Lower Township School District
Cape May, NJ

Unit Overview	
Content Area: Computer Science and Design Thinking	
Unit Title: 8.2- Design Thinking	
Grade Level: 1 and 2	**Timeline: 10 weeks**
Disciplinary Concepts: ● Engineering Design ● Interaction of Technology and Humans ● Nature of Technology ● Effects of Technology on the Natural World ● Ethics and Culture	
Core Ideas/Performance Expectations	
Core Ideas	**Performance Expectations**
Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions.	● 8.2.2.ED.1: Communicate the function of a product or device. ● 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process. ● 8.2.2.ED.3: Select and use appropriate tools and materials to build a product using the design process.
Limitations (constraints) must be considered when engineering designs.	● 8.2.2.ED.4: Identify constraints and their role in the engineering design process.
Human needs and desires determine which new tools are developed.	● 8.2.2.ITH.1: Identify products that are designed to meet human wants or needs. ● 8.2.2.ITH.2: Explain the purpose of a product and its value.
Technology has changed the way people live and work. Various tools can improve daily tasks and quality of life.	● 8.2.2.ITH.3: Identify how technology impacts or improves life. ● 8.2.2.ITH.4: Identify how various tools reduce work and improve daily tasks. ● 8.2.2.ITH.5: Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution.
Innovation and the improvement of existing technology involves creative thinking.	● 8.2.2.NT.1: Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together. ● 8.2.2.NT.2: Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem.

The use of technology developed for the human designed world can affect the environment, including land, water, air, plants, and animals. Technologies that use natural sources can have negative effects on the environment, its quality, and inhabitants. Reusing and recycling materials can save money while preserving natural resources and avoiding damage to the environment.	● 8.2.2.ETW.1: Classify products as resulting from nature or produced as a result of technology. ● 8.2.2.ETW.2: Identify the natural resources needed to create a product. ● 8.2.2.ETW.3: Describe or model the system used for recycling technology. ● 8.2.2.ETW.4: Explain how the disposal of or reusing a product affects the local and global environment.
The availability of technology for essential tasks varies in different parts of the world.	● 8.2.2.EC.1: Identify and compare technology used in different schools, communities, regions, and parts of the world.

Accommodations and Modifications	
Special Education	Change constraints and project requirements, Students working in groups, Extra time given when needed, Jobs given when working in the group, Priority seating,
English Language Learners	Vocabulary words explained with more than one definition, Students working in groups, Extra time given when needed, Jobs given when working in the group,
Students At-Risk of School Failure	Change constraints and project requirements, Students working in groups, Extra time given when needed, Jobs given when working in the group,
Advanced Skills	Change constraints and project requirements, Students working in groups, Jobs given when working in the group, alternative projects
Students with 504 Plans	Vocabulary words explained with more than one definition, Directions given in short steps, Priority seating, Students working in groups, Extra time given when needed, Jobs given when working in the group,

Assessments	
Formative	Questions at the beginning of the projects

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Summative	Participation in discussion, score on rubrics, studentś self-assessment and progression through projects
Benchmark	score on rubrics, progression
Alternative	Alternative projects

Interdisciplinary Connections
Math- (addition, subtraction, measurement) Writing, reading, science

Integration of 21st Century Skills- NJSLS 9	
There is a relationship between an individual's values, emotions, and the ways he/she chooses to spend money.	● 9.1.2.FP.1: Explain how emotions influence whether a person spends or saves
External factors can influence the items that an individual wants or needs.	● 9.1.2.FP.2: Differentiate between financial wants and needs. ● 9.1.2.FP.3: Identify the factors that influence people to spend or save (e.g., commercials, family, culture, society).
A budget is a plan that helps an individual obtain his/her financial goals.	● 9.1.2.PB.1: Determine various ways to save and places in the local community that help people save and accumulate money over time.
There are ways to keep the things we value safely at home and other places.	● 9.1.2.RM.1: Describe how valuable items might be damaged or lost and ways to protect them.
Different types of jobs require different knowledge and skills.	● 9.1.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job.
Income is received from work in different ways including regular payments, tips, commissions, and benefits.	● 9.1.2.CAP.2: Explain why employers are willing to pay individuals to work.
There are benefits and drawbacks to being an entrepreneur.	● 9.1.2.CAP.3: Define entrepreneurship and social entrepreneurship. ● 9.1.2.CAP.4: List the potential rewards and risks to starting a business.
Brainstorming can create new, innovative ideas.	● 9.4.2.CI.1: Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).

