**Science 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 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** |
| **3-5** | Understand and use technology systems. | 8.1.5.A.1 | Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems |
| Select and use applications effectively | 8.1.5.A.2 | Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures. |
| 8.1.5.A.3 | Use a graphic organizer to organize information about problem or issue. |
| 8.1.5.A.4 | Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data. |
| 8.1.5.A.5 | Create and use a database to answer basic questions |
| 8.1.5.A.6 | Export data from a database into a spreadsheet; analyze and produce a report that explains the analysis of the data. |
| **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 and Successmaker.
* 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.
* 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.
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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** |
| **3-5** | 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. |
| 8.1.5.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.
* Students will help create KahootIt! Quizzes to be used interactively with other classes.
* Students will use Edu Blog for novel student, shared reading, and independent reading activities for home and school.
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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** |
| **3-5** | 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 |
| 8.1.5.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 |
| 8.1.5.C.1 | Engage in online discussions with learners of other cultures to investigate a worldwide issue from multiple perspectives and sources, evaluate findings and present possible solutions, using digital tools and online resources for all steps. |
| 8.1.8.C.1 | Collaborate to develop and publish work that provides perspectives on a global problem for discussions with learners from other countries. |
| **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,, 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** |
| **3-5** | Advocate and practice safe, legal, and responsible use of information and technology. | 8.1.5.D.1 | Develop an understanding of ownership of print and nonprint information |
| 8.1.5.D.2 | Analyze the resource citations in online materials for proper use. |
| Demonstrate personal responsibility for lifelong learning. | 8.1.5.D.3 | Demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media. |
| Exhibit leadership for digital citizenship. | 8.1.5.D.4 | Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media. |
| **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** |
| **3-5** | 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. | 8.1.5.E.1 | Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks. |
| **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** |
| **3-5** | 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. | 8.1.5.E.1 | Apply digital tools to collect, organize, and analyze data that support a scientific finding. |
| **Key Activities*** Students use Google suite of tools to guide thinking about problems and how to solve them
* Lessons on the scientific process and use of digital tools to facilitate the collection, organization, analysis, and sharing of data and findings
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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** |
| **3-5** | The characteristics and scope of technology | 8.2.5.A.1 | Compare and contrast how products made in nature differ from products that are human made in how they are produced and used. |
| 8.2.5.A.2 | Investigate and present factors that influence the development and function of a product and a system. |
| The core concepts oftechnology. | 8.2.5.A.3 | 3 Investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints. |
| 8.2.5.A.4 | Compare and contrast how technologies have changed over time due to human needs and economic, political and/or cultural influences |
| The relationships among technologies and the connections between technology and other fields of study. | 8.2.5.A.5 | Identify how improvement in the understanding of materials science impactstechnologies.  |
| **Key Activities*** 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).
* Use manipulatives in math lessons provide opportunity to design, plan, develop, and use objects for a purpose (understanding abstract math)
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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** |
| **3-5** | The cultural, social, economic and political effects of technology. | 8.2.5.B.1 | Identify how technology impacts or improves life. |
| The effects of technology on the environment. | 8.2.5.B.2 | Demonstrate how reusing a product affects the local and global environment |
| 8.2.5.B.3 | Investigate ways that various technologies are being developed and used to reduce improper use of resources. |
| The role of society in the development and use of technology. | 8.2.5.B.4 | Research technologies that have changed due to society’s changing needs and wants |
| 8.2.5.B.5 | Explain the purpose of intellectual property law. |
| The influence of technologyon history. | 8.2.5.B.6 | 8.2.5.B.6 Compare and discuss how technologies have influenced history in the past century. |
| Key Activities:* 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** |
| **3-5** | The attributes of design. | 8.2.5.C.1 | Collaborate with peers to illustrate components of a designed system. |
| 8.2.5.C.2 | Explain how specifications and limitations can be used to direct a product’sdevelopment. |
| 8.2.5.C.3 | Research how design modifications have lead to new products |
| The application ofengineering design. | 8.2.5.C.4 | Collaborate and brainstorm with peers to solve a problem evaluating all solutions toprovide the best results with supporting sketches or models. |
| 8.2.5.C.5 | Explain the functions of a system and subsystems. |
| The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving. | 8.2.5.C.6 | Examine a malfunctioning tool and identify the process to troubleshoot and presentoptions to repair the tool.  |
| 8.2.5.C.7 | Work with peers to redesign an existing product for a different purpose. |
| **Key Activities*** 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** |
| **3-5** | Apply the design process. | 8.2.5.D.1 | Collaborate and apply a design process to solve a simple problem from everydayexperiences.  |
| Use and maintaintechnological products andsystems.  | 8.2.5.D.2 | Discover how a product works by taking it apart, sketching how parts fit, and putting itback together.  |
| 8.2.5.D.3 | Identify the strengths and weaknesses in a product or system.  |
| 8.2.5.D.4 | Identify the resources needed to create technological products or systems |
| Assess the impact of products and systems. | 8.2.5.D.5 | Identify how using a tool (such as a bucket or wagon) aids in reducing work. |
| Key Activities:* 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** |
| **3-5** | Computational thinking and computer programming as tools used in design and engineering. | 8.2.5.E.1 | Identify how computer programming impacts our everyday lives. |
| 8.2.5.E.2 | Demonstrate an understanding of how a computer takes input of data, processes andstores the data through a series of commands, and outputs information.  |
| 8.2.5.E.3 | Using a simple, visual programming language, create a program using loops, events and procedures to generate specific output |
| 8.2.5.E.4 | Debug an algorithm (i.e., correct an error). |
| 8.2.5.E.5 | Use appropriate terms in conversation (e.g., algorithm, program, debug, loop, events, procedures, memory, storage, processing, software, coding, procedure, and data). |
| **Key Activities*** Guided Math Lessons using Khan Academy, NJCTL, and Learn Zillion.
* Lessons on vocabulary for technical conversation
* Protocols for guiding student self-directedness with classroom procedures and academic critical thinking.
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* Non-fiction texts on role of computers and technology in society
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