1.   Creativity and Innovation

Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:

a.   apply existing knowledge to generate new ideas, products, or processes

> **Skills & Examples**
> create new products (e.g., public service announcements about environmental issues, book trailers, digital stories about elements in the periodic table, simulation of a voyage to China, podcast from a historical character) to demonstrate curriculum-related knowledge or processes (e.g., automating problem solving solutions through algorithmic thinking) that could be used to provide innovative solutions in the real world.

b.   create original works as a means of personal or group expression

> **Skills & Examples**
> create original animations or videos about a topic of personal interest or in response to a learning activity and document a reflection on the quality of the production (e.g., work illustrating reactions to communicating with students in other cultures about a global issue).

c.   c. use models and simulations to explore complex systems and issues

> **Skills & Examples**
> describe and illustrate a complex content-related concept or process using a model, simulation, concept-mapping software, or hypermedia. For example, use a programming language or software with branching capabilities to simulate the effects of temperature and humidity on precipitation or design a simple simulation to explore affects of manipulating one or two variables.

d.   d. identify trends and forecast possibilities

> **Skills & Examples**
> develop and apply a research strategy for making data-driven predictions. Manipulate the data to identify trends and forecast results. Identify variables that affect a process. Determine models that allow you to manipulate the variables, including graphs that can be extended over time and allow you to make predictions for particular circumstances (e.g., uphill vs downhill acceleration, pre- and post-unit attitudes re cyberbullying).

2. Communication and Collaboration

Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.   Students:

a.   interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media

> **Skills & Examples**
> use digital media tools (e.g., blogs, wikis, video-conferencing, virtual worlds, etc.) for synchronous and asynchronous collaboration with peers/experts/global partners to plan, design, and publish a content-specific product. Present and/or post results online. For example, collaborate in a virtual world to design and produce a re-enactment of a historical event, play, or experiment, or collaborate with students in another classroom using digital tools to debate an important issue.

b.   communicate information and ideas effectively to multiple audiences using a variety of media and formats

> **Skills & Examples**
> individually or in collaborative groups, identify and evaluate information from a variety of online sources for accuracy, bias, and comprehensiveness. Summarize and distribute results to multiple audiences (e.g., audiences with different levels of knowledge or perspectives) using a variety of communications media and formats (e.g., presentation, webpage, wiki, blog, online collaborative writing tools).

c.   develop cultural understanding and global awareness by engaging with learners of other cultures

> **Skills & Examples**
> identify a topic of global concern and use a variety of digital tools to collaborate with learners from other cultures to better understand the topic from different perspectives. Identify potential solutions or create products that help others understand the issues and perspectives.

d.   contribute to project teams to produce original works or solve problems

> **Skills & Examples**
> identify an appropriate project or problem associated with a specific content area; identify and assign roles for project team members; select appropriate digital tools for supporting investigation and/or experimentation related to the project/problem; work collaboratively to arrive at identifying and testing possible solution(s); present and disseminate results to a broad audience.

3. Research and Information Fluency

Students apply digital tools to gather, evaluate, and use information. Students:

a.   plan strategies to guide inquiry

> **Skills & Examples**
> create a concept map describing the aspects of a research topic or essential question. Select key topics for exploration (e.g., how is a hero different from a celebrity; which city would you select if you were moving to India for two years; how can a country best provide for security without undermining important civil liberties). Determine data-collection and search needs and strategies. Use project-management software to lay out inquiry processes and procedures.

b.   b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media

> **Skills & Examples**
> independently develop and apply effective search strategies for locating credible resources in multiple digital databases, categorize and classify information to support analysis, synthesize results, and report conclusions (e.g., using data visualization, spreadsheets and graphs, and other productivity tools).

c.   evaluate and select information sources and digital tools based on the appropriateness to specific tasks

> **Skills & Examples**
> select and apply appropriate tools and digital resources to accomplish a variety of tasks and justify their use based on efficiency and effectiveness for completing the projects.

d.   process data and report results

> **Skills & Examples**
> employ data-analysis tools (e.g., databases, visualization tools, statistical programs, graphing calculators) to analyze data collections. Create projections and models to inform decision-making. Effectively use multimedia formats to report results.

