




PARTNERSHIP FOR 21ST CENTURY SKILLS- CORE CONTENT INTEGRATION



Partnership for 21st Century Skills
Ohio Department of Education

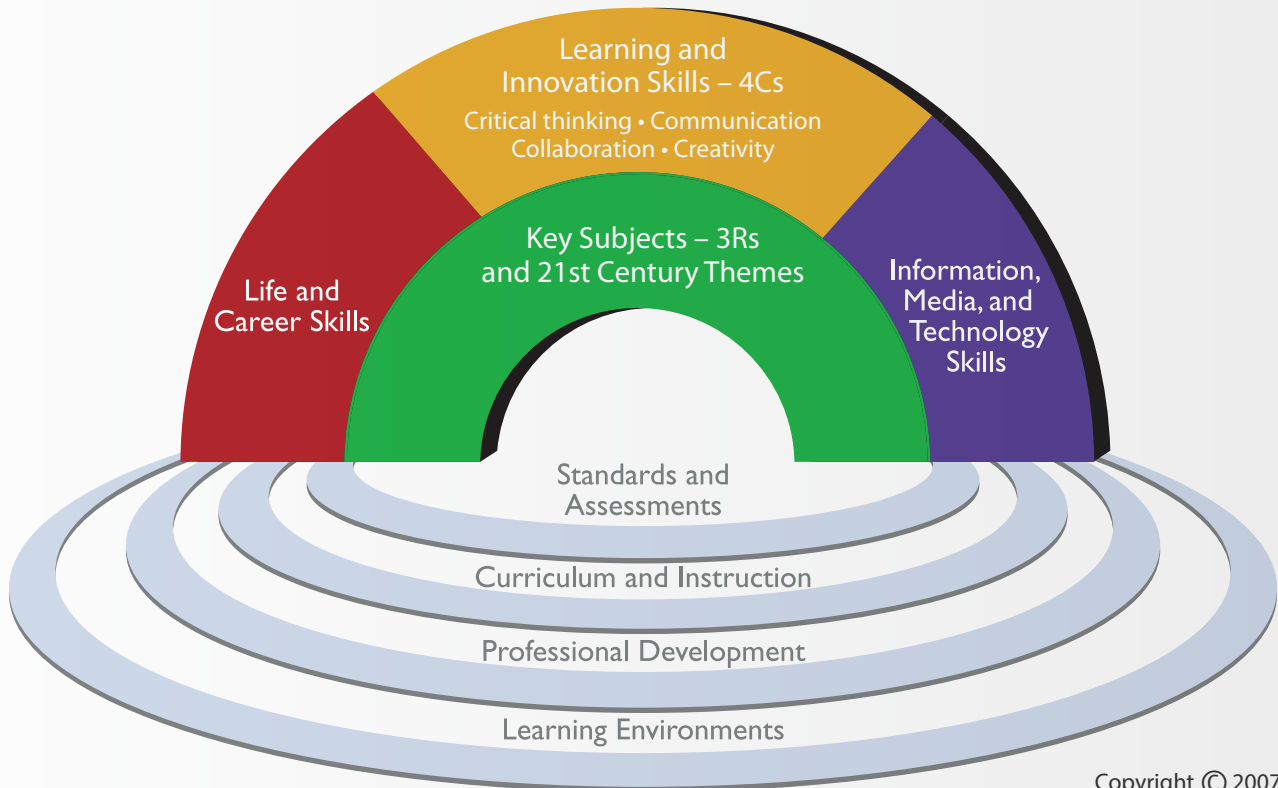


P21[®]

PARTNERSHIP FOR
21ST CENTURY LEARNING

Framework for 21st Century Learning

A unified vision for learning to ensure student success in a world where change is constant and learning never stops.



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21ST CENTURY STUDENT OUTCOMES AND SUPPORT SYSTEMS

The P21 Framework for 21st Century Learning was developed with input from educators, education experts, and business leaders to define and illustrate the skills, knowledge, expertise, and support systems that students need to succeed in work, life, and citizenship.

The Framework continues to be used by thousands of educators and hundreds of schools in the U.S. and abroad to put 21st century skills at the center of learning. All elements of the Framework are critical to ensure 21st century readiness for every student.

When a school, district, or state builds on this foundation, combining knowledge and skills with the necessary support systems of standards, assessments, curriculum and instruction, professional development, and learning environments - students are more engaged in the learning process and graduate better prepared to thrive in today's digitally and globally interconnected world.

Key Subjects and 21st Century Themes

Mastery of key subjects and 21st century themes is essential to student success. Key subjects include English, reading or language arts, world languages, arts, mathematics, economics, science, geography, history, government and civics.

