

**Jamestown Public School District #1**

Technology Plan

2021-2023

The following information was presented and reviewed by the District Technology Committee. The areas requiring updates are presented in yellow throughout the plan. The committee will be looking at the new [North Dakota Computer Science and Cybersecurity Standards](https://www.nd.gov/dpi/uploads/87/2019ComputerScienceCybersecurity.pdf) guidelines for the following areas of technology for future updates:

1. Technology Systems
   1. Technology Systems Networks & Internet
   2. Technology Systems Hardware and Software
   3. Troubleshooting
2. Computational Thinking
   1. Problem Solving and Algorithms: Strategies for understanding and solving problems
   2. Data Creation and Analysis: Data can be collected, used and presented with computing devices or digital tools
   3. Development and Design: Design processes create new, useful, and imaginative solutions to solve problems
3. Information Literacy
   1. Access: Effective searches strategies can locate information for intellectual or creative pursuits
   2. Evaluate: Information sources can be evaluated for accuracy, currency, appropriateness, and purpose
   3. Create: It is important to both consume and produce information to be digitally literate
   4. Intellectual Property: Respect for the rights and obligations of using and sharing intellectual property
4. Computing in Society
   1. Impacts of Computing: Past, present, and possible future impact of technology on society
   2. Social Interactions: Technology facilitates collaboration with others
5. Digital Citizenship
   1. Responsible Use: Respect and dignity in virtual and physical communities
   2. Safety & Ethics: There are both positive and negative impacts in social and ethical behaviors for using technology

Digital Identity: Responsibilities and opportunities of living, learning and working in an interconnected digital world

Vision Statement

The vision of technology integration at Jamestown Public School is to empower students and educators by cultivating a technology-rich educational environment. Everyone has equal access to knowledge and lifelong ethical and social learning skills in order to be productive in an information driven, globally connected society.

Overview

This plan outlines the vision and integration of technology and standards for Kindergarten through Twelfth Grade at the Jamestown School District #1. This plan includes the North Dakota computer science and cybersecurity standards. It was developed with input from teachers, building facilitators, district employees, and community members.

**2021-2023 Planning Team Members**   
**Name Title Role**Rob Lech Superintendent Administration

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Wayne Leben School Psychologist Special Education Rep.

Jada Anderson Parent Parent Rep.

**Goals, Strategies, and Timelines**

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| **Goal #1:** Jamestown Public Schools create learning environments that include effective technology resources for educators and students. | | | | | | |
| **Rationale:** Access to technology resources is necessary to ensure that all students have the resources needed to gain 21st Century skills. The types of technology tools available and the performance capabilities of those tools should be at a level that supports and sustains current learning practices and encourages new and innovative learning practices. | | | | | | |
| Strategy | | | Measure | Timeline Status | | |
| 1.1 | The district provides the necessary infrastructure for Internet access for all students and staff. This includes file servers, Ethernet switches, routers, hubs, racks, wireless access points, patch panels and other hardware components to ensure Internet access. In addition, each school has data circuits (fiber optics and T1 lines) available to receive and transmit text, graphics, and audio to and from the Internet. E-mail services, virus protection, and Internet filtering (to meet the Child Internet Protection Act) are provided through [EduTech](http://www.edutech.nodak.edu/), which is funded by the North Dakota Information Technology Department.  Filtering decisions are made by the Technology Director in accordance with the state ITD Department. | | Servers and hardware are updated to keep pace with demand as funding allows.  The technology department works with the state ITD Department to maintain a safe Internet environment for all patrons of the district. | Filtering is monitored and ongoing | Current  December 2023 | |
| 1.2 | The district continues the development of websites for the district and individual schools. The websites include calendars and events, policies and procedures, links to teachers, and other topics as needs arise. The district supports personnel to maintain the website. | Website-the content management system is contracted through Campus Suite. All aspects of the website are designed to meet WCAG ADA compliance guidelines. District stakeholders and the community provide feedback on the website. | | The new website was launched in August of 2017. There is a continuous process of reviewing and developing compliant documents that meet WCAG ADA guidelines. | Current  December 2023 | |
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|  | Strategy | Measure | | Timeline | Status |
| 1.3 | The district makes COSI health and science related topics available to pertinent education classes. These are provided for a cost and must be arranged through the Technology Integrationist. | COSI presentations are most often held in the JHS Theater and arranged and managed through the Technology Department. | | COSI events are available online or through the Technology Department. | Current  December 2023 |
| 1.4 | The district maintains at least one computer lab per building, or more in the case of larger student populations, with a student to computer ratio of 2.5:1 (lower ratios in areas serving greater numbers of high-need students). Computers are replaced on a 5-year replacement cycle. The replaced machines from the labs are distributed to classrooms to increase the student to computer ratio.  Teacher machines are standardized in quality. | The computer labs in each building currently serve a 1:1 student to computer ratio. | | The district continues a 5-year rotation cycle for replacing computers and technology equipment. | Current  December 2023 |
| 1.5 | Maker Spaces are available in the High School, Middle School, and Roosevelt Elementary.  Makerspace Student Goals:   1. Use a wide range of idea creation techniques-such as brainstorming. 2. Create new and worthwhile ideas-both incremental and radical concepts. 3. Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts. 4. Develop, implement, and communicate new ideas to others effectively. 5. Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work. 6. Demonstrate originality and inventiveness in work and understand the real-world limits to adopting new ideas. 7. View failure as an opportunity to learn; understand that creativity and innovation are a long-term, cyclical process of small successes and frequent mistakes. 8. Implement innovations 9. Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur. | Maker Spaces provide students with the ability to explore STEAM (Science, Technology, Engineering, Arts, and Math) Technologies. They offer students a look into future career-based experiences and allow for the exploration of new ideas and how to carry them through to a final product. | | Maker Spaces will continue to be implemented in all school building in the district. | Ongoing December 2023 |

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|  | Strategy | | Measure | | Timeline | Status |
| 1.6 | The district provides technical support, so technology resources are reliable and available to educators and students.  Adequate training is available for all educators and school personnel.  Building facilitators serve as the first step in technical support issues. | | The technology department currently has 6 employees, with 3 of those assigned to hardware and software issues.  We will be communicating better with BF and staff and using surveys to find the needs for technology, software, and professional development  Once a need is identified it will be assigned to the group best suited to address the needs. | | The district provides technology support on a ratio of 744 workstations to one support person.  Building facilitators are hired for each building. | Current  December 2023 |
| 1.7 | The district provides the necessary infrastructure to permit communication between schools and parents via phone, email, Smartphone app, and the web sites. Social media has seen increased use as a communication method and to highlight success within the schools and for the district. | | Email services are provided through EduTech and are a suite of programs called Office 365.  The district App is used to send notifications and as a resource forms, menus, calendars, grade and contact information, district staff directory and sports related information.  The district website is used for communication of basic information such as calendars, menus, newsletters, linking with social media and news articles.  PowerSchool provides parents and students access to grades and other student information. | | Email service is maintained through EduTech.  Blackboard is updated daily, and information shared as needed.  The website is updated on a regular basis by the district webmaster.  PowerSchool logins and passwords are provided to parents. | Current  December 2023 |
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|  | | Strategy | | Measure | Timeline | Status |
| 1.7  Cont. | | An adequate number of telephone lines ensure school staff access to communication with parents and students.  Emergency contacts are made electronically using the district BlackBoard App and pushing notices through phone, text, e-mail, app, and social media.  Internal Emergency Notification System-4444 with immediate access to all positions of leadership in all buildings. | | Parents can pay school-related fees online.  Social Media accounts have been established for Jamestown Public School District, Jamestown High School, Jamestown Middle School, Lincoln, Louis L’Amour and Washington Elementary on Facebook. The district also has a Twitter account for the district and the Wellness Committee.  Telephone service is a VOIP service. Long distance telephone service is available to staff and administration.  Wireless telephone services and data services (cellular service) are available to selected staff to be used in case of emergencies and in conducting school-related business.  Emergency contact information is provided through BlackBoard.  Immediate Response Team with access to important information regarding the incident or emergency. 911 calls also monitored through this system. | Lunch and school fees can be paid using e~Funds  Social Media updated daily as events occur.  VOIP is maintained by technology department staff.  Implemented within the past couple of years. | Current  December 2023 |

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|  | Strategy | | Measure | Timeline | | Status |
| 1.8 | An inventory of software licenses is maintained, and upgrades and additional licenses are purchased as needed to maintain copyright compliance.  Microsoft 365 A3 is used to upgrade Microsoft components for the district. This includes all current components and additionally adds Minecraft.  Additional software for education and administrative needs is purchased as needed and is pre-approved through the technology department in coordination with the District Curriculum Director. | An inventory of software licenses and purchases is used to monitor copyright compliance. | | | The software inventory is maintained by the tech department. | Current  December 2023 |
| 1.9 | Needs are identified through joint efforts of teachers, James River Special Education Unit (JRSEU), and the technology department. | Technology is available to meet the educational needs of all students in the district. | | | Technology is purchased as needed based on the educational requirements of the students. | Current  December 2023 |
| 1.10 | Improved teaching and learning take place through the use of computers, projectors, document cameras, student computers, internet access for all machines, software to support learning, phones in every classroom, and other hardware needs demonstrated by the teacher. **We recommend that each classroom should have a SMART Board/projector/doc cam/computer package, an audio system, and at least 4 student devices determined by need and grade level.** | Sufficient technology is provided by the district. | | | Equipment is maintained and operable. | Current  December 2023 |

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| **Goal #2:** Jamestown Public Schools support educators in their use of appropriate technologies to improve their teaching and other professional practices. | | | | | | |
| **Rationale:** Teachers and administrators must possess skills that allow them to be innovators in technology-rich teaching, learning, and administrative environments. Through professional development, educators are proficient at aligning technology use with student learning standards and goals and integrating technology seamlessly into the curriculum. | | | | | | |
|  | Strategy | Measure | | Timeline | | Status |
| 2.1 | The district endorses the National Educational Technology Standards for [Teachers](http://www.iste.org/docs/pdfs/20-14_ISTE_Standards-T_PDF.pdf) and School [Administrators](http://www.iste.org/docs/pdfs/20-14_ISTE_Standards-A_PDF.pdf) (NETS) and the [ND Library and Technology Standards](http://www.dpi.state.nd.us/standard/content.shtm) and uses them in developing standards for teachers, students, and administrators. Technology standards are used as a guide for providing professional development opportunities in the district.  The [North Dakota Computer Science and Cybersecurity Standards](https://www.nd.gov/dpi/uploads/87/2019ComputerScienceCybersecurity.pdf) will be used as guidelines for the following areas of technology:   1. Technology Systems 2. Computational Thinking 3. Information Literacy 4. Computing in Society 5. Digital Citizenship | | District Technology Standards for Teachers and Students have been adopted and distributed through building-level meetings.  These Standards cover Kindergarten through Twelfth Grade. They were released in early 2019. | | District Technology Standards are reviewed annually and used to prepare professional development.  JPS will be looking at how the Standards can best be implemented into the District Technology Plan and present that during 2019-2020. | Current December 2023 and ongoing for Standards Implementation. |
| 2.2 | The district shares the definition for curriculum integration developed by the ND ETC and ND Department of Public Instruction (DPI), which encompasses curriculum design, teaching and learning strategies, new roles for educators and students, and assessments.  All educators complete a minimum of four integrated technology lessons with students annually (grades K-1 two lessons), one of which shows communication outside of the district. | | Through the Marzano Model of Instruction teachers and administrators are keenly aware of educational practices and technology use in the classroom. This is documented as part of the evaluation process in each building.  Technology is included in curriculum planning.  Integrated lessons are noted in lesson plans. | | Technology is included in curriculum planning for the district.  Documentation occurs through the observation process. Integrated lessons are visible in lesson plans. | Current  December 2023 |