4. Critical Thinking, Problem Solving, and Decision Making

Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources. Students:

a.   identify and define authentic problems and significant questions for investigation

> **Skills & Examples**
> explore a content-related issue or problem (e.g., historical or present-day issues or problems informed by authentic resources from government, media, and other expert advisors). Apply research strategies to obtain information and data related to the identified problem. Use statistical and/or graphed data to organize and present the problem and possible solutions in digital format.

b.   plan and manage activities to develop a solution or complete a project

> Skills & Examples
> plan a thesis statement related to a problem and independently select and use the appropriate digital tools, resources, and computational strategies to solve the problem.

c.   collect and analyze data to identify solutions and/or make informed decisions

> **Skills & Examples**
> select and use data-collection technology (e.g., probes, handhelds, geographic mapping systems) to gather and view data, examine patterns, analyze potential solutions, and report conclusions for content-related problems.

d.   use multiple processes and diverse perspectives to explore alternative solutions

> **Skills & Examples**
> use electronic data collection, collaborative authoring tools, and online collaborative environments to explore and document points of view based on location, environment, or culture and to evaluate solutions from a variety of perspectives.

5. Digital Citizenship

Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students:

a.   advocate and practice safe, legal, and responsible use of information and technology

> **Skills & Examples**
> analyze the consequences resulting from inappropriate use of information and technology such as cyberbullying. Develop materials to educate others about solutions such as how not to be a victim and how to reform the bully.

b.   exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity

> **Skills & Examples**
> evaluate benefits, limitations, and optimal conditions for use of new technology resources to support communication, collaboration, product development, and academic goals.

c.   demonstrate personal responsibility for lifelong learning

> **Skills & Examples**
> identify and use personal and academic learning communities or resources to support lifelong interests, learning, and academic success.

d.   exhibit leadership for digital citizenship

> **Skills & Examples**
> use collaborative electronic communications, video, and/or authoring tools to explore, share, and publish aspects of digital citizenship with other learners around the world.

6. Technology Operations and Concepts

Students demonstrate a sound understanding of technology concepts, systems, and operations. Students:

a.   understand and use technology systems

> **Skills & Examples**
> use a variety of technology interfaces and operating systems (e.g., computer, printer, Internet-connected mobile devices) and demonstrate an understanding of how they interact with local and wide area networks. Apply technology systems and resources (e.g., graphing calculator, electronic microscope, simulations, programming languages, digital recorders and editors, generic productivity tools) to complete learning activities. Use multiple file types and their related software applications. Apply basic algorithmic concepts and methods (e.g., problem decomposition, data representation and abstraction, iteration, ordering of steps) to solve problems. Understand basic programming.

b.   select and use applications effectively and productively

> **Skills & Examples**
> independently develop and apply criteria for selecting a digital application to accomplish a specific real-world task. Compare and contrast the efficiency and effectiveness of several applications. Justify the appropriateness of an application. Are able to find the ultimate configuration that matches their application needs (e.g., bigger HD and RAM for video editing vs. less powerful but lighter computer for taking notes and browsing Internet).

c.   troubleshoot systems and applications

> **Skills & Examples**
> demonstrate the ability to locate and use documentation and online resources to help solve hardware and software problems. Provide accurate descriptions of the problems using correct terminology (e.g., keep a log of solutions tried for hardware, software, and network issues in either the classroom or school) and, when appropriate, propose a plan of action to resolve unexpected problems and prevent future occurrences.

d.   transfer current knowledge to learning of new technologies

> **Skills & Examples**
> develop and apply strategies for systematically learning new technologies and advanced features of current technologies, (e.g., identifying and describing features that are key to particular applications/hardware and discovering how they are implemented in new versions and other similar applications).