	● 9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem.	● 9.4.2.DC.1: Explain differences between ownership and sharing of information. ● 9.4.2.DC.2: Explain the importance of respecting digital content of others.
Individuals should practice safe behaviors when using the Internet.	● 9.4.2.DC.3: Explain how to be safe online and follow safe practices when using the internet (e.g., 8.1.2.NI.3, 8.1.2.NI.4). ● 9.4.2.DC.4: Compare information that should be kept private to information that might be made public.
An individual's digital footprint reflects the various actions an individual makes online, both positive and negative.	● 9.4.2.DC.5: Explain what a digital footprint is and how it is created.
Digital communities allow for social interactions that can result in positive or negative outcomes.	● 9.4.2.DC.6: Identify respectful and responsible ways to communicate in digital environments.
Individuals from different cultures may have different points of view and experiences.	● 9.4.2.GCA:1: Articulate the role of culture in everyday life by describing one's own culture and comparing it to the cultures of other individuals (e.g., 1.5.2.C2a, 7.1.NL.IPERS.5, 7.1.NL.IPERS.6).
Collaboration can simplify the work an individual has to do and sometimes produce a better product.	● 9.4.2.TL.7: Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts (e.g., W.2.6., 8.2.2.ED.2).
Information is shared or conveyed in a variety of formats and sources.	● 9.4.2.IML.4: Compare and contrast the way information is shared in a variety of contexts (e.g., social, academic, athletic) (e.g., 2.2.2.MSC.5, RL.2.9).
A variety of diverse sources, contexts, disciplines and cultures provide valuable and necessary information that can be used for different purposes. Information is shared or conveyed in a variety of formats and sources.	● 9.4.2.IML.3: Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).

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Career Readiness, Life Literacies, and Key Skills Practices
Career Readiness, Life Literacies, and Key Skills Practices describe the habits of the mind that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. These practices should be taught and reinforced in all content areas with increasingly higher levels of complexity and expectation as a student advances through a program of study. 1. Act as a responsible and contributing community member and employee. 2. Attend to financial well-being. 3. Consider the environmental, social and economic impacts of decisions. 4. Demonstrate creativity and innovation. 5. Utilize critical thinking to make sense of problems and persevere in solving them. 6. Model integrity, ethical leadership and effective management. 7. Plan education and career paths aligned to personal goals. 8. Use technology to enhance productivity, increase collaboration and communicate effectively. 9. Work productively in teams while using cultural/global competence.

Integration of Technology Resources
Internet Connection, Chromebook, Whiteboard and projector, Shared documents, Google Suite, http://Youtube.com, Google search, https://www.dukefarms.org/making-an-impact/eagle-cam/ , https://makecode.microbit.org/ Micro:bit, Scratch Jr

Materials	
Mr Ferris and His Wheel	Micro:bit
Various building supplies	Chromebook
Paper, Pencils	Whiteboard and projector

Instructional Activities
● Design an umbrella- 1st grade ● Design a moving vehicle- 2nd grade ● Build a tower- 1st grade ● Help moose brush his teeth- 1st grade ● Paddle boats- 1st grade ● Hex bug maze- 1st grade ● Build a chair for baby bear ● Create and share digital media video story reading, Scratch Jr story etc. ● Observation a eagleś nest and sharing information- 1st grade

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- Online safety Common Sense Education
- Dealing with frustration STEM Building activity
- Build a windmill- 2nd grade
- Create a step counter- 2nd grade
- Create a tool to move golf balls- 2nd grade
- Hoop Glider- 2nd grade
- Binary bracelet- 1st grade
- Micro:bit game- 2nd grade
- Rollercoaster- 2nd grade
- Design a tool to retrieve capsules- 2nd grade
- Combined project with art