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|  | Strategy | Measure | Timeline | | Status |
| 2.3 | The school improvement plan calls for increased analysis of data gathered by the district to be used in planning for the future.  ND SLDS stores data from multiple sources.  Training in the use of the data is available. Jamestown School District Instructional Coaches work closely with the classroom teachers. | Training sessions assist staff in data analysis of results obtained from, ND SLDS, NDSA, Renaissance Star, Fastbridge, Read 180, etc. | | Training sessions are now offered by SEEC, EduTech and/or district staff. | Current  December 2023 |

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| 2.4 | The district provides professional development for educators and administrators to assist them in developing technology skills and curriculum integration. The for the district holds technology trainings based on the results of the school improvement plan, district technology standards, and professional development plans.  Trainings occur on a scheduled basis. Individual technology assistance for teachers and classrooms is available by appointment.  EduTech classes and other professional development are available online through the [EduTech Training Console](http://www.edutech.nodak.edu/training/).  Teachers are encouraged to participate in trainings to increase needed technology skills.  Content software and appropriate software for communication, lesson and test preparation are available for teachers.  Video streaming resources (Discovery Education and Learn 360) are purchased and available for integration into content areas. YouTube is available. | Building facilitators are in place to assist teachers.  Administration includes technology proficiency as a part of the annual staff evaluation process through Marzano.  Software and video resources are available for teachers to use in the classroom. | Building facilitators are available in all buildings.  Professional development trainings occur on a scheduled basis; the schedule is available on the Outlook calendar.  Attendance at trainings is tracked and is available to administration.  Additional technology trainings are offered as needed. Video streaming services are available. | Current  December 2023 |

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| **Goal #3:** Jamestown Public Schools provides students with learning opportunities that are enhanced by technology. | | | | | | |
| **Rationale:** Technology in schools enhances and transforms teaching practices and student learning. It provides opportunities for educators to break through isolation and serves as a catalyst for significant changes in learning practices. | | | | | | |
|  | | Strategy | Measure | | Timeline | Status |
| 3.1 | Educators use the [ND Library and Technology Content Standards](https://www.nd.gov/dpi/uploads/87/lib_tech.pdf) as the guideline for determining student technology literacy in general. Early 2019 the [North Dakota Computer Science and Cybersecurity Standards](https://www.nd.gov/dpi/uploads/87/2019ComputerScienceCybersecurity.pdf) were adopted for Kindergarten through Twelfth Grade. These standards will be implemented into the Jamestown District Technology Plan beginning in 2019-2020. | | Eighth grade students attain a minimum competency in technology.  Standards are benchmarked K-12. | NAEP assessment of technology and engineering skills to real-life situations performed testing in 2018.  ND Standards written in the 2019-2020 plan. | | Ongoing December 2023 |
| 3.2 | Educators implement standards-based learning opportunities that use technology-enhanced instructional strategies to meet the learning styles/needs of students, including students with disabilities. Technology integrated lessons created by students K-4 will be shared with students and their parents in a timely manner through SeeSaw. In grade five students are introduced to their Office 365 account and will begin saving to the student’s OneDrive in 5-12.  Technology use is based on district technology standards for each grade level. | | Assistive technologies are available to help all students learn. Student created technology samples will be shared through SeeSaw in grades K-4. Beginning in grade five students will save their information in their student c-account or to their OneDrive. In grade six through graduation students will be using their OneDrive for files.  Standards are used to determine appropriate skills and learning needs at each grade level. | Assistive technologies are used as needed. All buildings subscribe to Discovery Education and Learn 360. Students save a minimum of one tech example for K-1, two for grades 2-~~4~~, and three projects in grades 5-12 annually. | | Current  December 2023 |
| 3.3 | Educators ensure that student/teacher use of technology is authentic, curriculum-based, collaborative, and/or communicative. Teachers will include four of their lessons that integrate technology (two lessons for K-1), of which at least one lesson requires students to use technology that involves communication outside of the district. | | Lessons using technology will be included in teacher lesson plans. Educator’s use of technology in their classroom will be evident through the Marzano Model of Evaluation. | Documentation is evident in the reviews performed the principal. | | Current  December 2023 |
| 3.4 | The district will use distance learning through ITV/IVN and other technologies to ensure that students graduate ready for work or post-secondary education. | | ITV/IVN classrooms are in place at JVCTC. A portable unit for IVN sessions is available for all buildings. | Equipment upgraded summer 2017. | | Current  December 2023 |
| 3.5 | Students use age-appropriate software and technology programs (Read 180, System 44, Microsoft Office, Vocabulary A to Z, etc.) to enhance traditional learning. | | Students use Read 180, System 44, Office, in addition to other software programs as needed. | Age-appropriate software is available for each building. | | Current  December 2023 |

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|  | | Strategy | Measure | Timeline | Status |
| 3.6 | Video streaming is available for use in all classrooms. | | Video streaming is available. | All buildings subscribe to Discovery Education and Learn 360. | Current  December 2023 |
| 3.7 | Develop and implement foundational courses for students, in which they learn technology skills that enable them to integrate the use of technology into other curricular areas. | | Necessary hardware and software are in place.  Courses are developed at all levels. | Courses are available. | Current  December 2023 |
| 3.8 | The district teaches Internet safety K-12. The implementation plan includes instruction by teachers, librarians, and counselors. Gr. 3-5 use https://beinternetawesome.withgoogle.com/en\_us/ | | An Internet safety curriculum is taught 3-5. | Internet safety curriculum is provided. | Current  December 2023 |
| 3.9 | Develop and implement a multimedia course for students, in which they learn to edit sound, movies, and animations, in order to integrate the completed products into other curricular areas. Necessary hardware and software will be in place. | | Gr 5 develops book trailers and publishes them within the library Kidblogs account.  In the Middle School students implement tools from their Office 365 accounts such as Sway, PowerPoint and Word.  Multimedia I and II have been implemented into the high school course offerings. | Gr 5 covers multimedia during second semester each year.  Multimedia I and II are available to high school students. | Current  December 2023 |
| 3.10 | Microsoft Office 365 and Microsoft Teams provides a tool for teachers to connect students to collaborate on content, to work in teams and to share ideas. Teams allows for excellent feedback opportunities in real time and to more closely monitor progress throughout a project. Tracking of digital content streamlines the process of evaluating and revising classroom topics.  Google Apps for Education are utilized on an as requested basis. | | Students in grades five through twelve have access to their @k12.nd.us accounts. The accounts include all the tools necessary to be productive in today’s society using and creating digital content. Students have access to a wide variety of Office 365 applications to work through their high school graduation and two years beyond graduation. One Drive for Business provides unlimited storage for each student. | Beginning in 2013 EduTech worked with Microsoft to provide the @k12.nd.us accounts to students and staff. They continue to open additional applications through the process. Microsoft Teams provides a total classroom experience for the learning environment. | Current  December 2023 |

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| **Goal #4:** Jamestown Public Schools use data systems that monitor student achievement and analyze student and school data in order to improve teaching and learning outcomes for all students, including those in all subgroups. | | | | | |
| **Rationale:** Data systems that are integrated into the daily operations of schools are used to assess, monitor, and analyze student achievement in order to differentiate instruction and improve teaching and learning outcomes for all students. | | | | | |
|  | | Strategy | Measures | Timeline | Status |
| 4.1 | The district implements a student information system to track achievement and allow the analysis necessary to differentiate instruction to better meet student learning needs.  ESGI is used to track and record progress for preschool through kindergarten students. | | PowerSchool is used to track student and class achievement. Parents and students have access to student grades online. | PowerSchool is upgraded as needed.  Parent and student logins and passwords are provided annually. | Current  December 2023 |
| 4.2 | Jamestown Public Schools uses a Multi-Tiered System of Support (MTSS) framework to provide appropriate instruction based on student abilities and needs. | | MTSS protocols and pathways assist teachers with identification of student needs. | MTSS protocols are in place in each building. | Current  December 2023 |
| 4.3 | Web-based Electronic Individual Education Plans (IEP’s) are used throughout North Dakota. | | Web-based electronic IEP's are used. | IEP’s are maintained on TIENET. | Current  December 2023 |
| 4.4 | The district implements data warehouses to enable data analysis at the building and classroom levels.  Renaissance and FastBridge assessment data are used to analyze reading and math skills in all schools.  In-program assessment progress monitoring tools are used for math and reading interventions across the district.  The Student Information Management Systems Coordinator (SIMS) is responsible for data systems. | | Data warehouses are used for analyzing data from NDSA, Renaissance Star, and FastBridge.  Data is used by teachers when working with students.  The SIMS Coordinator maintains data systems. | Trainings on the use of data warehouses are held as needed.  Progress monitoring occurs on a regular and scheduled basis.  The SIMS Coordinator maintains data systems. | Current  December 2023 |
| 4.5 | Jamestown uses Renaissance Star testing to assess student achievement.  Teachers have access to reports for individual students and classrooms. | | Renaissance Star is used the district in grades 9-12  Fast Bridge K-8 | Benchmark testing is done all winter and spring. | Current  December 2023 |
| 4.6 | The district school improvement plan calls for increased analysis of data gathered by the district to be used in the monitoring and analyzing of student achievement and to drive instruction.  Jamestown School District Instructional Coaches work closely with the teachers to provide support in evaluating data and implementing strategies in the classroom for continuing success. | | Data is reviewed and used in planning instruction in the classroom.  Instructional Coaches meet with elementary classroom teachers throughout the year both in grade level teams and individually to provide support and address concerns or challenges. | Jamestown administrators and teachers will use curriculum-based assessments and ND SLDS.  Time is allocated for data review and planning. | Current  December 2023 |

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| **Goal #5:** Jamestown Public Schools assesses the use of the technology resources implemented in the district. | | | | | | | |
| **Rationale:** Assessment is necessary to ensure that technology is used effectively and creates new opportunities for learning and promoting student achievement. | | | | | | | |
|  | | Strategy | | Measure | | Timeline | Status |
| 5.1 | The use of technology in instructional strategies is assessed by building administration. | | Through the Marzano Model of Instruction teachers and administrators are keenly aware of educational practices and technology use in the classroom. This is documented as part of the evaluation process in each building~~.~~ Technology use is also measured as part of our AdvancEd student review and engagement piece. | | Marzano evaluation tools will demonstrate instructional growth through the evaluation process based on the tier each instructor is being evaluated on. | | Current  December 2023 |
| 5.2 | District technology standards for teachers and students and the district Acceptable Use Policy (AUP) are reviewed to keep pace with changes in technology.  Staff sign each policy update, and students or parent/guardians review and sign annually. | | The District Technology Committee reviews the tech standards and AUP yearly. | | The AUP will continue to be reviewed and evaluated. | | Current  December 2023 |
| 5.3 | The district technology plan is reviewed and updated annually. Status of the goals is noted in the plan. | | The district technology plan is reviewed and updated annually by the District Technology Committee. | | Annual review completed by spring of each year. | | Current  December 2023 |

