**Science Appendix E: Technology Standards**

**Grades K-2**

The Lindenwold Public Schools believe that technology in science 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 status as a Google Apps school gives all stakeholders regular and consistent opportunities to use Google tools as part of our instruction, assessment, collaboration, and documentation practices.

| **Standard** | 8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge |
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| **Strand** | A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations |
| **Grade Level bands** | **Content Statement Students will:** | **Indicator** | **Indicator** |
| **K-2** | Understand and use technology systems. | 8.1.2.A.1 | Identify the basic features of a digital device and explain its purpose |
| Select and use applications effectively | 8.1.2.A.2 | Create a document using a word processing application |
| 8.1.2.A.3 | Compare the common uses of at least two different digital applications and identify the advantages and disadvantages of using each. |
| 8.1.2.A.4 | Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums). |
| 8.1.2.A.5 | Enter information into a spreadsheet and sort the information |
| 8.1.2.A.6 | Identify the structure and components of a database. |
| 8.1.2.A.7 | Enter information into a database or spreadsheet and filter the information |
| **Key activities:*** Introduction to and use of computers/Chromebooks
* Introduction to and use of digital cameras and/or flipcams.
* 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 Waterford Institute
* 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 iMovie and Quicktime.
* Introduction to and use of search engines including Google, KidRex, and Kiddle.
* Organize information and data using Smartboard Tools or Smartexchange Notebook Resources.
* Introduction to and use of iPad or iPhone Apps such as Epic!, Story Kit, Toontastic, Phonics Genius, YodelOh, BugBrainEd, and Lakeshore Apps.
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| **Strand** | B. Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology. |
| **Grade Level bands** | **Content Statement Students will:** | **Indicator** | **Indicator** |
| **K-2** | Apply existing knowledge to generate new ideas, products, or processes. Create original works as a means of personal or group expression.Apply existing knowledge to generate new ideas, products, or processes. Create original works as a means of personal or group expression. | 8.1.P.B.1 | Create a story about a picture taken by the student on a digital camera or mobile device. |
| 8.1.2.B.1 | Collaborate to produce a digital story about a significant local event or issue based on first-person interviews. |
| 8.1.5.B.1 | Synthesize and publish information about a local or global issue or event (ex. telecollaborative project, blog, school web). |
| 8.1.8.B.1 | Apply previous content knowledge by creating and piloting a digital learning game or tutorial. |
| **Key Activities:*** Students use Google suite of tools to engage in collaborative creation using photos, words, artistic expressions, etc.
* Students use flipcams to capture photographs or videos
* With support, students can use flipcam images to create a story using Google Applications.
* 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 photographing pages from a book and recording the reading of pages using Story Kit.
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| **Strand** | C. Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. |
| **Grade Level bands** | **Content Statement Students will:** | **Indicator** | **Indicator** |
| **K-2** | Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media. Communicate information and ideas to multiple audiences using a variety of media and formats. Develop cultural understanding and global awareness by engaging with learners of other cultures. Contribute to project teams to produce original works or solve problems. | 8.1.P.C.1 | Collaborate with peers by participating in interactive digital games or activities |
| 8.1.2.C.1 | Engage in a variety of developmentally appropriate learning activities with students in other classes, schools, or countries using various media formats such as online collaborative tools, and social media |
| **Key Activities:*** Use Skype to partner with classrooms abroad 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.
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| **Strand** | D. Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. |
| **Grade Level bands** | **Content Statement Students will:** | **Indicator** | **Indicator** |
| **K-2** | Advocate and practice safe, legal, and responsible use of information and technology. | 8.1.2.D.1 | Develop an understanding of ownership of print and nonprint information |
| **Key Activities:*** Incorporate lessons and various multimedia from Netsmartz.org 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>
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| **Strand** | Strand E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information. |
| **Grade Level bands** | **Content Statement Students will:** | **Indicator** | **Indicator** |
| **K-2** | Plan strategies to guide inquiry Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. Evaluate and select information sources and digital tools based on the appropriateness for specific tasks. | 8.1.2.E.1 | Use digital tools and online resources to explore a problem or issue. |
| **Key Activities:*** Students will use digital tools to conduct research related to content covered in instruction or personal inquiry.
* Students will use flipcams or digital cameras to serve as a model for appropriate school and academic behavior.
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| **Strand** | F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. |
| **Grade Level bands** | **Content Statement Students will:** | **Indicator** | **Indicator** |
| **K-2** | Identify and define authentic problemsand significant questions for investigation. Plan and manage activities to develop a solution or complete a project. Collect and analyze data to identify solutions and/or make informed decisions. Use multiple processes and diverse perspectives to explore alternative solutions | 8.1.2.E.1 | Use geographic mapping tools to plan and solve problems. |
| **Key Activities*** Students use Google suite of tools (including maps) to guide thinking about problems and how to solve them
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| **Standard** | 8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment. |
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| **Strand** | A. The Nature of Technology: Creativity and Innovation Technology systems impact every aspect of the world in which we live. |
| **Grade Level bands** | **Content Statement Students will:** | **Indicator** | **Indicator** |
| **K-2** | The characteristics and scope of technology | 8.2.2.A.1 | Define products produced as a result of technology or of nature |
| 8.2.2.A.2 | Describe how designed products and systems are useful at school, home and work |
| The core concepts oftechnology. | 8.2.2.A.3 | Identify a system and the components that work together to accomplish its purpose. |
| 8.2.2.A.4 | Choose a product to make and plan the tools and materials needed. |
| The relationships among technologies and the connections between technology and other fields of study. | 8.2.2.A.5 | Collaborate to design a solution to a problem affecting the community. |
| **Key Activities*** Consider how design of human civilization affects the environment and vice versa
* Manipulatives in math lessons provide opportunity to design, plan, develop, and use

 objects for a purpose (understanding abstract math)* Understanding of local community and design of key features like parks, roads, etc.
* Administer project-based learning projects that is based around a driving question, a

 problem, or a product.  Use multimedia resources in order to answer the question, solve  the problem, or to create the product.  (Earth conservation, community responsibility,  etc).   |