In addition, schools must promote an understanding of academic content at much higher levels by weaving 21st century interdisciplinary themes into key subjects:

- Global Awareness
- Financial, Economic, Business and Entrepreneurial Literacy
- Civic Literacy
- Health Literacy
- Environmental Literacy

Learning and Innovation Skills

Learning and innovation skills are what separate students who are prepared for increasingly complex life and work environments in today's world and those who are not. They include:

- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication
- Collaboration

Information, Media and Technology Skills

Today, we live in a technology and media-driven environment, marked by access to an abundance of information, rapid changes in technology tools and the ability to collaborate and make individual contributions on an unprecedented scale. Effective citizens and workers must be able to exhibit a range of functional and critical thinking skills, such as:

- Information Literacy
- Media Literacy
- ICT (Information, Communications and Technology) Literacy

Life and Career Skills

Today's students need to develop thinking skills, content knowledge, and social and emotional competencies to navigate complex life and work environments. P21's essential Life and Career Skills include:

- Flexibility and Adaptability
- Initiative and Self-Direction
- Social and Cross-Cultural Skills
- Productivity and Accountability
- Leadership and Responsibility

21ST CENTURY SUPPORT SYSTEMS

21st century learning requires an innovative support system to engage learners through applicable skills and knowledge, appropriate technologies, and real-world connections to make learning relevant, personalized, and engaging. P21 has identified five critical support systems to ensure all students receive the kinds of learning experiences that build 21st century competency:

- 21st Century Standards
- Assessments of 21st Century Skills
- 21st Century Curriculum and Instruction
- 21st Century Professional Development
- 21st Century Learning Environments

For more information, visit P21 at www.P21.org.



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- National Board for Professional Teaching Standards
- National Education Association
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- PBS
- Pearson
- Playworld
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P21 Framework Definitions

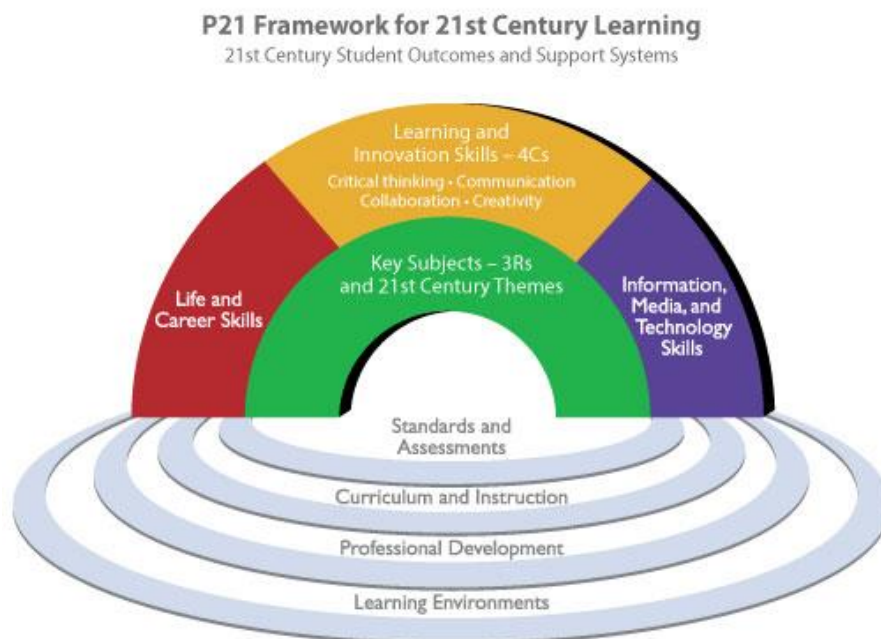
To help practitioners integrate skills into the teaching of key academic subjects, the Partnership has developed a unified, collective vision for learning known as the Framework for 21st Century Learning. This Framework describes the skills, knowledge and expertise students must master to succeed in work and life; it is a blend of content knowledge, specific skills, expertise and literacies.

Every 21st century skills implementation requires the development of key academic subject knowledge and understanding among all students. Those who can think critically and communicate effectively must build on a base of key academic subject knowledge.

Within the context of key knowledge instruction, **students must also learn the essential skills for success in today’s world, such as critical thinking, problem solving, communication and collaboration.**

When a school or district builds on this foundation, combining the entire Framework with the necessary support systems—standards, assessments, curriculum and instruction, professional development and learning environments—students are more engaged in the learning process and graduate better prepared to thrive in today’s global economy.

While the graphic represents each element distinctly for descriptive purposes, the Partnership views all the components as fully interconnected in the process of 21st century teaching and learning.



21st CENTURY STUDENT OUTCOMES

The elements described in this section as “21st century student outcomes” (represented by the rainbow) are the knowledge, skills and expertise students should master to succeed in work and life in the 21st century.