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| **Goal #6:** Jamestown Public Schools provides a safe and secure learning environment to meet our district goal of “Learning For All”. | | | | | | | |
| **Rationale:** Driven by events in schools across the nation providing a secure learning environment to where students feel safe is essential to today’s society. | | | | | | | |
|  | | Strategy | | Measure | | Timeline | Status |
| 6.1 | The use of security cameras to provide real-time views of buildings-both inside and out shall be provided throughout the district. | | Cameras and monitoring software will be strategically placed in all Jamestown Public Schools and student participation areas. Monitoring software currently in use is Avigilon. | | Cameras are in all buildings as described. Upgrades to cameras in the high school were completed fall 2017. Middle school and some elementary schools are scheduled for this summer 2018. Continued replacement in the elementary buildings will follow. | | Current with upgrades scheduled. |
| 6.2 | The classroom where our students spend much of their day is their learning zone. Classroom security cameras could provide an added measure of safety. These could be set for activation in the event of a security situations. | | Cameras and activation switches would be placed strategically in classrooms throughout the district. | | Classroom cameras currently in use in the high school. Placement by principal request. | | Continue to be available upon request. |
| 6.3 | District digital and electronic data is crucial to the operations of any district. To secure these files backup occurs for all district servers.  An added measure is for the technology department to also provide off-site backup to ensure that all data is safe and accessible. | | The District Technology Department will setup and monitor an off-site backup in the form of a second Nimble Unit. | | Backup occurs on a regular scheduled basis on-site.  Off-site backup is scheduled to be setup within the next budget cycle. | | Future planning in the district. |
| 6.4 | To maintain the integrity of files, systems, networks and Jamestown Public School District resources it is crucial to have a plan for securing these systems and devices with anti-virus and anti-spyware. | | The district technology department scans every machine each summer to bring them current and to eliminate any problems. Software is installed to maintain the integrity of the systems. A state firewall is in place through EduTech. | | Annual review done each summer. | | Current  December 2023 |
| 6.5 | Password protocol is important to maintain a secure system where all district logins are kept at the securest level possible. | | The district has set a password protocol to maintain the security of the system. | | Protocol is reviewed by key stakeholders yearly.  Technology staff put in place password change required by staff when computers are turned in for summer updates and at the start of 2nd semester. | | Current  December 2023 |

# Computer Science and Cybersecurity Content Standards Development Process

## The development of the Computer Science and Cybersecurity Content Standards for North Dakota was a multi-phase process. State Superintendent of Public Instruction Kirsten Baesler established a statewide committee through an application process that included teachers, administrators, and higher education faculty. Over three multi-day sessions, the committee developed a new set of standards. The committee began by reviewing state and national standards. Drawing from the information gained from those documents, the committee drafted the initial North Dakota Computer Science and Cybersecurity Content Standards. Input from two rounds of public comments; one review by a content standard review committee representing business interests, parents, and the public; and a review by content experts was used to inform the development of the new standards.

# Inclusion of Cybersecurity Standards

## Cybersecurity is engrained throughout the North Dakota Computer Science and Cybersecurity Standards. Cybersecurity is defined as a set of techniques used to protect the integrity of networks, programs, and data from attack, damage, or unauthorized access. Specifically, the standards that are seen throughout the Computer Science and Cybersecurity Standards fall into the CIA triad model of cybersecurity. The CIA triad is a set of guiding principles for learning, understanding, implementing, and policy making for cybersecurity. The cybersecurity standards were written with the CIA triad in

## mind. Cybersecurity standards are noted in the standards document with a CYSEC indicator.

## The goal of the cybersecurity standards is to ensure that all North Dakota graduates are educated in the foundational principles of cybersecurity. By educating students in cybersecurity, we will develop citizens of North Dakota that are prepared to live in an increasingly digital and technology-driven society.

## Image result for cia triad cyber securitySome goals of the standards will ensure that students:

## Use the Internet safely

## Are good digital citizens

## Use basic safety and security concepts

## Secure and protect their digital identity

## Protect their digital data and technology using best practices

## Have awareness of potential threats around them

## Recognize attacks that are happening

## React appropriately to an attack/breach

## Develop systems and processes with security in mind

## Understand the role cybersecurity plays in the workplace

## CIA is defined as:

## **Confidentiality**- Ensuring that data is accessible only to its intended parties. Data should not be accessed or read without authorization.

## **Integrity**- Data should not be modified or compromised in any way. It assumes that data remains in its intended state and can only be edited by authorized parties.

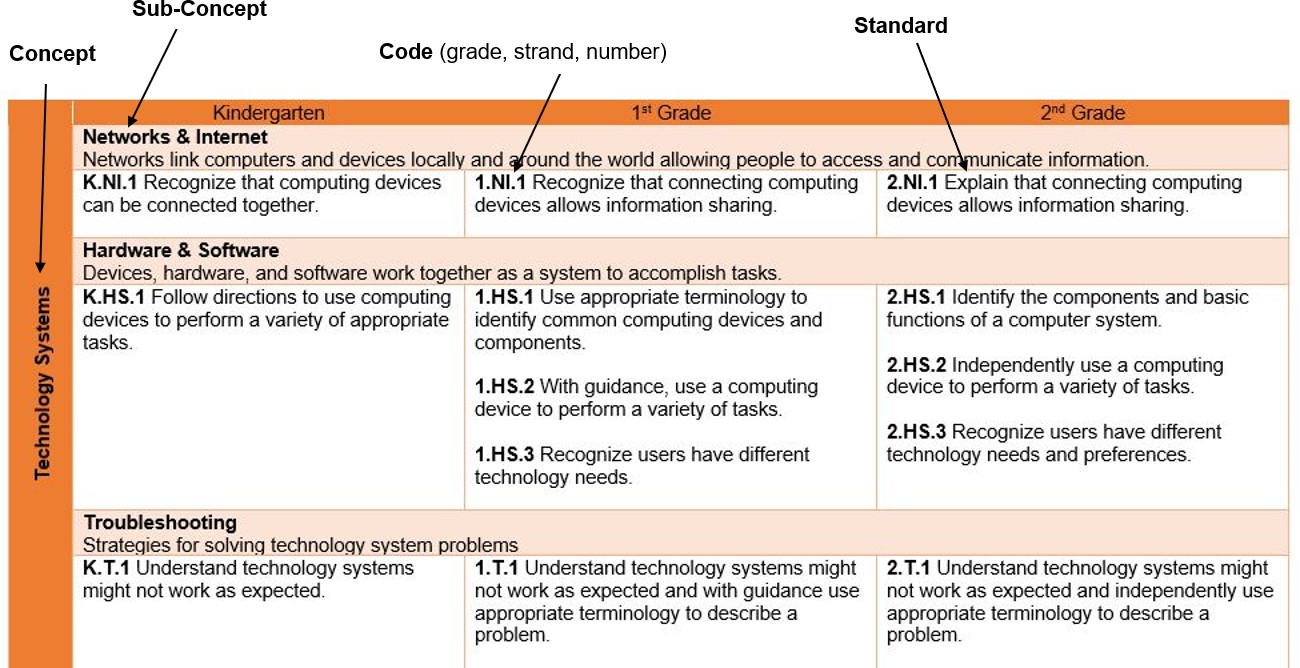
## **Availability**- Keep data and resources available for authorized use, especially during emergencies or disasters. Systems need to be available for use and free from errors and conflicts.

# Standards’ Intentions of Use

## The application of these standards will provide a consistent and shared responsibility for student growth and achievement across curriculum.

# How to Read This Document

## The standards are comprised of five main sections: K-2, 3-5, 6-8, 9-12 general, and 9-12 extension. These standards are developed with the understanding that the first four sections are for all K-12 students. The extension standards are for select specialized classes in high school. The overarching topics across all levels are Technology Systems, Computational Thinking, Information Literacy, Computing in Society, and Digital Citizenship.



## Individual grade-specific standards can be identified by their grade, strand, and number, so that 3.HS.1, for example, stands for grade 3, Hardware & Software, standard 1.

## In reading this document, the terms ‘continued growth’ and ‘with guidance’ are used.

## **Continued growth** indicates a repeating standard that will advance based on the complexity of the examples and problems students encounter as they move through the grades; the prior grade level standard needs continued attention.

## **With guidance** indicates students may work with the whole class, be prompted by an adult, work with one or more peers, or with other supports as needed.

# Kindergarten-Second Grade

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| **Technology Systems** | **Kindergarten** | **1st Grade** | **2nd Grade** |
| **Networks & Internet**  Networks link computers and devices locally and around the world allowing people to access and communicate information. | | |
| **K.NI.1** Recognize that computing devices can be connected together. | **1.NI.1** Recognize that connecting computing devices allows information sharing. | **2.NI.1** Explain that connecting computing devices allows information sharing. |
| **Hardware & Software**  Devices, hardware, and software work together as a system to accomplish tasks. | | |
| **K.HS.1** Follow directions to use computing devices to perform a variety of appropriate tasks. | **1.HS.1** Use appropriate terminology to identify common computing devices and components.  **1.HS.2** With guidance, use a computing device to perform a variety of tasks.  **1.HS.3** Recognize users have different technology needs. | **2.HS.1** Identify the components and basic functions of a computer system.  **2.HS.2** Independently use a computing device to perform a variety of tasks.  **2.HS.3** Recognize users have different technology needs and preferences. |
| **Troubleshooting**  Strategies for solving technology system problems. | | |
| **K.T.1** Understand technology systems might not work as expected. | **1.T.1** Understand technology systems might not work as expected and with guidance, use appropriate terminology to describe a problem. | **2.T.1** Understand technology systems might not work as expected and independently use appropriate terminology to describe a problem. |
| **Computational Thinking** | **Kindergarten** | **1st Grade** | **2nd Grade** |
| **Problem Solving & Algorithms**  Strategies for understanding and solving problems. | | |
| **K.PSA.1** With guidance, determine if a program works.  **K.PSA.2** Use trial and error in attempt to solve a problem. | **1.PSA.1** Solve a problem through trial and error using given materials/resources.  **1.PSA.2** Follow a set of instructions (algorithms) in order to complete a task.  **1.PSA.3** Define debug. | **2.PSA.1** Use problem solving steps: understanding the task, considering various strategies, isolate and debug.  **2.PSA.2** Break a task into smaller steps to identify patterns or solve the problem.  **2.PSA.3** Define algorithms. |

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| **Computational Thinking** |  | **1.PSA.4** Identify and practice debugging strategies including 'Go back to when it worked’. |  |
| **Data Creation & Analysis**  Data can be collected, used, and presented with computing devices or digital tools. | | |
| **K.DCA.1** With guidance, draw conclusions and make predictions based on picture graphs or patterns with or without a computing device. | **1.DCA.1** With guidance, identify and interpret data from a chart or graph in order to make a prediction with or without a computing device. | **2.DCA.1** With guidance, construct and interpret data and present it in a chart or graph in order to make a prediction with or without a computing device. |
| **Development & Design**  Design processes to create new, useful, and imaginative solutions to problems. | | |
| **K.DD.1** With guidance, create programs to follow a sequence. | **1.DD.1** With guidance, create programs to accomplish tasks that includes sequencing or looping. | **2.DD.1** Independently or collaboratively create programs to accomplish tasks that include sequencing or looping. |
| **Information Literacy** | **Kindergarten** | **1st Grade** | **2nd Grade** |
| **Access**  Effective search strategies can locate information for intellectual or creative pursuits. | | |
| **K.A.1** With guidance, use a keyword search with a teacher selected online resource. | **1.A.1** Use a keyword search with a teacher- selected online resource. | **2.A.1** Continued growth. |
| **Evaluate**  Information sources can be evaluated for accuracy, currency, appropriateness, and purpose. | | |
| **K.E.1** Name various information sources. | **1.E.1** With guidance, evaluate information for research purposes. | **2.E.1** With guidance, determine whether the purpose of content is to inform or to influence actions. |
| **Create**  It is important to both consume and produce information to be digitally literate. | | |
| **K.C.1** With guidance, create a digital product. | **1.C.1** Independently or with guidance, create a digital product. | **2.C.1** Independently or collaboratively, create a digital product. |

