various systems and rates of change as they evolve. .

Scientific Text

- Read and understand scientific texts and primary sources.
- Identify and define scientific vocabulary.
- Summarize main ideas presented in the text.
- Apply knowledge to additional situations and investigations.

Investigations

Framing the Question:

- Based on observation of phenomena, understand or come up with a question or hypothesis to investigate.
- Collect information and ideas about your question.
- Identify the variables or special factors that may affect your investigation.

Scientific Research:

- Gather information that addresses the question or hypothesis.
- Identify, use, and cite appropriate scientific references.
- Make a plan for investigating the question or hypothesis.

Laboratory Investigation:

- Make a plan for testing the question or hypothesis.
- Identify and use appropriate scientific equipment.
- Make observations and record data.
- Use appropriate representations, such as charts, tables, and graphs, to display data.

Analyzing What You Find:

- Consider multiple explanations for what you observe or discover.
- Use evidence to draw or support a logical conclusion.
- Identify possible sources of error and bias in the investigation or research.
- Verify the results of the investigation or find corroborating evidence for your research.
- Revise your explanation if necessary.

Synthesizing What You Find:

- Answer your question and/or draw conclusions about the validity of your hypothesis.
- Use the observations to ask additional questions, make new predictions, and test those predictions by running more simulations or by changing the model.
- Connect ideas to other information , or to a "real world" use.
- Use data or research to respond to questions or comments from others.
- Share and defend the results of the investigation in writing and orally.

Last revised by Ellen Lodgen and Jessica Xiarhos on July 24, 2020
Additional edits by Ellen Lodgen, Jenn Stoddard, and Jessica Xiarhos on August 4, 2020