**Appendix E: Technology Standards**

**Grades 3-5**

The Lindenwold Public Schools believe that technology is most effective when it is part of the learning experience throughout all courses and grades, wherever possible and appropriate. Our teachers aim to help students consider how to select, use, and recommend technologies to accomplish specific objectives and goals related to the curriculum. Our district-wide use of the Google suite gives all stakeholders regular and consistent opportunities to use Google tools as part of our instruction, assessment, collaboration, and documentation practices.

| **Standard** | 8.1 Computer Science and Design Thinking | | |
| --- | --- | --- | --- |
| **Topic** | Computing Systems | | |
| **Grade Level Bands** | **Core Idea** | **Indicator** | **Performance Expectations** |
| **3-5** | Computing devices may be connected to other devices to form a system as a way to extend their capabilities. | 8.1.5.CS.1 | Model how computing devices connect to other components to form a system. |
| Software and hardware work together as a system to accomplish tasks (e.g., sending, receiving, processing, and storing units of information). | 8.1.5.CS.2 | Model how computer software and hardware work together as a system to accomplish tasks. |
|
| Shared features allow for common troubleshooting strategies that can be effective for many systems. | 8.1.5.CS.3 | Identify potential solutions for simple hardware and software problems using common troubleshooting strategies. |
| **Key activities:**   * Introduction to and use of computers/Chromebooks * Introduction to and use of Google suite of tools including Search, Docs, Slides, Sheets, Forms, Sites, Maps, YouTube, and Photos * Introduction to and use of various Web tools and websites including: * Bookflix, My Capstone Library, PebbleGo, abcmouse, Starfall, Abcya, Think Central, Discovery Education, Sumdog, PBS Kids, Mobymax, Animal Planet, Learn 360, National Geographic, KahootIt!, and Brainpop Jr. * Introduction to and use of WeVideo and Flip * Introduction to and use of search engines including Google, KidzSearch, and Kiddle. * Organize information and data using Smartboard Tools or Smartexchange Notebook Resources. * With support, the students will gather and analyze data in grade level challenges (ie Fantasy Football, Book Brackets, Budgeting) * Introduction to and use of iPad or iPhone Apps such as Epic!, Story Kit, Toontastic, Phonics Genius, YodelOh, BugBrainEd, and Lakeshore Apps. | | | |

| **Standard** | 8.1 Computer Science and Design Thinking | | |
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| **Topic** | Networks and the Internet | | |
| **Grade Level Bands** | **Core Idea** | **Indicator** | **Performance Expectations** |
| **3-5** | Information needs a physical or wireless path to travel to be sent and received. | 8.1.5.NI.1 | Develop models that successfully transmit and receive information using both wired and wireless methods. |
| Distinguishing between public and private information is important for safe and secure online interactions.  Information can be protected using various security measures (i.e., physical and digital). | 8.1.5.NI.2 | Describe physical and digital security measures for protecting sensitive personal information. |
| **Key Activities:**   * Students use Google suite of tools to engage in collaborative creation using photos, words, artistic expressions, etc. * With support, students can use digital resources to research information online. Students can copy and paste images to support their writing or publication of their own work. * With support, use digital apps to create live cartoons using Toontastic or SketchPad pages from a book and recording the reading of pages using WeVideo and Flip. * With guidance, students will utilize WeVideo and Flip to create school films (ie Cub’s Pride Video, NJSLA Pep Rally Music Video, Student Brain Breaks) * Students will help create KahootIt! Quizzes to be used interactively with other classes. * Students will use Bookflix and Epic for novel student, shared reading, and independent reading activities for home and school. | | | |

| **Standard** | 8.1 Computer Science and Design Thinking | | |
| --- | --- | --- | --- |
| **Topic** | Impacts of Computing | | |
| **Grade Level Bands** | **Core Idea** | **Indicator** | **Performance Expectations** |
| **3-5** | The development and modification of computing technology is driven by an individual's needs and wants and can affect individuals differently. | 8.1.5.IC.1 | Identify computing technologies that have impacted how individuals live and work and describe the factors that influenced the changes |
| 8.1.5.IC.2 | Identify possible ways to improve the accessibility and usability of computing technologies to address the diverse needs and wants of users. |
| **Key Activities:**   * Use Skype/Zoom/Google Meet to partner with classrooms and engage in discussion * Use collaborative and/or competitive interactive digital games for learning * Use online web resources (ie, KidsPost, DOGO News, CNN Student News, Scholastic News, CBC4Kids, National Geographic for Kids, Discovery Kids, NASA Kids Club, Time for Kids) to follow global trends and current events around the world. * Use Podcasts for kids (Radio WIllow Web, Wild Animal Chronicles, Children’s Fun Storytime, Poem of the Day, The Science Show for Kids, Bookwink) to follow current events and engage in literature discussions. | | | |