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| **Information Literacy** | **Intellectual Property**  Respect for the rights and obligations of using and sharing intellectual property. | | |
| **K.IP.1** Discuss that creative works have owners (copyright).  **K.IP.2** Understand that credit should be given to the creator of creative work. | **1.IP.1** Understand that creative works have owners.  **1.IP.2** With guidance, give credit to the creator of a creative work. | **2.IP.1** Understand that students own their creative works.  **2.IP.2** Continued growth |
| **Computing in Society** | Kindergarten | 1st Grade | 2nd Grade |
| **Impacts of Computing**  Past, present, and possible future impact of technology on society. | | |
| **K.IC.1** List different ways in which technologies are used in daily life. | **1.IC.1** Identify how technologies are used in and out of school. | **2.IC.1** Identify how technologies are used in the workforce. |
| **Social Interactions**  Technology facilitates collaboration with others. | | |
| **K.SI.1** With guidance, use technology to share thinking with teachers or adults. | **1.SI.1** With guidance, use technology to share thinking with peers. | **2.SI.1** With guidance, use technology to communicate with others outside of the classroom. |
| **Digital Citizenship** | Kindergarten | 1st Grade | 2nd Grade |
| **Safety & Ethics**  There are both positive and negative impacts in social and ethical behaviors for using technology. | | |
| **K.SE.1** With guidance, use technology in safe and correct ways. (CYSEC)  **K.SE.2** With guidance, use authentication methods to access technology. (CYSEC) | **1.SE.1** Identify how to use technology in safe and correct ways. (CYSEC)  **1.SE.2** Understand the differences between a username and authentication methods and independently use them to access technology. (CYSEC) | **2.SE.1** Explain how to use technology in safe and correct ways. (CYSEC)  **2.SE.2** Identify strategies for protecting authentication methods. (CYSEC)  **2.SE.3** Recognize the risks of interacting online with others. (CYSEC) |
| **Responsible Use**  Respect and dignity in virtual communities. | | |
| **K.RU.1** Discuss positive and negative behaviors when using electronic communication. (CYSEC) | **1.RU.1** Identify positive and negative behaviors when using electronic communication. (CYSEC) | **2.RU.1** Explain positive and negative behaviors when using electronic communication. (CYSEC) |

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| **Digital Citizenship** | **K.RU.2** With guidance, identify appropriate manners while participating in an online community.  **K.RU.4** Comply with Acceptable Use Policies. | **1.RU.2** Discuss reporting inappropriate electronic content. (CYSEC)  **1.RU.4** Comply with Acceptable Use Policies. | **2.RU.2** Know and identify how to report concerns regarding online content and behaviors. (CYSEC)  **2.RU.3** Develop a code of conduct, explain, and practice appropriate behavior and responsibilities while participating in an online community.  **2.RU.4** Comply with Acceptable Use Policies. |
| **Digital Identity**  Responsibilities and opportunities of living, learning and working in an interconnected digital world. | | |
| No standards at this level. | **1.DI.1** Recognize that you have a digital identity. | **2.DI.1** Define digital identity. |

# Third-Fifth Grade

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| **Technology Systems** | 3rd Grade | 4th Grade | 5th Grade |
| **Networks & Internet**  Networks link computers and devices locally and around the world allowing people to access and communicate information. | | |
| **3.NI.1** Recognize that information is sent and received over physical or wireless paths. | **4.NI.1** Recognize that computing devices can be connected in a variety of ways to share information. | **5.NI.1** Understand that information is sent and received across physical or wireless paths. |
| **Hardware & Software**  Devices, hardware, and software work together as a system to accomplish tasks. | | |
| **3.HS.1** Identify the components and the basic functions of a computer system including peripherals and external storage features.  **3.HS.2** Independently use a computing device to perform a variety of tasks.  **3.HS.3** Recognize users have different technology needs and preferences. | **4.HS.1** Explain the difference between hardware and software.  **4.HS.2** Continued growth.  **4.HS.3** Continued growth. | **5.HS.1** Compare and contrast physical and virtual systems.  **5.HS.2** Continued growth.  **5.HS.3** Continued growth. |
| **Troubleshooting**  Strategies for solving technology system problems. | | |
| **3.T.1** With guidance, apply basic troubleshooting strategies. | **4.T.1** Continued growth. | **5.T.1** Continued growth. |
| **Computational Thinking** | 3rd Grade | 4th Grade | 5th Grade |
| **Problem Solving & Algorithms**  Strategies for understanding and solving problems. | | |
| **3.PSA.1** Solve a task by breaking it into smaller pieces.  **3.PSA.2** Debug a program that includes sequencing. | **4.PSA.1** Decompose (break down) a large task into smaller, manageable subtasks.  **4.PSA.2** Debug a program that includes sequencing or loops.  **4.PSA.3** Identify multiple solutions to a task. | **5.PSA.1** Create a sequence of instructions from a previous decomposed task.  **5.PSA.2** Debug a program that includes sequencing, loops, or conditionals.  **5.PSA.3** Work collaboratively to explore multiple solutions to a task. |

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| **Computational Thinking** | **Data Creation & Analysis**  Data can be collected, used, and presented with computing devices or digital tools. | | |
| **3.DCA.1** Collect and organize data in various visual formats. | **4.DCA.1** Organize and present collected data visually to highlight comparisons. | **5.DCA.1** Organize and present collected  data to highlight comparisons and support a claim. |
| **Development & Design**  Design processes to create new, useful, and imaginative solutions to problems. | | |
| **3.DD.1** Independently or collaboratively create programs that use sequencing and looping.  **3.DD.2** Convert an algorithm into code. | **4.DD.1** Independently and collaboratively create programs that use sequencing, loops, and conditionals. | **5.DD.1** Continued growth.  **5.DD.2** Create solutions to problems using a design method. |
| **Information Literacy** | 3rd Grade | 4th Grade | 5th Grade |
| **Access**  Effective search strategies can locate information for intellectual or creative pursuits. | | |
| **3.A.1** Use basic search strategies with teacher-selected online sources. | **4.A.1** Use multiple teacher-selected online resources to locate information. | **5.A.1** Refine your keyword search to improve your results. |
| **Evaluate**  Information sources can be evaluated for accuracy, currency, appropriateness, and purpose. | | |
| **3.E.1** With guidance, compare and contrast resources based on content and the author’s purpose. | **4.E.1** With guidance, use a strategy to evaluate information for research purposes. | **5.E.1** Continued growth. |
| **Create**  It is important to both consume and produce information to be digitally literate. | | |
| **3.C.1** Independently or collaboratively, create a digital product. | **4.C.1** Continued growth. | **5.C.1** Independently or collaboratively, create a digital product using two or more tools. |
| **Intellectual Property**  Respect for the rights and obligations of using and sharing intellectual property. | | |
| **3.IP.1** Define copyright.  **3.IP.2** With guidance, identify the elements of a citation.  **3.IP.3** Explain piracy and plagiarism. | **4.IP.1** Demonstrate an understanding of copyright and fair use.  **4.IP.2** With guidance, create a citation.  **4.IP.3** With guidance, use strategies to avoid piracy and plagiarism. | **5.IP.1** With guidance, demonstrate an understanding of ethical issues in copyright and fair use.  **5.IP.2** Continued growth.  **5.IP.3** Continued growth. |

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| **Computing in Society** | 3rd Grade | 4th Grade | 5th Grade |
| **Impacts of Computing**  Past, present, and possible future impact of technology on society. | | |
| **3.IC.1** Identify technologies that have changed the world. | **4.IC.1** Give examples of technologies that influence society today. | **5.IC.1** Explain how technologies can change the future. |
| **Social Interactions**  Technology facilitates collaboration with others. | | |
| **3.SI.1** Recognize that there are various collaborative technologies.  **3.SI.2** With guidance, use collaborative technology to seek out diverse perspectives. | **4.SI.1** With guidance, use collaborative technology to interpret diverse perspectives. | **5.SI.1** With guidance, use collaborative technology to compare and contrast diverse perspectives. |
| **Digital Citizenship** | 3rd Grade | 4th Grade | 5th Grade |
| **Safety & Ethics**  There are both positive and negative impacts in social and ethical behaviors for using technology. | | |
| **3.SE.1** Identify problems that relate to inappropriate use of computing devices and networks. (CYSEC)  **3.SE.2** Keep authentication methods confidential and be proactive if they are compromised. (CYSEC)  **3.SE.3** Recognize that data-collection technology can be used to track navigation online. (CYSEC)  **3.SE.4** Identify the difference between public and private information. (CYSEC) | **4.SE.1** Identify and explain issues related to responsible use of technology and information and describe personal consequences of inappropriate use. (CYSEC)  **4.SE.2** Create secure authentication to insure privacy. (CYSEC)  **4.SE.3** Continued growth**.**  **4.SE.4** Recognize when it is safe to share private information online. (CYSEC) | **5.SE.1** Recognize that there are real-world cybersecurity problems (i.e., Hacking) when interacting online. (CYSEC)  **5.SE.2** Continued growth.  **5.SE.3** Continued growth.  **5.SE.4** Apply strategies to keep your private information safe online. (CYSEC) |
| **Responsible Use**  Respect and dignity in virtual communities. | | |
| **3.RU.1** Identify and discuss positive and negative uses of technology and information and their impact. | **4.RU.1** Discuss basic issues related to the appropriate use of technology and information, and the consequences of  inappropriate use. | **5.RU.1** Demonstrate an understanding of the appropriate use of technology and information and the consequences of  inappropriate use. |

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| **Digital Citizenship** | **3.RU.2** Recognize similarities and differences between in-person bullying and cyberbullying.  **3.RU.3** Develop a code of conduct, explain, and practice appropriate behavior and responsibilities while participating in an online community.  **3.RU.4** Comply with Acceptable Use Policies. | **4.RU.2** Identify strategies for dealing responsibly with cyberbullying and reporting inappropriate behavior.  **4.RU.3** Continued growth.  **4.RU.4** Comply with Acceptable Use Policies. | **5.RU.2** Use strategies that prevent and deal responsibly with cyberbullying and inappropriate behavior.  **5.RU.3** Continued growth.  **5.RU.4** Comply with Acceptable Use Policies. |
| **Digital Identity**  Responsibilities and opportunities of living, learning and working in an interconnected digital world. | | |
| **3.DI.1** Recognize the permanence of their actions in the digital world. | **4.DI.1** Explain the importance of your digital identity. | **5.DI.1** Continued growth. |

# Sixth-Eighth Grade

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| **Technology Systems** | 6th Grade | 7th Grade | 8th Grade |
| **Networks & Internet**  Networks link computers and devices locally and around the world allowing people to access and communicate information. | | |
| **6.NI.1** Explain how data is sent across networks. | **7.NI.1** Model how data is sent from one computer to another across networks. | **8.NI.1** Investigate how data is sent from one computer to another across networks. |
| **Hardware & Software**  Devices, hardware, and software work together as a system to accomplish tasks. | | |
| **6.HS.1** Use hardware and/or software to complete a task.  **6.HS.2** Use software features to accomplish a goal.  **6.HS.3** Organize, store, and retrieve digital information with guidance.  **6.HS.4** Identify threats to technology systems. (CYSEC)  **6.HS.5** Identify security measures to protect technology systems. (CYSEC) | **7.HS.1** Compare and contrast hardware and/or software options to complete a task.  **7.HS.2** Continued growth.  **7.HS.3** Organize, store, and retrieve digital information with minimal guidance.  **7.HS.4** Describe threats to technology systems. (CYSEC)  **7.HS.5** Explain how security measures protect technology systems. (CYSEC) | **8.HS.1** Choose appropriate device/hardware/software to complete a task.  **8.HS.2** Continued growth.  **8.HS.3** Organize, store, and retrieve digital information efficiently.  **8.HS.4** Describe ways to protect against threats to technology systems. (CYSEC)  **8.HS.5** Compare, and contrast security measures used to protect technology systems. (CYSEC) |
| **Troubleshooting**  Strategies for solving technology system problems. | | |
| **6.T.1** Apply basic troubleshooting strategies. | **7.T.1** Continued growth. | **8.T.1** Continued growth. |
| **Computational Thinking** | 6th Grade | 7th Grade | 8th Grade |
| **Problem Solving & Algorithms**  Strategies for understanding and solving problems. | | |
| **6.PSA.1** Identify and test an algorithm to solve a problem.  **6.PSA.2** Debug a program that includes sequencing, loops, or conditionals. | **7.PSA.1** Modify and test an algorithm to solve a problem.  **7.PSA.2** Continued growth. | **8.PSA.1** Create and test an algorithm to solve a problem across disciplines.  **8.PSA.2** Continued growth. |