Key SUBJECTS AND 21st CENTURY THEMES

Mastery of **key subjects and 21st century themes** is essential for all students in the 21st century. **Key** subjects include:

- English, reading or language arts
- World languages
- Arts
- Mathematics
- Economics
- Science
- Geography
- History
- Government and Civics

In addition to these subjects, we believe schools must move to include not only a focus on mastery of key subjects, but also promote understanding of academic content at much higher levels by weaving **21st century interdisciplinary themes** into key subjects:

Global Awareness

- Using 21st century skills to understand and address global issues
- Learning from and working collaboratively with individuals representing diverse cultures, religions and lifestyles in a spirit of mutual respect and open dialogue in personal, work and community contexts
- Understanding other nations and cultures, including the use of non-English languages

Financial, Economic, Business and Entrepreneurial Literacy

- Knowing how to make appropriate personal economic choices
- Understanding the role of the economy in society
- Using entrepreneurial skills to enhance workplace productivity and career options

Civic Literacy

- Participating effectively in civic life through knowing how to stay informed and understanding governmental processes
- Exercising the rights and obligations of citizenship at local, state, national and global levels
- Understanding the local and global implications of civic decisions

Health Literacy

- Obtaining, interpreting and understanding basic health information and services and using such information and services in ways that enhance health
- Understanding preventive physical and mental health measures, including proper diet, nutrition, exercise, risk avoidance and stress reduction
- Using available information to make appropriate health-related decisions
- Establishing and monitoring personal and family health goals
- Understanding national and international public health and safety issues

Environmental Literacy

- Demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it, particularly as relates to air, climate, land, food, energy, water and ecosystems
- Demonstrate knowledge and understanding of society's impact on the natural world (e.g., population growth, population development, resource consumption rate, etc.)
- Investigate and analyze environmental issues, and make accurate conclusions about effective solutions
- Take individual and collective action towards addressing environmental challenges (e.g., participating in global actions, designing solutions that inspire action on environmental issues)

LEARNING AND INNOVATION SKILLS

Learning and innovation skills increasingly are being recognized as those that separate students who are prepared for a more and more complex life and work environments in the 21st century, and those who are not. A focus on creativity, critical thinking, communication and collaboration is essential to prepare students for the future.

CREATIVITY AND INNOVATION***Think Creatively***

- Use a wide range of idea creation techniques (such as brainstorming)
- Create new and worthwhile ideas (both incremental and radical concepts)
- Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts

Work Creatively with Others

- Develop, implement and communicate new ideas to others effectively
- Be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work
- Demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas

- View failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes

Implement Innovations

- Act on creative ideas to make a tangible and useful contribution to the field in which the innovation will occur

CRITICAL THINKING AND PROBLEM SOLVING

Reason Effectively

- Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation

Use Systems Thinking

- Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems

Make Judgments and Decisions

- Effectively analyze and evaluate evidence, arguments, claims and beliefs
- Analyze and evaluate major alternative points of view
- Synthesize and make connections between information and arguments
- Interpret information and draw conclusions based on the best analysis
- Reflect critically on learning experiences and processes

Solve Problems

- Solve different kinds of non-familiar problems in both conventional and innovative ways
- Identify and ask significant questions that clarify various points of view and lead to better solutions

COMMUNICATION AND COLLABORATION

Communicate Clearly

- Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
- Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions
- Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)
- Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact
- Communicate effectively in diverse environments (including multi-lingual)

Collaborate with Others

- Demonstrate ability to work effectively and respectfully with diverse teams
- Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal

- Assume shared responsibility for collaborative work, and value the individual contributions made by each team member

INFORMATION, MEDIA AND TECHNOLOGY SKILLS

People in the 21st century live in a technology and media-driven environment, marked by various characteristics, including: 1) access to an abundance of information, 2) rapid changes in technology tools, and 3) the ability to collaborate and make individual contributions on an unprecedented scale. Effective citizens and workers of the 21st century must be able to exhibit a range of functional and critical thinking skills related to information, media and technology.

INFORMATION LITERACY

Access and Evaluate Information

- Access information efficiently (time) and effectively (sources)
- Evaluate information critically and competently

Use and Manage Information

- Use information accurately and creatively for the issue or problem at hand
- Manage the flow of information from a wide variety of sources
- Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information

MEDIA LITERACY

Analyze Media

- Understand both how and why media messages are constructed, and for what purposes
- Examine how individuals interpret messages differently, how values and points of view are included or excluded, and how media can influence beliefs and behaviors
- Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of media

Create Media Products

- Understand and utilize the most appropriate media creation tools, characteristics and conventions
- Understand and effectively utilize the most appropriate expressions and interpretations in diverse, multi-cultural environments

ICT (Information, Communications and Technology) LITERACY

Apply Technology Effectively

- Use technology as a tool to research, organize, evaluate and communicate information

- Use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy
- Apply a fundamental understanding of the ethical/legal issues surrounding the access and use of information technologies

LIFE AND CAREER SKILLS

Today's life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills.