| **Standard** | 8.1 Computer Science and Design Thinking | | |
| --- | --- | --- | --- |
| **Topic** | Data & Analysis | | |
| **Grade Level Bands** | **Core Idea** | **Indicator** | **Performance Expectations** |
| **3-5** | Data can be organized, displayed, and presented to highlight relationships | 8.1.5.DA.1 | Collect, organize, and display data in order to highlight relationships or support a claim. |
| The type of data being stored affects the storage requirements | 8.1.5.DA.2 | Compare the amount of storage space required for different types of data. |
| Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data. | 8.1.5.DA.3 | Organize and present collected data visually to communicate insights gained from different views of the data |
| 8.1.5.DA.4 | Organize and present climate change data visually to highlight relationships or support a claim. |
| Many factors influence the accuracy of inferences and predictions. | 8.1.5.DA.5 | Propose cause and effect relationships, predict outcomes, or communicate ideas using data. |
| **Key Activities:**   * Incorporate lessons and various multimedia from BrainPop and Common Sense Education teaching primary and elementary students about proper “netiquette”. * Incorporate lessons and various multimedia from Brainpop Jr to teach students about technology tools and web safety. * Students will get a Copyright and Fair Use Introduction https://www.commonsensemedia.org/videos/copyright-and-fair-use-animation | | | |

| **Standard** | 8.1 Computer Science and Design Thinking | | |
| --- | --- | --- | --- |
| **Topic** | Algorithms & Programming | | |
| **Grade Level Bands** | **Core Idea** | **Indicator** | **Performance Expectations** |
| **3-5** | Different algorithms can achieve the same result.  Some algorithms are more appropriate for a specific use than others. | 8.1.5.AP.1 | Compare and refine multiple algorithms for the same task and determine which is the most appropriate |
| Programming languages provide variables, which are used to store and modify data | 8.1.5.AP.2 | Create programs that use clearly named variables to store and modify data. |
| A variety of control structures are used to change the flow of program execution (e.g., sequences, events, loops, conditionals). | 8.1.5.AP.3 | Create programs that include sequences, events, loops, and conditionals. |
|  | Programs can be broken down into smaller parts to facilitate their design, implementation, and review. Programs can also be created by incorporating smaller portions of programs that already exist. | 8.1.5.AP.4 | Break down problems into smaller, manageable sub-problems to facilitate program development. |
| 8.1.5.AP.5 | Modify, remix, or incorporate pieces of existing programs into one’s own work to add additional features or create a new program. |
| Individuals develop programs using an iterative process involving design, implementation, testing, and review | 8.1.5.AP.6 | Develop programs using an iterative process, implement the program design, and test the program to ensure it works as intended. |
| **Key Activities:**   * Students will use digital tools to conduct research related to content covered in instruction or personal inquiry. * Students will use digital media to serve as a model for appropriate school and academic behavior. * Students will use Code.org to create various programs based on appropriate levels and skill sets. | | | |

| **Standard** | 8.2 Design Thinking | | |
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| **Topic** | Engineering Design | | |
| **Grade Level Bands** | **Core Idea** | **Indicator** | **Performance Expectations** |
| 3-5 | Engineering design is a systematic and creative process of communicating and collaborating to meet a design challenge.  Often, several design solutions exist, each better in some way than the others. | 8.2.5.ED.1 | Explain the functions of a system and its subsystems. |
| 8.2.5.ED.2 | Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models. |
| 8.2.5.ED.3 | Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task. |
| Engineering design requirements include desired features and limitations that need to be considered. | 8.2.5.ED.4 | Explain factors that influence the development and function of products and systems (e.g., resources, criteria, desired features, constraints) |
| 8.2.5.ED.5 | Describe how specifications and limitations impact the engineering design process. |
| 8.2.5.ED.6 | Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process |
| **Key Activities:**   * Students will use Bloxels to create and design digital characters and pieces for a functioning game. * Students will use Tinkercad to create 3D object that can be printed using a 3D printer. * Students will use SketchPad and Canva to help create visual stories. | | | |