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| **Computational Thinking** | **6.PSA.3** Compare and contrast the efficiencies of multiple solutions to a task. |  |  |
| **Data Creation & Analysis**  Data can be collected, used, and presented with computing devices or digital tools. | | |
| **6.DCA.1** Collect and analyze data to support a claim. | **7.DCA.1** Represent data, in more than one way, to defend your claim. | **8.DCA.1** Represent data from multiple sources in order to defend or refute a claim. |
| **Development & Design**  Design processes to create new, useful, and imaginative solutions to solve problems. | | |
| **6.DD.1** Use programs that utilize combinations of loops, conditionals, and the manipulation of variables representing different data types. | **7.DD.1** Modify programs that utilize combinations of loops, conditionals, and the manipulation of variables representing different data types. | **8.DD.1** Create programs that utilize combinations of loops, conditionals, and the manipulation of variables representing different data types. |
| **Information Literacy** | 6th Grade | 7th Grade | 8th Grade |
| **Access**  Effective search strategies can locate information for intellectual or creative pursuits. | | |
| **6.A.1** Use a variety of strategies to refine and revise search results. | **7.A.1** Continued growth. | **8.A.1** Use advanced search strategies to locate information online. |
| Information sources can be evaluated for accuracy, currency, appropriateness, and purpose. | | |
| **6.E.1** Evaluate information and its sources. | **7.E.1** Independently, evaluate information and its sources using student selected processes and strategies. | **8.E.1** Continued growth. |
| **Create**  It is important to both consume and produce information to be digitally literate. | | |
| **6.C.1** Repurpose or remix original works following fair use guidelines. | **7.C.1** Continued growth. | **8.C.1** Continued growth. |
| **Intellectual Property**  Respect for the rights and obligations of using and sharing intellectual property. | | |
| **6.IP.1** With guidance, properly use copyrighted works, works in the creative commons, and works in the public domain. | **7.IP.1** With minimal guidance, properly use copyrighted works, works in the creative commons, and works in the public domain. | **8.IP.1** Properly use copyrighted works, works in the creative commons, and works in the public domain. |

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| **Information Literacy** | **6.IP.2** Cite a variety of sources using the appropriate format.  **6.IP.3** Describe negative consequences of piracy and plagiarism. | **7.IP.2** Continued growth.  **7.IP.3** Identify strategies to avoid personal works and the works of others from being pirated and plagiarized. (CYSEC) | **8.IP.2** Continued growth.  **8.IP.3** Debate the risks and benefits of sharing personal works online (CYSEC) |
| **Computing in Society** | 6th Grade | 7th Grade | 8th Grade |
| **Impacts of Computing**  Past, present, and possible future impact of technology on society. | | |
| **6.IC.1** Identify the positive and negative impacts of past, present, and future technology, including bias and accessibility. | **7.IC.1** Compare and contrast the impacts of technology, including bias and accessibility. | **8.IC.1** Explore and create solutions for the negative impacts of technology, including bias and accessibility. |
| **Social Interactions**  Technology facilitates collaboration with others. | | |
| **6.SI.1** Use collaborative technology.  **6.SI.2** Identify how social interactions can impact a person’s self-image. | **7.SI.1** Use collaborative technology to gather and share information.  **7.SI.2** Continued growth. | **8.SI.1** Use collaborative technology to communicate information to a specific audience.  **8.SI.2** Continued growth. |
| **Digital Citizenship** | 6th Grade | 7th Grade | 8th Grade |
| **Safety & Ethics**  There are both positive and negative impacts in social and ethical behaviors for using technology. | | |
| **6.SE.1** Identify steps for responding to uncomfortable situations when interacting online. (CYSEC)  **6.SE.2** Identify basic methods to maintain digital privacy and security. (CYSEC)  **6.SE.3** Recognize that data-collection technology can be used to track navigation online. (CYSEC)  **6.SE.4** Identify threats to personal cybersecurity. (CYSEC) | **7.SE.1** Continued growth.  **7.SE.2** Identify a variety of methods to maintain digital privacy and security. (CYSEC)  **7.SE.3** Continued growth.  7.SE.4 Describe how to respond to threats to personal cybersecurity. (CYSEC) | **8.SE.1** Continued growth.  **8.SE.2** Identify advanced methods to maintain digital privacy and security. (CYSEC)  **8.SE.3** Continued growth.  **8.SE.4** Discuss the consequences of identity theft. (CYSEC) |

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| **Digital Citizenship** | **Responsible Use**  Respect and dignity in virtual and physical communities. | | |
| **6.RU.1** Identify different forms of cyberbullying.  **6.RU.2** Identify strategies to stop cyberbullying.  **6.RU.3** Use appropriate digital etiquette in a variety of situations.  **6.RU.4** Understand the purpose of and comply with Acceptable Use Policies. | **7.RU.1** Describe different forms of cyberbullying and the effects on all parties involved.  **7.RU.2** Identify strategies to prevent and stop cyberbullying.  **7.RU.3** Continued growth.  **7.RU.4** Understand the purpose of and comply with Acceptable Use Policies. | **8.RU.1** Continued growth.  **8.RU.2** Identify strategies to prevent and stop cyberbullying.  **8.RU.3** Continued growth.  **8.RU.4** Understand the purpose of and comply with Acceptable Use Policies. |
| **Digital Identity**  The responsibilities and opportunities that come with living, learning, and working in an interconnected digital world. | | |
| **6.DI.1** Describe personal online usage and determine how it affects identity on- and offline. | **7.DI.1** Evaluate how digital identity can impact a person now and in the future. | **8.DI.1** Continued growth. |

# Ninth-Twelfth Grade

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| **Technology Systems** | 9th Grade | 10th Grade | 11th Grade | 12th Grade |
| **Networks & Internet**  Networks link computers and devices locally and around the world allowing people to access and communicate information | | | |
| **9.NI.1** Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology).  **9.NI.2** Understand the implications of accessing publicly available Internet connections. (CYSEC) | **10.NI.1** Identify and define different network connection types (e.g., Wi-Fi, mobile data, ethernet).  **10.NI.2** Identify networkable devices. | **11.NI.1** Compare and contrast different network connection types (e.g., Wi-Fi, mobile data, ethernet).  **11.NI.2** Understand the global impact of networkable devices. | **12.NI.1** Choose an appropriate network connection given a scenario or situation.  **12.NI.2** Compare and contrast the benefits and security risks of networkable devices. |
| **Hardware & Software**  Devices, hardware, and software work together as a system to accomplish tasks. | | | |
| **9.HS.1** Compare and contrast appropriate device/hardware/software to complete a task.  **9.HS.2** Define software and security patches/update. (CYSEC)  **9.HS.3** Explain why a backup is necessary. (CYSEC) | **10.HS.1** Continued growth.  **10.HS.2** Recognize the importance of and effectively perform software and security patches/updates. (CYSEC)  **10.HS.3** Identify important data or systems that need redundancy. (CYSEC) | **11.HS.1** Continued growth.  **11.HS.2** Identify and choose hardware and software to help protect a system. (CYSEC)  **11.HS.3** Identify different options for redundancy (e.g., cloud storage, external, duplicate devices). (CYSEC) | **12.HS.1** Continued growth.  **12.HS.2** Continued growth.  **12.HS.3** Implement redundancy. (CYSEC) |
| **Troubleshooting**  Strategies for solving technology system problems. | | | |
| **9.T.1** Describe basic hardware and software problems using appropriate and accurate terminology. | **10.T.1** Follow appropriate guidelines that convey systematic troubleshooting techniques to identify and fix errors. | **11.T.1** Continued growth. | **12.T.1** Implement systematic troubleshooting strategies to identify and fix errors. |

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| **Computational Thinking** | 9th Grade | 10th Grade | 11th Grade | 12th Grade |
| **Problem Solving & Algorithms**  Strategies for understanding and solving problems | | | |
| **9.PSA.1** Identify, recognize, and use an algorithm to solve a complex problem across disciplines. | **10.PSA.1** Create and test an algorithm to solve a complex problem across disciplines. | **11.PSA.1** Demonstrate ways a given algorithm applies to problems across disciplines and explain the benefits and drawbacks of choices made. | **12.PSA.1** Use and adapt common algorithms to solve computational problems. |
| **Data Creation & Analysis**  Data can be collected, used, and presented with computing devices or digital tools. | | | |
| **9.DCA.1** Collect and analyze complex data. | **10.DCA.1** Represent complex data in more than one way to support a claim. | **11.DCA.1** Represent complex data in multiple ways to defend a student-generated claim. | **12.DCA.1** Represent complex data using interactive data visualizations or computational models. |
| **Information Literacy** | 9th Grade | 10th Grade | 11th Grade | 12th Grade |
| **Access**  Effective searches strategies can locate information for intellectual or creative pursuits. | | | |
| **9.A.1** Plan and employ effective research strategies to locate information. | **10.A.1** Curate relevant information from digital resources using a variety of tools and methods. | **11.A.1** Devise new search strategies based on information gaps and new understanding. | **12.A.1** Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions. |
| **Evaluate**  Information sources can be evaluated for accuracy, currency, appropriateness, and purpose. | | | |
| **9.E.1** Evaluate the accuracy, perspective, credibility, and relevance of information, media, data, or other resources. | **10.E.1** Gather accurate, credible, and relevant sources of information, media, data, or other resources showing different perspectives. | **11.E.1** Use accurate, credible, and relevant sources of information, media, data, or other resources showing different perspectives. | **12.E.1** Explain source selection based on accuracy, perspective, credibility, and relevance of information, media, data, or other resources. |

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| **Information Literacy** | **Create**  It is important to both consume and produce information to be digitally literate. | | | |
| **9.C.1** Create original works or responsibly repurpose or remix digital resources into new creations to communicate an idea. | **10.C.1** Choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication. | **11.C.1** Publish or present content that customizes the message and medium for their intended audiences to communicate their idea. | **12.C.1** Exhibit perseverance, a tolerance for ambiguity, and the capacity to work with open- ended problems in the design and creation process. |
| **Intellectual Property**  Respect for the rights and obligations of using and sharing intellectual property. | | | |
| **9.IP.1** Properly use copyrighted works, works in the creative commons, and works in the public domain.  **9.IP.2** Cite sources in a standard format to ethically reference the intellectual property of others.  **9.IP.3** Engage in positive, safe, legal and ethical behavior when using technology. | **10.IP.1** Demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.  **10.IP.2** Continued growth.  **10.IP.3** Continued growth. | **11.IP.1** Explain the beneficial and harmful effects that intellectual property laws can have on innovation, creativity, and collaboration.  **11.IP.2** Continued growth.  **11.IP.3** Evaluate the social and economic implications of piracy and plagiarism in the context of safety, law, or ethics. | **12.IP.1** Debate laws and regulations that impact the development and use of software.  **12.IP.2** Continued growth.  **12.IP.3** Continued growth. |
| **Computing in Society** | 9th Grade | 10th Grade | 11th Grade | 12th Grade |
| **Impacts of Computing**  Past, present, and possible future impact of technology on society. | | | |
| **9.IC.1** Evaluate how technology has impacted the workforce positively and negatively. | **10.IC.1** Evaluate the social, personal, and economic implications technology has on society and the economy. | **11.IC.1** Explain how computing may change cultural aspects of society. | **12.IC.1** Predict how computing may impact the workplace and personal lives. |
| **Social Interactions**  Technology facilitates collaboration with others. | | | |
| **9.SI.1** Identify how technology has affected our means of communication. | **10.SI.1** Evaluate the impacts of technology on social interactions. | **11.SI.1** Investigate ways to maximize the benefits and minimize the harmful effects technology can have on society. | **12.SI.1** Evaluate the impact of equity, bias, access, and influence on the availability of computing resources in a global society. |

