Warren Township Public School District
Curriculum

Subject: Reach/Innovation & Design	**Grade: Kindergarten**	**Unit: Making Things Better**
Total Number of Lessons: 10	**Unit Time Frame: One marking period (10 six-day cycles)**	

Instructional Materials (Include specific text or digital resource links that are used by teachers and students within the unit):

Reach Manual - Innovation & Design - Kindergarten, Reach Engineering Kit - Making Things Better, Reach Engineering Reader "Anna Banana - Student Engineer", legoeducation.com Spike Essential Lesson Website

Goals:	**Skills / Understandings**
• In this introduction to engineering skills, kindergarteners will change products to improve them. • Students will compare products to see which is better. • Students will create 3D models from 2D blueprints.	• Engineers redesign products to make them better. • Identify a product's strengths and weaknesses and use that information to guide redesign efforts. • Students design-as-they-build using blocks and other building materials. • Students document their designs on paper after building and testing. • Following step-by-step pictorial instructions enables construction of complex models.

NJ Student Learning Standards and Descriptors:

- K-PS2-2: Analyze to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.
- K-PS3-2: Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.
- K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change (e.g. "climate change") to define a simple problem that can be solved through the development of a new or improved object or tool.
- K-2-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- K-2-ETS1-3: Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
- 1-PS4-3: Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.
- 2-PS1-2: Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

Unit Essential Questions:	Student Vocabulary:	Lesson Learning Statement::
• What does it mean to make something better? • How do engineers decide which product is better? • How can I make complex tasks easier to execute? • What information do engineers use to inform redesign?	• Engineer • Strengths • Weaknesses • success criteria • Measure • Temperature • Graph • Sensor • Multiple • Keva • Trials • Half • conclusions • Design • Redesign • Models • Solutions • 2D, 3D • Coding • Program	• Engineers make things better by looking for weaknesses to improve. • The better product is the one that meets the success criteria. • A product can have multiple success criteria, and better solutions meet all of them. • I need to change my product when the success criteria change. • I can use measurements to decide which product is best. • Test results inform redesign. • Step-by-step plans help me put complex models together. • I can program a motor to do a task.

Interdisciplinary Connections (include standard number and activity examples):	**Assessment Strategies / Resources:**	**Benchmark Assessments / Products: Specific common assessments both formative and summative (provide a link to the assessments)**
K-PS2-1, K-PS2-2 - Cause and effect - simple tests can be designed to gather evidence to support or refute student ideas about causes. SL.K.3 - Ask and answer questions in order to seek help, get information, or clarify something that is not understood. K.MD.A.2 - Directly compare two objects with a measurable attribute in common, to see which object has "more of/less of" the attribute, and describe the difference. PS3.B: Conservation of Energy and Energy Transfer - Sunlight warms Earth's surface. W.K.2 - Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. Influence of Engineering, Technology, and Science on Society and the Natural World - People depend on various technologies in their lives; human life would be very different without technology. (K-ESS3-2) W.K.2 - Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS3-3). SL.K.3 - Ask and answer questions in order to seek help, get information, or clarify something that is not understood. SL.K.5 - Add drawings or other visual displays to descriptions as desired to provide additional detail. (K-ESS3-1).	Checklists, models, sketches, measuring in feet, measuring temperature, creating models, observation, communicating using precise engineering language, drawing conclusions from data	End of unit assessment

ETS1.A: Defining and Delimiting Engineering Problems: ● A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) ● Ask questions, make observations, and gather information about a situation people want to change (e.g. climate change) to define a simple problem that can be solved through the development of a new or improved object or tool. ● Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1) ETS1.B: Developing Possible Solutions: ● Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions, such as climate change, to other people. (K-2-ETS1-2). ETS1.C: Optimizing the Design Solution: ● Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3) Structure and Function: ● The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)		

21st Century Life and Careers - Technology (link to standard 8.1 and 8.2) / Career and 21st Century Skills (link to standard 9.1, 9.2, 9.2) (Include standard number and activity examples from each area):		
● 8.1.2.CS.1: Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences. ● 8.1.2.IC.1: Compare how individuals live and work before and after the implementation of new computing technology. ● 8.1.2.DA.2: Store, copy, search, retrieve, modify, and delete data using a computing device. ● 8.1.2.AP.4: Break down a task into a sequence of steps. ● 8.1.2.AP.5: Describe a program's sequence of events, goals, and expected outcomes. ● 9.4.2.CI.1: Demonstrate openness to new ideas and perspectives. ● 9.4.2.CI.2: Demonstrate originality and inventiveness in work.		
Warren QSAC Accommodations Chart		
Pictorial displays of instructions, pictorial worksheets and checklists, options for written text		