| **Standard** | 8.2 Design Thinking | | |
| --- | --- | --- | --- |
| **Topic** | Interaction of Technology and Humans | | |
| **Grade Level Bands** | **Core Idea** | **Indicator** | **Performance Expectations** |
| 3-5 | Societal needs and wants determine which new tools are developed to address real-world problems. | 8.2.5.ITH.1 | Explain how societal needs and wants influence the development and function of a product and a system |
| A new tool may have favorable or unfavorable results as well as both positive and negative effects on society.  Technology spurs new businesses and careers. | 8.2.5.ITH.2 | Evaluate how well a new tool has met its intended purpose and identify any shortcomings it might have |
| 8.2.5.ITH.3 | Analyze the effectiveness of a new product or system and identify the positive and/or negative consequences resulting from its use |
| 8.2.5.ITH.4 | Describe a technology/tool that has made the way people live easier or has led to a new business or career. |
| **Key Activities:**   * Students will use Strawbees to build a prototype of an invention that helps people. * Students will use Tinkercad to create the final version of their invention that helps people. * Students will use WeVideo to create a Shark Tank pitch for their invention. | | | |

| **Standard** | 8.2 Design Thinking | | |
| --- | --- | --- | --- |
| **Topic** | Nature of Technology | | |
| **Grade Level Bands** | **Core Idea** | **Indicator** | **Performance Expectations** |
| 3-5 | Technology innovation and improvement may be influenced by a variety of factors.  Engineers create and modify technologies to meet people’s needs and wants; scientists ask questions about the natural world. | 8.2.5.NT.1 | Troubleshoot a product that has stopped working and brainstorm ideas to correct the problem. |
| 8.2.5.NT.2 | Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries, and societies |
| 8.2.5.NT.3 | Redesign an existing product for a different purpose in a collaborative team. |
| 8.2.5.NT.4 | Identify how improvement in the understanding of materials science impacts technologies |
| **Key Activities:**   * Students will be able to use Code.org to debug a program to make it work the way it is intended. * Students will be able to discuss with their peers how to improve and debug their Bloxels video game after peers have played their game. * Discussion about the different accessibility features on the Chromebooks and how they are used to help individuals and why they were developed. | | | |

| **Standard** | 8.2 Design Thinking | | |
| --- | --- | --- | --- |
| **Topic** | Effects of Technology on the Natural World | | |
| **Grade Level Bands** | **Core Idea** | **Indicator** | **Performance Expectations** |
| 3-5 | The technology developed for the human designed world can have unintended consequences for the environment.  Technology must be continually developed and made more efficient to reduce the need for non-renewable resources. | 8.2.5.ETW.1 | Describe how resources such as material, energy, information, time, tools, people, and capital are used in products or systems |
| 8.2.5.ETW.2 | Describe ways that various technologies are used to reduce improper use of resources |
| 8.2.5.ETW.3 | Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved. |
| 8.2.5.ETW.4 | Explain the impact that resources, such as energy and materials used to develop technology, have on the environment |
| 8.2.5.ETW.5 | Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change. |
| **Key Activities:**   * Students will use BrainPop and Common Sense Education to learn about how to understand the negative effects of the internet and cyberbullying. * Students will be able to use PebbleGo and KidzSearch to research how technology has played a part in harming animals and the environment around them. * Incorporate Mystery Science lessons to teach students about different new technology resources and how they work and affect us. | | | |

| **Standard** | 8.2 Design Thinking | | |
| --- | --- | --- | --- |
| **Topic** | Ethics & Culture | | |
| **Grade Level Bands** | **Core Idea** | **Indicator** | **Performance Expectations** |
| 3-5 | Technological choices and opportunities vary due to factors such as differences in economic resources, location, and cultural values | 8.2.5.EC.1 | Analyze how technology has contributed to or reduced inequities in local and global communities and determine its short- and long-term effects |
| **Key Activities:**   * Discussion about what new technology they would want in their school to help them with their education. * Discussion about how online school would be different if all students did not have access to the same technology resources. | | | |