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| **Digital Citizenship** | 9th Grade | 10th Grade | 11th Grade | 12th Grade |
| **Safety & Ethics**  There are both positive and negative impacts in social and ethical behaviors for using technology. | | | |
| **9.SE.1** Recognize the effects sharing information online can have on others' privacy. (CYSEC)  **9.SE.2** Know how to modify account settings to protect privacy and security. (CYSEC)  **9.SE.3** Recognize that data- collection technology can be used to track navigation online. (CYSEC)  **9.SE.4** Describe ways to prevent identity theft. (CYSEC) | **10.SE.1** Implement best practices to secure personal information. (CYSEC)  **10.SE.2** Recognize the importance of monitoring your private data. (CYSEC)  **10.SE.3** Manage personal data to maintain digital privacy and security and are aware of data- collection technology used to track online behaviors. (CYSEC)  **10.SE.4** Identify if their private data has been altered and can react appropriately. (CYSEC) | **11.SE.1** Understand encryption and how it is used to protect data. (CYSEC)  **11.SE.2** Explain the privacy concerns related to the collection and generation of data through automated processes. (CYSEC)  **11.SE.3** Continued Growth  **11.SE.4** Develop a plan to recover from an incident that was tied to unauthorized access. (CYSEC) | **12.SE.1** Continued growth.  **12.SE.2** Illustrate how sensitive data can be affected by malware and other attacks. (CYSEC)  **12.SE.3** Continued growth.  **12.SE.4** Continued growth. |
| **Responsible Use**  Respect and dignity in virtual and physical communities. | |  | |
| **9.RU.1** Apply cyberbullying prevention strategies.  **9.RU.2** Apply safe and ethical behaviors to personal electronic communication and interaction. (CYSEC)  **9.RU.3** Continued growth.  **9.RU.4** Understand the purpose of and comply with Acceptable Use Policies. | **10.RU.1** Continued growth. **10.RU.2** Continued growth. **10.RU.3** Continued growth.  **10.RU.4** Understand the purpose of and comply with Acceptable Use Policies. | **11.RU.1** Continued growth. **11.RU.2** Continued growth. **11.RU.3** Continued growth.  **11.RU.4** Understand the purpose of and comply with Acceptable Use Policies. | **12.RU.1** Continued growth. **12.RU.2** Continued growth. **12.RU.3** Continued growth.  **12.RU.4** Understand the purpose of and comply with Acceptable Use Policies. |

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| **Digital Citizenship** | **Digital Identity**  The responsibilities and opportunities that come with living, learning, and working in an interconnected digital world. | | | |
| **9.DI.1** Manage a digital identity and be aware of the permanence of actions in the digital world. (CYSEC) | **10.DI.1** Continued growth. | **11.DI.1** Continued growth. | **12.DI.1** Continued growth. |

**CYSEC** - North Dakota Cybersecurity standard

# CS Extension Standards (9-12)

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| **Technology Systems** | **9-12** |
| **Network & Internet** |
| **ES.NI.1** Examine the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing.  **ES.NI.2** Explain how the characteristics of the Internet influence the systems developed on it.  **ES.NI.3** Develop solutions to security threats. (CYSEC)  **ES.NI.4** Give examples to illustrate how sensitive data can be affected by malware and other attacks. (CYSEC)  **ES.NI.5** Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology).  **ES.NI.6** Compare ways software developers protect devices and information from unauthorized access. (CYSEC) |
| **Hardware & Software** |
| **ES.HS.1** Categorize and describe the different functions of operating system software.  **ES.HS.2** Categorize the roles of operating system software.  **ES.HS.3** Demonstrate familiarity and knowledge of the programming environment. |
| **Troubleshooting** |
| **ES.T.1** Continued growth. |
| **Computational Thinking** | **9-12** |
| **Algorithms & Programming** |
| **ES.AP.1** Design algorithms to solve computational problems using a combination of original and existing algorithms.  **ES.AP.2** Implement searching and sorting algorithms to solve computational problems.  **ES.AP.3** Evaluate algorithms in terms of their efficiency. |

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| **Computational Thinking** | **ES.AP.4** Evaluate key qualities of a program through a process, such as code review, program tracing, and/or critical data testing.  **ES.AP.5** Demonstrate knowledge of the different types of programming errors.  **ES.AP.6** Identify and correct different types of programming errors using a systematic approach. |
| **Variables** |
| **ES.V.1** Use data structures to represent information.  **ES.V.2** Compare and contrast fundamental data structures and their uses. |
| **Control Structures** |
| **ES.CS.1** Design computational artifacts using single and multi-way conditional statements.  **ES.CS.2** Design computational artifacts using pretest and/or posttest repetitions.  **ES.CS.3** Design computational artifacts using fixed and/or variable length repetitions.  **ES.CS.4** Iteratively design and develop computational artifacts for practical intent, personal expression, or to address a societal issue.  **ES.CS.5** Justify the selection of specific control structures by identifying tradeoffs associated with implementation, readability, and performance.  **ES.CS.6** Demonstrate the flow of execution of a recursive algorithm. |
| **Modularity** |
| **ES.M.1** Analyze a large-scale computational problem and identify generalizable patterns or problem components that can be applied to a solution.  **ES.M.2** Decompose problems into smaller subproblems through systematic analysis.  **ES.M.3** Construct solutions to problems using student-created components, such as procedures, modules, and/or objects.  **ES.M.4** Demonstrate code reuse by creating programming solutions using libraries or APIs. |

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| **Computational Thinking** | **Program Development** |
| **ES.PD.1** Iteratively evaluate and refine a computational artifact to enhance its performance, reliability, usability, and/or accessibility.  **ES.PD.2** Document decisions made during the design process using text, graphics, presentations, and/or demonstrations in the development of complex programs.  **ES.PD.3** Develop and use a series of test cases to verify that a program performs according to its design specifications.  **ES.PD.4** Modify an existing program to add additional functionality and discuss intended and unintended implications.  **ES.PD.5** Explain security issues that might lead to compromised computer programs.  **ES.PD.6** Internally document coding structures. |
| **Information Literacy** | **9-12** |
| **Access**  Conduct basic searches to gather information from teacher provided digital sources. |
| **ES.A.1** Continued growth. |
| **Evaluate**  Evaluate information sources based on purpose.  Recognize when the purpose of content is to inform or to influence actions. |
| **ES.E.1** Continued growth. |
| **Create**  Products are used to share information with others. |
| **ES.C.1** Evaluate the ability of models and simulations to test and support hypotheses. |
| **Computing in Society** | **9-12** |
| **Impacts of Computing**  The past, present, and possible future impact of technology on society. People use many types of technologies in their daily work and personal lives. |
| **ES.IC.1** Continued growth. |

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| **Computing in Society** | **Social Interactions**  Communication with peers, teachers, and others using technology. |
| **ES.SI.1** Continued growth. |
| **Digital Citizenship** | **9-12** |
| **Safety, Law, and Ethics**  Positive and negative social and ethical behaviors for using technology. |
| **ES.SLE.1** Evaluate computational artifacts to maximize their beneficial effects and minimize harmful effects on society. |
| **Responsible Use**  Safe and ethical behaviors in the digital world. |
| **ES.RU.1** Continued growth. |
| **Privacy**  Personal privacy concepts. |
| **ES.P.1** Continued growth. |

# K-12 Progression Chart

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| **Technology Systems** | | |
| **Technology Systems Networks & Internet** | **Technology Systems Hardware and Software** | **Troubleshooting** |
| **K.NI.1** Recognize that computing devices can be connected. | **K.HS.1** Follow directions to use computing devices to perform a variety of appropriate  tasks. | **K.T.1** Understand technology systems might not work as expected. |
| **1.NI.1** Recognize that connecting computing devices allows information sharing. | **1.HS.1** Use appropriate terminology to identify common computing devices and components.  **1.HS.2** With guidance, use a computing device to perform a variety of tasks.  **1.HS.3** Recognize users have different technology needs. | **1.T.1** Understand technology systems might not work as expected and with guidance use appropriate terminology to describe a problem. |
| **2.NI.1** Explain that connecting computing devices allows information sharing. | **2.HS.1** Identify the components and the basic functions of a computer system.  **2.HS.2** Independently use a computing device to perform a variety of tasks.  **2.HS.3** Recognize users have different technology needs and preferences. | **2.T.1** Understand technology systems might not work as expected and independently use appropriate terminology to describe a problem. |
| **3.NI.1** Recognize that information is sent and received over physical or wireless paths. | **3.HS.1** Identify the components and the basic functions of a computer system including peripherals and external storage features.  **3.HS.2** Continued growth.  **3.HS.3 Continued growth.** | **3.T.1** With guidance, apply basic troubleshooting strategies. |
| **4.NI.1** Recognize that computing devices can be connected in a variety of ways to share information. | **4.HS.1** Explain the difference between hardware and software.  **4.HS.2 Continued growth. 4.HS.3 Continued Growth** | **4.T.1** Continued growth. |

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| **Technology Systems** | | |
| **Technology Systems Networks & Internet** | **Technology Systems Hardware and Software** | **Troubleshooting** |
| **5.NI.1** Understand that computing devices can be connected in a variety of ways to share information. | **5.HS.1** Compare and contrast physical and virtual systems.  **5.HS.2** Continued growth.  **5.HS.3** Continued growth. | **5.T.1** Continued growth. **.** |
| **6.NI.1** Explain how data is sent across networks. | **6.HS.1** Use hardware and/or software to complete a task.  **6.HS.2** Use software features to accomplish a goal.  **6.HS.3** Organize, store, and retrieve digital information with guidance  **6.HS.4** Identify threats to technology systems. (CYSEC)  **6.HS.5** Identify security measures to protect technology systems. (CYSEC) | **6.T.1** Apply basic troubleshooting strategies. |
| **7.NI.1** Model how data is sent from one computer to another across networks. | **7.HS.1** Compare and contrast hardware and/or software options to complete a task.  **7.HS.2** Continued growth.  **7.HS.3** Organize, store, and retrieve digital information with minimal guidance.  **7.HS.4** Describe threats to technology systems. (CYSEC)  **7.HS.5** Explain how security measures protect technology systems. (CYSEC) | **7.T.1** Continued growth. |
| **8.NI.1** Investigate how data is sent from one computer to another across networks. | **8.HS.1** Choose appropriate hardware and/or software to complete a task. | **8.T.1** Continued growth. |

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| **Technology Systems** | | |
| **Technology Systems Networks & Internet** | **Technology Systems Hardware and Software** | **Troubleshooting** |
|  | **8.HS.2** Continued growth.  **8.HS.3** Organize, store, and retrieve digital information efficiently.  **8.HS.4** Describe ways to protect against threats to technology systems. (CYSEC)  **8.HS.5** Compare and contrast security  measures used to protect technology systems. (CYSEC) |  |
| **9.NI.1** Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology).  **9.NI.2** Understand the implications of accessing publicly available Internet connections. (CYSEC) | **9.HS.1** Compare and contrast appropriate device/hardware/software to complete a task.  **9.HS.2** Define software and security patches/updates. (CYSEC)  **9.HS.3** Explain why a backup is necessary. (CYSEC) | **9.T.1** Describe basic hardware and software problems using appropriate and accurate terminology. |
| **10.NI.1** Identify and define different network connection types (e.g., Wi-Fi, mobile data, ethernet).  **10.NI.2** Identify networkable devices. | **10.HS.1** Continued Growth  **10.HS.2** Recognize the importance of and effectively perform software and security patches/updates. (CYSEC)  **10.HS.3** Identify important data or systems that need redundancy. (CYSEC) | **10.T.1** Follow appropriate guidelines that convey systematic troubleshooting techniques to identify and fix errors. |
| **11.NI.1** Compare and contrast different network connection types (e.g., Wi-Fi, mobile data, ethernet).  **11.NI.2** Understand the global impact of networkable devices. | **11.HS.1** Continued growth.  **11.HS.2** Identify and choose hardware and software to help protect a system. (CYSEC) | **11.T.1** Continued growth. |

