Unit: Experimentation and Development	Concept: Experimentation

Standard
- 3.5.9-12.K (ETS) Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

Key Learning
- (LTTG) Students will be able to employ hands-on problem solving, i.e., designing, making/building, producing, and evaluating outcomes.

Unit Essential Question
- How can I employ hands-on problem solving, i.e., designing, making/building, producing, and evaluating outcomes?

Essential Question
- How do costs, benefits, and tradeoffs factor into decisions made about technology and engineering?

Key Vocabulary
- Engineering Design Process, Computer Simulation, Systems, and Model

Learning Experience
- Students who demonstrate understanding can use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.
- Clarifying Statement: Both physical models and computers can be used in various ways to aid in the engineering design process.

(Big Idea) Technology & Engineering Curriculum Framework Big Ideas
- Decisions made about technology and engineering involve consideration of costs, benefits, and tradeoffs.

(SEP) Science and Engineering Practices
- Using Mathematics and Computational Thinking - Use mathematical models and/or computer simulations to predict the effects of a design solution on systems and/or the interactions between systems.

(DCI) Disciplinary Core Ideas
- ETS1.B: Developing Possible Solutions - Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most efficient or economical; and in making a persuasive presentation to a client about how a given design will meet his or her needs.

(TEP) Technology and Engineering Practices
- Critical Thinking - Uses evidence to better understand and solve problems in technology and engineering, including applying computational thinking.

Terms

- (ETS) Engineering, Technology, and Applications of Science – Standards applicable across the Science, Environmental Literacy & Sustainability, and Technology & Engineering content areas.
- (LTTG) PDE Technology & Engineering Long Term Transfer Goals
- (Learning Experience) A learning experience refers to any interaction, activity, or other experience in which students acquire new understanding, knowledge, behaviors, or skills.
- (Big Idea #) PDE Technology & Engineering Curriculum Framework Big Ideas
- (SEP) PDE Science and Engineering Practices
- (DCI) PDE Disciplinary Core Ideas
- (TEP) PDE Technology and Engineering Practices