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| **Strand** | B. Technology and Society: Knowledge and understanding of human, cultural and societal values are fundamental when designing technological systems and products in the global society. |
| **Grade Level bands** | **Content Statement Students will:** | **Indicator** | **Indicator** |
| **K-2** | The cultural, social, economic and political effects of technology. | 8.2.2.B.1 | Identify how technology impacts or improves life. |
| The effects of technology on the environment. | 8.2.2.B.2 | Demonstrate how reusing a product affects the local and global environment |
| The role of society in the development and use of technology. | 8.2.2.B.3 | Identify products or systems that are designed to meet human needs. |
| 8.2.2.B.4 | Identify how the ways people live and work has changed because of technology. |
| Key Activities:* Lessons on human impact on environment
* Lessons on importance of recycling and sustainability
* Considerations of limitations of technology in its use to achieve curricular aims (e.g., pros and cons of print materials vs. digital materials)
* Lessons on human impact on environment
* Lessons on importance of recycling and sustainability
* Students will familiarize themselves the exponential development of

 technology.  Students will become aware of the convenience of technology, as well as  become aware of good digital responsibility |

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| **Strand** | C. Design: The design process is a systematic approach to solving problems |
| **Grade Level bands** | **Content Statement Students will:** | **Indicator** | **Indicator** |
| **K-2** | The attributes of design. | 8.2.2.C.1 | Brainstorm ideas on how to solve a problem or build a product. |
| 8.2.2.C.2 | Create a drawing of a product or device that communicates its function to peers and discuss |
| 8.2.2.C.3 | Explain why we need to make new products |
| The application ofengineering design. | 8.2.2.C.4 | Identify designed products and brainstorm how to improve one used in the classroom |
| 8.2.2.C.5 | Describe how the parts of a common toy or tool interact and work as part of a system. |
| The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving. | 8.2.2.C.6 | Investigate a product that has stopped working and brainstorm ideas to correct the problem. |
| Key Activities:* Lessons on how consumer culture shapes our lives
* Discussion on physical limitations of technological equipment
* Administer project-based learning projects that is based around a driving question, a problem, or a product.  Use multimedia resources in order to answer the question, solve the problem, or to create the product.  (Earth conservation, community responsibility, creating team-building games, etc).
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| **Strand** | D. Abilities for a Technological World: The designed world is the product of a design process that provides the means to convert resources into products and systems. |
| **Grade Level bands** | **Content Statement Students will:** | **Indicator** | **Indicator** |
| **K-2** | Apply the design process. | 8.2.2.D.1 | Collaborate and apply a design process to solve a simple problem from everydayexperiences.  |
| Use and maintaintechnological products andsystems.  | 8.2.2.D.2 | Discover how a product works by taking it apart, sketching how parts fit, and putting itback together.  |
| 8.2.2.D.3 | Identify the strengths and weaknesses in a product or system.  |
| 8.2.2.D.4 | Identify the resources needed to create technological products or systems |
| Assess the impact of products and systems. | 8.2.2.D.5 | Identify how using a tool (such as a bucket or wagon) aids in reducing work. |
| Key Activities:* Lessons on how consumer culture shapes our lives
* Discussion on physical limitations of technological equipment
* Administer project-based learning projects that is based around a driving question, a

 problem, or a product.  Use multimedia resources in order to answer the question, solve  the problem, or to create the product.  (Earth conservation, community responsibility,  creating team-building games, etc).  |

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| **Strand** | E. Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge. |
| **Grade Level bands** | **Content Statement Students will:** | **Indicator** | **Indicator** |
| **K-2** | Computational thinking and computer programming as tools used in design and engineering. | 8.2.2.E.1 | List and demonstrate the steps to an everyday task. |
| 8.2.2.E.2 | Demonstrate an understanding of how a computer takes input through a series of written commands and then interprets and displays information as output. |
| 8.2.2.E.3 | Create algorithms (a sets of instructions) using a pre-defined set of commands (e.g., to move a student or a character through a maze). |
| 8.2.2.E.4 | Debug an algorithm (i.e., correct an error). |
| 8.2.2.E.5 | Use appropriate terms in conversation (e.g., basic vocabulary words: input, output, the operating system, debug, and algorithm). |
| **Key Activities*** Lessons on vocabulary for technical conversation
* Protocols for guiding student self-directedness with classroom procedures and

 academic critical thinking* Lessons on vocabulary for technical conversation
* Online Mystery Science resources-- introducing logging in and accessing materials
* Protocols for guiding student self-directedness with classroom procedures and

 academic critical thinking |