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| **Technology Systems** | | |
| **Technology Systems Networks & Internet** | **Technology Systems Hardware and Software** | **Troubleshooting** |
|  | **11.HS.3** Identify different options for redundancy (e.g., cloud storage, external,  duplicate devices). (CYSEC) |  |
| **12.NI.1** Choose an appropriate network connection given a scenario or situation.  **12.NI.2** Compare and contrast the benefits and security risks of networkable devices. | **12.HS.1** Continued growth.  **12.HS.2** Continued growth.  **12.HS.3** Implement redundancy. (CYSEC) | **12.T.1** Implement systematic troubleshooting strategies to identify and fix errors. |
| **ES.NI.1** Examine the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing.  **ES.NI.2** Explain how the characteristics of the Internet influence the systems developed on it.  **ES.NI.3** Develop solutions to security threats. (CYSEC)  **ES.NI.4** Give examples to illustrate how sensitive data can be affected by malware and other attacks. (CYSEC)  **ES.NI.5** Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology).  **ES.NI.6** Compare ways software developers protect devices and information from  unauthorized access. (CYSEC) | **ES.HS.1** Categorize and describe the different functions of operating system software.  **ES.HS.2** Categorize the roles of operating system software.  **ES.HS.3** Demonstrate familiarity and knowledge of the programming environment. | **ES.T.1** Continued growth. |

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| **Computational Thinking** | | |
| **Problem Solving and Algorithms: Strategies for understanding and solving problems** | **Data Creation & Analysis: Data can be collected, used, and presented with computing devices or digital tools** | **Development and Design: Design processes create new, useful, and imaginative solutions to solve problems** |
| **K.PSA.1** With guidance, determine if a program works | **K.PSA.2** Use trial and error in attempt to solve a problem.  **K.DA.1** With guidance, draw conclusions and  make predictions based on picture graphs or patterns, with or without a computing device. | **K.DD.1** With guidance, create programs to follow a sequence. |
| **1.PSA.1** Solve a problem through trial and error using given materials/resources.  **1.PSA.2** Follow a set of instructions (Algorithms) in order to complete a task.  **1.PSA.3** Define debug  **1.PSA.4** Identify and practice debugging  strategies including 'Go back to when it worked' | **1.DA.1** With guidance, identify and interpret data from a chart or graph in order to make a prediction, with or without a computing device. | **1.DD.1** With guidance, create programs to accomplish tasks that includes sequencing or looping. |
| **2.PSA.1** Use problem solving steps: understanding the task, considering various strategies, isolate and debug  **2.PSA.2** Break a task into smaller steps to identify patterns or solve the problem.  **2.PSA.3** Define Algorithms | **2.DA.1** With guidance, construct and interpret data and present it in a chart or graph in order to make a prediction, with or without a computing device. | **2.DD.1** Independently or collaboratively create programs to accomplish tasks that include sequencing or looping. |
| **3.PSA.1** Solve a task by breaking it into smaller pieces.  **3.PSA.2** Debug a program that includes sequencing. | **3.DA.1** Collect and organize data in various visual formats. | **3.DD.1** Independently or collaboratively create programs that use sequencing and looping.  **3.DD.2** Convert an algorithm into code. |
| **4.PSA.1** Decompose (break down) a large task into smaller, manageable subtasks. | **4.DA.1** Organize and present collected data visually to highlight comparisons. | **4.DD.1** Independently and collaboratively create programs that use sequencing, loops,  and conditionals. |

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| **Computational Thinking** | | |
| **Problem Solving and Algorithms: Strategies for understanding and solving problems** | **Data Creation & Analysis: Data can be collected, used, and presented with computing devices or digital tools** | **Development and Design: Design processes create new, useful, and imaginative solutions to solve problems** |
| **4.PSA.2** Debug a program that includes sequencing or loops.  **4.PSA.3** Identify multiple solutions to a task. |  |  |
| **5.PSA.1** Create a sequence of instructions from a previous decomposed task.  **5.PSA.2** Debug a program that includes sequencing, loops, or conditionals.  **5.PSA.3** Work collaboratively to explore multiple solutions to a task. | **5.DA.1** Organize and present collected data to highlight comparisons and support a claim. | **5.DD.1** Independently create programs that use sequencing, loops, and conditionals.  5.DD.2 Create a solution to problems using a design method. |
| **6.PSA.1** Identify and test an algorithm to solve a problem.  **6.PSA.2** Debug a program that includes sequencing, loops, or conditionals.  **6.PSA.3** Compare/contrast the efficiencies of multiple solutions to a task | **6.DCA.1 C**ollect and analyze data to support a claim. | **6.DD.1** Use programs that utilize combinations of loops, conditionals, and the manipulation of variables representing different data types. |
| **7.PSA.1** Modify and test an algorithm to solve a problem.  **7.PSA.2** Continued growth. | **7.DCA.1** Represent data, in more than one way, to defend your claim. | **7.DD.1** Modify programs that utilize combinations of loops, conditionals, and the manipulation of variables representing different  data types. |
| **8.PSA.1** Create and test an algorithm to solve a problem across disciplines.  **8.PSA.2** Continued growth. | **8.DCA.1** Represent data from multiple sources in order to defend or refute a claim. | **8.DD.1** Create programs that utilize combinations of loops, conditionals, and the manipulation of variables representing different  data types. |
| **9.PSA.1** Identify, recognize, and use an  algorithm to solve a complex problem across disciplines. | **9.DCA.1** Collect and analyze complex data. |  |
| **10.PSA.1** Create and test an algorithm to solve a complex problem across disciplines. | **10.DCA.1** Represent complex data in more than one way to support a claim. |  |

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| **Computational Thinking** | | | | | |
| **Problem Solving and Algorithms: Strategies for understanding and solving problems** | | **Data Creation & Analysis: Data can be collected, used, and presented with computing devices or digital tools** | | **Development and Design: Design processes create new, useful, and imaginative solutions to solve problems** | |
| **11.PSA.1** Demonstrate ways a given algorithm applies to problems across disciplines and  explain the benefits and drawbacks of choices made. | | **11.DCA.1** Represent complex data in multiple ways to defend a student-generated claim. | |  | |
| **12.PSA.1** Use and adapt common algorithms to solve computational problems. | | **12.DCA.1** Represent complex data using interactive data visualizations or computational  models. | |  | |
| **Information Literacy** | | | | | |
| **Access: Effective searches strategies can locate information for intellectual or creative pursuits** | **Evaluate: Information sources can be evaluated for accuracy, currency, appropriateness, and purpose** | | **Create: It is important to both consume and produce information to be digitally literate.** | | **Intellectual Property: Respect for the rights and obligations for the right and obligations of using and sharing intellectual**  **property** |
| **K.A.1** With guidance, use a keyword search with a teacher selected online resource.  **1.A.1** Use a keyword search with a teacher selected online resource. | **K.E.1** Name various information sources.  **1.E.1** With guidance, evaluate information for research purposes. | | **K.C.1** With guidance, create a digital product.  **1.C.1** Independently or with guidance, create a digital product. | | **K.IP.1** Discuss that creative works have owners (copyright).  **K.IP.2** Understand that credit should be given to the creator of a creative work.   1. **IP.1** Understand that creative works have owners. |
| **2.A.1** Continued Growth | **2.E.1** With guidance, determine  whether the purpose of content is to inform or to influence actions. | | **2.C.1** Independently or  collaboratively, create a digital product. | | **2.IP.1** Understand that students own their creative works. |
| **3.A.1** Use basic search strategies with teacher selected online sources. | **3.E.1** With guidance, compare and contrast resources based on content and the author's purpose. | | **3.C.1** Continued growth. | | **3.IP.1** Define copyright. |
| **4.A.1** Use multiple teachers selected online resources to  locate information. | **4.E.1** With guidance, use a strategy to evaluate information  for research purposes. | | **4.C.1** Continued growth. | | **4.IP.1** Demonstrate an understanding of copyright and  fair use. |
| **5.A.1** Refine a keyword search to improve results. | **5.E.1** Continued growth. | | **5.C.1** Independently or  collaboratively, create a digital product using two or more tools. | | **5.IP.1** With guidance, demonstrate  an understanding of ethical issues in copyright and fair use. |

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| **Information Literacy** | | | |
| **Access: Effective searches strategies can locate information for intellectual or creative pursuits** | **Evaluate: Information sources can be evaluated for accuracy, currency, appropriateness, and purpose** | **Create: It is important to both consume and produce information to be digitally literate.** | **Intellectual Property: Respect for the rights and obligations for the right and obligations of**  **using and sharing intellectual property** |
| **6.A.1** Use a variety of strategies to refine and revise search results | **6.E.1** Evaluate information and its sources. | **6.C.1** Repurpose or remix original works following fair use guidelines | **6.IP.1** With guidance, properly use copyrighted works, works in the creative commons, and works in  the public domain. |
| **7.A.1** Continued growth. | **7.E.1** Independently, evaluate information and its sources using student selected processes and  strategies. | **7.C.1** Continued growth. | **7.IP.1** With minimal guidance, properly use copyrighted works, works in the creative commons,  and works in the public domain. |
| **8.A.1** Use advanced search strategies to locate information online. | **8.E.1** Continued growth. | **8.C.1** Continued growth. | **8.IP.1** Properly use copyrighted works, works in the creative commons, and works in the public  domain. |
| **9.A.1** Plan and employ effective research strategies to locate information. | **9.E.1** Evaluate the accuracy, perspective, credibility, and  relevance of information, media, data, or other resources. | **9.C.1** Create original works or responsibly repurpose or remix  digital resources into new creations to communicate an idea. | **9.IP.1** Properly use copyrighted works, works in the creative  commons, and works in the public domain. |
| **10.A.1** Curate relevant information from digital resources using a variety of tools and methods. | **10.E.1** Gather accurate, credible, and relevant sources of information, media, data or other resources showing different  perspectives. | **10.C.1** Choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication. | **10.IP.1** Demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property. |
| **11.A.1** Devise new search strategies based on information gaps and new understanding. | **11.E.1** Use accurate, credible, and relevant sources of information, media, data or other resources showing different perspectives. | **11.C.1** Publish or present content that customizes the message and medium for their intended audiences to communicate their  idea. | **11.IP.1** Explain the beneficial and harmful effects that intellectual property laws can have on innovation, creativity, and  collaboration. |
| **12.A.1** Build knowledge by actively exploring real-world issues and problems, developing  ideas and theories and pursuing answers and solutions. | **12.E.1** Explain source selection based on accuracy, perspective, credibility, and relevance of  information, media, data or other resources. | **12.E.1** Exhibit perseverance, a tolerance for ambiguity, and the capacity to work with open-ended  problems in the design and creation process | **12.IP.1** Debate laws and regulations that impact the development and use of software. |

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| **Computing in Society** | | | |
| **Impacts of Computing: Past, present, and possible future impact of technology on society** | | **Social Interactions: Technology facilitates collaboration with others** | |
| **K.IC.1** List different ways technologies are used in daily life. | | **K.SI.1** With guidance, use technology to share thinking with teachers or adults | |
| **1.IC.1** Identify how technologies are used in and out of school. | | **1.SI.1** With guidance, use technology to share thinking with peers. | |
| **2.IC.1** Identify how technologies are used in the workforce. | | **2.SI.1** With guidance, use technology to communicate with others outside of the classroom. | |
| **3.IC.1** Identify computing technologies that have changed the world. | | **3.SI.1** Recognize that there are various collaborative technologies.  **3.SI.2** With guidance, use collaborative technology to seek out diverse perspectives. | |
| **4.IC.1** Give examples of computing technologies that influence society today. | | **4.SI.1** With guidance, use collaborative technology to interpret diverse perspectives. | |
| **5.IC.1** Explain how computing technologies can change the future. | | **5.SI.1** With guidance, use collaborative technology to compare diverse perspectives. | |
| **6.IC.1** Identify the positive and negative impacts of technology, including bias and accessibility.  **6.IC.2** Investigate past, present, and future technologies. | | **6.SI.1** Use collaborative technology.  **6.SI.2** Identify how social interactions can impact a person’s self-image. | |
| **Digital Citizenship** | | | |
| **Responsible Use: Respect and dignity in virtual and physical communities** | **Safety & Ethics: There are both positive and negative impacts in social and ethical behaviors for using technology.** | | **Digital Identity: Responsibilities and opportunities of living, learning and working in an interconnected digital world.** |
| **K.RU.1** Discuss positive and negative behaviors when using electronic communication. (CYSEC)  **K.RU.2** With guidance, identify appropriate manners while participating in an online community.  No Standards at this Level  **K.RU.4** Comply with Acceptable Use Policies. | **K.SE.1** With guidance, use technology in safe and correct ways. (CYSEC)  **K.SE.2** With guidance, use authentication methods to access technology. (CYSEC) | | No standards at this level |

