Moon Area School District Curriculum Map

Course: STEAM
Grade Level: 7-8
S. Martindale
Frequency: Full-Year Course

Big Ideas

BID IDEAS KEY:
BLACK – Engineering Process
ORANGE – STOP MOTION ANIMATION
BLUE – CODING
RED – AQUAPONICS
YELLOW – ROLLER COASTER
GREEN – GRAPHIC DESIGN

BIG IDEAS

1. Learn the 6 steps of the engineering process.
2. Apply the steps of the engineering process.
3. There is more than one way to solve a problem.
4. Explain and demonstrate basic computer operations and concepts.
5. Demonstrate the effectiveness of image generating technique to communicate a story (e.g., photography, video).
6. Analyze and evaluate the effectiveness of a graphic object designed and produced to communicate a thought or concept.
7. Apply basic technical drawing techniques to communicate an idea or solution to a problem.
8. Apply the appropriate method of communications technology to communicate a thought.
9. An application, computer or device does what it is told through a set of instructions.
10. Programs can be written for educational and recreational purposes.
11. Agriculture provides our necessities of life.
12. Sustainable farming practices environmental stewardship.
13. Sustainability involves balancing the needs of people, profit, and the planet.
14. Show how models are used to communicate and test design ideas and processes.
15. Measurement describes the attributes of objects and events.
16. Gravity, friction, and change in mass can affect the motion of objects.
17. Energy is the ability to do work and work is done when a force moves an object.
18. Engineers utilize preliminary drawings as an initial plan in preparation of building models.
19. The design process is used to solve problems.

20. Models are used to test ideas, make changes and learn more about what would happen to a similar real object.
21. Communication and collaboration is essential to efficient and effective problem solving.

Essential Questions

22. How can I solve this problem/want or need?
23. What is the engineering design process?
24. How are technical ideas communicated and applied to real world applications?
25. How do we communicate with an audience using a digital platform?
26. Why is it important to be able to use and manipulate computer software?
27. What is the importance of having a plan?
28. How do forces and motion affect technological design?
29. What types of force do you experience while riding a roller coaster?
30. How do the subsystems in a vehicle (roller coaster car) work together for a system to work effectively?
31. What qualities increase plant growth?
32. What are the benefits of an ecosystem working together?
33. How does sustainability apply to agriculture?
34. How will sustainability feed our population in the future?
35. How is technology closely related to creativity (which results in innovation)?
36. How does every part in a system relate to others?
37. What is graphic design?
38. What are the main attributes that make designs aesthetically pleasing?
39. Why are aesthetics important?
40. What design elements can be used to reach a desired outcome?

Primary Resource(s) & Technology:
Online software, Microsoft Teams, Promethean Boards, Student PC/Laptops/iPads

Pennsylvania and/or focus standards referenced at:
www.pdesas.org
www.education.pa.gov

Big Ideas/EQs	Focus Standard(s)	Assessed Competencies (Key content and skills)	Timeline
STOP MOTION ANIMATION 1,2,3,4,5,6,7,8	3.6.7.B 3.7.7.C 3.7.7.A 3.4.6.D2 3.4.7.C2 3.4.8.C3 3.4.8.D1	1. Students will learn basic "video production" techniques. 2. Students will learn how to create a "video script & story board". 3. Students will learn features of using digital frames, camera remote and iPad apps. 4. Students will learn how to transfer information from still frames to animated movies. 5. Students will learn how to utilize available software to perform a variety of editing features, and effects to their video. 6. The student will be assessed by their final projects which will be presented to the classroom teacher. The student will be monitored and evaluated by classroom performance and comprehension of instructed material.	August – September (Weeks or Days)
SCRATCH CODING 1,2,3,4,8,9,10	1A.AP.10, 1A.AP.12, 1A.AP.15, 1B.AP.10, 15.3.2M, 15.4.2B 3.4.8.C3 3.4.8.D1	1. Students will demonstrate appropriate, responsible use of technology in the STEAM classroom. 15.4.2.B 2. Students will apply basic technology literacy skills to create a program in the Scratch environment 1B.AP.10 3. Students will troubleshoot, revise, and provide appropriate feedback on programs. STL-10.C 4. Students will create a project that is an interactive digital representation of their interests. 1B.AP.10	
AQUAPONICS 1,2,3,11,12,13,14	15.4.2.B 3.3.6.A2 4.4.6.A 13.3.5B 3.4.6 E2 3.4.8.C3 3.4.8.D1	1. Students will demonstrate appropriate, responsible use of technology in the STEAM classroom. 15.4.2.B 2. Students will explain how both plants and animals have specific growing requirements. 4.4.6.A 3. Students will compare various ideas of soil fertility and make connections with the importance of a hearty grow bed and long-term environmental stewardship. 3.3.6.A2	

		4. Students will demonstrate an understanding of their role climate and soil composition or what plants grow and thrive in relating to plant growth. 4.4.6.A 5. Identify how emerging agricultural technologies influence ecosystem dynamics and human/ animal food resources. 3.4.6 E2 6. Explain the importance of working cooperatively with others at both home and school to complete a task. 13.3.5.B	
PAPER ROLLER COASTER 1,2,3,14,15,16,17	3.1.6.A9 3.2.6.B1 3.2.8.B2 3.4.6.B4 3.4.6.C2 3.4.6.C3 3.4.8.C3 3.4.8.D1	1. Students will work in teams to design a roller coaster model that faces many constraints. 2. Students will explain how changes in motion require force. 3. Students will recognize kinetic energy and the principles of motion 4. Students will recognize that vehicles are made up of subsystems (structural, suspension, guidance, control, support that work together).	
GRAPHIC DESIGN 1,2,3,4,14, 18,19,20, 21	3.4.6.A2 3.4.6.D2 3.4.7.C1 3.4.7.C2 3.4.8.C1 3.4.6.C2 3.4.8.C2 3.4.8.C3 3.4.8.D1	1. Students will apply the principles and elements of a design on a variety of media/products. 2. Students will focus on aesthetics as part of the engineer design process. 3. Students will sketch to communicate ideas. 4. Students will use the design sketch to create a digital model. 5. Students will use the digital model to create a screen print.	
ENGINEERING PROCESS 1,2,3,14, 18,19,20, 21	3.4.6.A2 3.4.6.D2 3.4.7.C1 3.4.7.C2 3.4.8.C1 3.4.6.C2 3.4.8.C2 3.4.8.C3 3.4.8.D1	1. Use the engineering process to solve real world problems. 2. Orchestrate each step of the engineering process. 3. Apply math and science to real world problems. 4. Communicate technical ideas verbally. 5. Communicate ideas through models. 6. Measure and model with appropriate precision.	