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| **Digital Citizenship** | | |
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| **1.RU.1** Identify positive and negative behaviors when using electronic communication. (CYSEC)  **1.RU.2** Discuss reporting inappropriate electronic content. (CYSEC)  No Standards at this Level  **1.RU.4** Comply with Acceptable Use Policies. | **1.SE.1** Identify how to use technology in safe and correct ways. (CYSEC)  **1.SE.2** Understand the differences between a username and an authentication method and Independently use them to access technology. (CYSEC) | **1.DI.1** Recognize that you have a digital identity. |
| **2.RU.1** Explain positive and negative behaviors when using electronic communication. (CYSEC)  **2.RU.2** Know and identify how to report concerns regarding online content and behaviors. (CYSEC)  **2.RU.3** Develop a code of conduct, explain, and practice appropriate behavior and responsibilities while participating in an online community.  **2.RU.4** Comply with Acceptable Use Policies. | **2.SE.1** Explain how to use technology in safe and correct ways. (CYSEC)  **2.SE.2** Identify strategies for protecting authentication methods. (CYSEC)  **No standards at this level**  **2.SE.4** Recognize the risks of interacting online with others. (CYSEC) | **2.DI.1** Define digital identity. |
| **3.RU.1** Identify and discuss positive and negative uses of technology and information and their impact. (CYSEC)  **3.RU.2** Recognize similarities and differences between in-person bullying and cyberbullying.  **3.RU.3** Continued growth. | **3.SE.1** Identify problems that relate to inappropriate use of computing devices and networks. (CYSEC)  **3.SE.2** Keep authentication methods confidential and be proactive if they are compromised. (CYSEC) | **3.DI.1** Recognize the permanence of their actions in the digital world. |

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| **Digital Citizenship** | | |
| **Responsible Use: Respect and dignity in virtual and physical communities** | **Safety & Ethics: There are both positive and negative impacts in social and ethical behaviors for using technology.** | **Digital Identity: Responsibilities and opportunities of living, learning and working in an interconnected digital world.** |
| **3.RU.4** Comply with Acceptable Use Policies. | **3.SE.3** Recognize that data-collection technology can be used to track navigation online. (CYSEC)  **3.SE.4** Identify the difference between public and private information. (CYSEC) |  |
| **4.RU.1** Discuss basic issues related to the appropriate use of technology and information, and the consequences of inappropriate use. (CYSEC)  **4.RU.2** Identify strategies for dealing responsibly with cyberbullying and reporting inappropriate behavior.  **4.RU.3** Continued growth.  **4.RU.4** Comply with Acceptable Use Policies. | **4.SE.1** Identify and explain issues related to responsible use of technology and information and describe personal consequences of inappropriate use. (CYSEC)  **4.SE.2** Create secure authentication to ensure privacy. (CYSEC)  **4.SE.3** Continued growth.  **4.SE.4** Recognize when it is safe to share private information online. (CYSEC) | **4.DI.1** Explain the importance of your digital identity. |
| **5.RU.1** Demonstrate an understanding of the appropriate use of technology and information and the consequences of inappropriate use. (CYSEC)  **5.RU.2** Use strategies that prevent and deal responsibly with cyberbullying and inappropriate behavior.  **5.RU.3** Continued growth.  **5.RU.4** Comply with Acceptable Use Policies. | **5.SE.1** Recognize that there are real-world cybersecurity problems (i.e., hacking) when interacting online. (CYSEC)  **5.SE.2** Continued growth.  **5.SE.3** Continued growth.  **5.SE.4** Apply strategies to keep your private information safe online. (CYSEC) | **5.DI.1** Continued Growth |

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| **Digital Citizenship** | | |
| **Responsible Use: Respect and dignity in virtual and physical communities** | **Safety & Ethics: There are both positive and negative impacts in social and ethical behaviors for using technology.** | **Digital Identity: Responsibilities and opportunities of living, learning and working in an interconnected digital world.** |
| **6.RU.1** Identify different forms of cyberbullying.  **6.RU.2** Identify strategies to stop cyberbullying.  **6.RU.3** Use appropriate digital etiquette in a variety of situations.  **6.RU.4** Understand the purpose of and comply with Acceptable Use Policies. | **6.SE.1** Identify steps for responding to uncomfortable situations when interacting online. (CYSEC)  **6.SE.2** Identify basic methods to maintain digital privacy and security. (CYSEC)  **6.SE.3** Recognize that data-collection technology can be used to track navigation online. (CYSEC)  **6.SE.4** Identify threats to personal cybersecurity. (CYSEC) | **6.DI.1** Describe personal online usage and determine how it affects identity on- and offline. |
| **7.RU.1** Describe different forms of cyberbullying and the effects on all parties involved.  **7.RU.2** Identify strategies to prevent and stop cyberbullying.  **7.RU.3** Continued growth.  **7.RU.4** Understand the purpose of and comply with Acceptable Use Policies. | **7.SE.1** Continued growth.  **7.SE.2** Identify a variety of methods to maintain digital privacy and security. (CYSEC)  **7.SE.3** Continued growth.  **7.SE.4** Describe how to respond to threats to personal cybersecurity. (CYSEC) | **7.DI.1** Evaluate how digital identity can impact a person now and in the future. |
| **8.RU.1** Describe different forms of cyberbullying and the effects on all parties involved.  **8.RU.2** Identify strategies to prevent and stop cyberbullying.  **8.RU.3** Continued growth. | **8.SE.1** Continued growth.  **8.SE.2** Identify advanced methods to maintain digital privacy and security. (CYSEC)  **8.SE.3** Continued growth.  **8.SE.4** Discuss the consequences of identity theft. (CYSEC) | **8.DI.1** Continued growth. |

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| **Digital Citizenship** | | |
| **Responsible Use: Respect and dignity in virtual and physical communities** | **Safety & Ethics: There are both positive and negative impacts in social and ethical behaviors for using technology.** | **Digital Identity: Responsibilities and opportunities of living, learning and working in an interconnected digital world.** |
| **8.RU.4** Understand the purpose of and comply with Acceptable Use Policies. |  |  |
| **9.RU.1** Apply cyberbullying prevention strategies.  **9.RU.2** Apply safe and ethical behaviors to personal electronic communication and interaction. (CYSEC)  **9.RU.3** Continued growth.  **9.RU.4** Understand the purpose and comply with Acceptable Use Policies. | **9.SE.1** Recognize the effects sharing information online can have on others' privacy. (CYSEC)  **9.SE.2** Know how to modify their account settings to protect privacy and security. (CYSEC)  **9.SE.3** Recognize that data-collection technology can be used to track navigation online. (CYSEC)  **9.SE.4** Describe ways to prevent identity theft. (CYSEC) | **9.DI.1** Manage a digital identity and be aware of the permanence of actions in the digital world. (CYSEC) |
| **10.RU.1** Continued growth. **10.RU.2** Continued growth. **10.RU.3** Continued growth.  **10.RU.4** Understand the purpose and comply with Acceptable Use Policies. | **10.SE.1** Implement best practices to secure personal information. (CYSEC)  **10.SE.2** Recognize the importance of monitoring your private data. (CYSEC)  **10.SE.3** Manage personal data to maintain digital privacy and security and are aware of data-collection technology used to track online behaviors. (CYSEC)  **10.SE.4** Identify if their private data has been altered and can react appropriately. (CYSEC) | **10.DI.1** Continued growth. |
| **11.RU.1** Continued growth.  **11.RU.2** Continued growth.  **11.RU.3** Continued growth. | **11.SE.1** Understand encryption and how it is used to protect data. (CYSEC) | **11.DI.1** Continued growth. |

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| **Digital Citizenship** | | |
| **Responsible Use: Respect and dignity in virtual and physical communities** | **Safety & Ethics: There are both positive and negative impacts in social and ethical behaviors for using technology.** | **Digital Identity: Responsibilities and opportunities of living, learning and working in an interconnected digital world.** |
| **11.RU.4** Understand the purpose and comply with Acceptable Use Policies. | **11.SE.2** Explain the privacy concerns related to the collection and generation of data through automated processes. (CYSEC)  **11.SE.3** Continued growth.  **11.SE.4** Develop a plan to recover from an  incident that was tied to unauthorized access. (CYSEC) |  |
| **12.RU.1** Continued growth. **12.RU.2** Continued growth. **12.RU.3** Continued growth.  **12.RU.4** Understand the purpose and comply with Acceptable Use Policies. | **12.SE.1** Continued growth.  **12.SE.2** Illustrate how sensitive data can be affected by malware and other attacks. (CYSEC)  **12.SE.3** Continued growth.  **12.SE.4** Continued growth. | **12.DI.1** Continued growth. |

District Technology Committee-responsibility within the Jamestown Public School District Strategic Plan 2020-2023

[Strategic Initiative IV](http://www.jamestown.k12.nd.us/boe/district-strategic-planning/files/documents/2019-24%20Strategic%20Plan/STRATEGIC%20INITIATIVE%20IV-Technology.docx)

**ONE-YEAR TECHNOLOGY BUDGET 2019-2020**

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| --- | --- | --- |
| **Budget** | **Budget** | **Budget** |
| **Expenditures** | **2019/2020** | **2020/2021** |
|  |  |  |
| Professional Salaries | $265,000 | $272,890 |
| Technical/Ancillary Salaries | $50,000 | $95,742 |
| Employee Benefits | $107,000 | $117,989 |
| Purchased & Technical Services - EduTech | $31,800 | $30,800 |
| Maintenance of Equipment | $55,000 | $40,000 |
| Travel | $5,000 | $4480 |
| Material & Supplies and Software | $26,000 | $10,500 |
| Equipment | $345,000 | $359,700 |
| Other, Dues, Memberships, Fees | $25,000 | $50,000 |
|  |  |  |
| **GRAND TOTAL** | **$909,800** | **$982,101** |
|  |  |  |
| **Revenue** | **Budget** | **Budget** |
| **Budget** | **2019/2020** | **2020/2021** |
| Local Funds | $285,000 | $285,000 |
| Federal Funds | $15,000 | $15,000 |
|  |  |  |
| **GRAND TOTAL** | **$300,000** | **$300,000** |

**TECHNOLOGY BUDGET NARRATIVE**

Jamestown has five full-time and one part-time staff membersin its technology department. In addition, the district utilizes building facilitators in each building to communicate technology needs to the technology department and facilitate basic technology support. The district has a “dark fiber” Wide Area Network through Dakota Central Communications and receives its Internet access through North Dakota STAGEnet. With available funding, the district will “turn over” its computers every three to five years as well as upgrade switches, routers, servers, printers, etc. during this time frame. With the addition of increased demand for online learning the technology department continues to respond with more available devices to a 1:1 platform. Finally, the school district plans to update all machines to Windows 10. Microsoft Office 2019 or 365 as our integrated software package. PowerSchool is our administrative student database system. Schoology is the online curriculum platform for digital learning.

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