FLEXIBILITY AND ADAPTABILITY

Adapt to Change

- Adapt to varied roles, jobs responsibilities, schedules and contexts
- Work effectively in a climate of ambiguity and changing priorities

Be Flexible

- Incorporate feedback effectively
- Deal positively with praise, setbacks and criticism
- Understand, negotiate and balance diverse views and beliefs to reach workable solutions, particularly in multi-cultural environments

INITIATIVE AND SELF-DIRECTION

Manage Goals and Time

- Set goals with tangible and intangible success criteria
- Balance tactical (short-term) and strategic (long-term) goals
- Utilize time and manage workload efficiently

Work Independently

- Monitor, define, prioritize and complete tasks without direct oversight

Be Self-directed Learners

- Go beyond basic mastery of skills and/or curriculum to explore and expand one's own learning and opportunities to gain expertise
- Demonstrate initiative to advance skill levels towards a professional level
- Demonstrate commitment to learning as a lifelong process
- Reflect critically on past experiences in order to inform future progress

SOCIAL AND CROSS-CULTURAL SKILLS

Interact Effectively with Others

- Know when it is appropriate to listen and when to speak

- Conduct themselves in a respectable, professional manner

Work Effectively in Diverse Teams

- Respect cultural differences and work effectively with people from a range of social and cultural backgrounds
- Respond open-mindedly to different ideas and values
- Leverage social and cultural differences to create new ideas and increase both innovation and quality of work

PRODUCTIVITY AND ACCOUNTABILITY

Manage Projects

- Set and meet goals, even in the face of obstacles and competing pressures
- Prioritize, plan and manage work to achieve the intended result

Produce Results

- Demonstrate additional attributes associated with producing high quality products including the abilities to:
 - Work positively and ethically
 - Manage time and projects effectively
 - Multi-task
 - Participate actively, as well as be reliable and punctual
 - Present oneself professionally and with proper etiquette
 - Collaborate and cooperate effectively with teams
 - Respect and appreciate team diversity
 - Be accountable for results

LEADERSHIP AND RESPONSIBILITY

Guide and Lead Others

- Use interpersonal and problem-solving skills to influence and guide others toward a goal
- Leverage strengths of others to accomplish a common goal
- Inspire others to reach their very best via example and selflessness
- Demonstrate integrity and ethical behavior in using influence and power

Be Responsible to Others

- Act responsibly with the interests of the larger community in mind

21st CENTURY SUPPORT SYSTEMS

The elements described below are the critical systems necessary to ensure student mastery of 21st century skills. 21st century standards, assessments, curriculum, instruction, professional development and learning environments must be aligned to produce a support system that produces 21st century outcomes for today's students.

21st Century Standards

- Focus on 21st century skills, content knowledge and expertise
- Build understanding across and among key subjects as well as 21st century interdisciplinary themes
- Emphasize deep understanding rather than shallow knowledge
- Engage students with the real world data, tools and experts they will encounter in college, on the job, and in life; students learn best when actively engaged in solving meaningful problems
- Allow for multiple measures of mastery

Assessment of 21st Century Skills

- Supports a balance of assessments, including high-quality standardized testing along with effective formative and summative classroom assessments
- Emphasizes useful feedback on student performance that is embedded into everyday learning
- Requires a balance of technology-enhanced, formative and summative assessments that measure student mastery of 21st century skills
- Enables development of portfolios of student work that demonstrate mastery of 21st century skills to educators and prospective employers
- Enables a balanced portfolio of measures to assess the educational system's effectiveness in reaching high levels of student competency in 21st century skills

21st Century Curriculum and Instruction

- Teaches 21st century skills discretely in the context of key subjects and 21st century interdisciplinary themes
- Focuses on providing opportunities for applying 21st century skills across content areas and for a competency-based approach to learning
- Enables innovative learning methods that integrate the use of supportive technologies, inquiry- and problem-based approaches and higher order thinking skills
- Encourages the integration of community resources beyond school walls

21st Century Professional Development

- Highlights ways teachers can seize opportunities for integrating 21st century skills, tools and teaching strategies into their classroom practice — and help them identify what activities they can replace/de-emphasize
- Balances direct instruction with project-oriented teaching methods
- Illustrates how a deeper understanding of subject matter can actually enhance problem-solving, critical thinking, and other 21st century skills
- Enables 21st century professional learning communities for teachers that model the kinds of classroom learning that best promotes 21st century skills for students
- Cultivates teachers' ability to identify students' particular learning styles, intelligences, strengths and weaknesses

- Helps teachers develop their abilities to use various strategies (such as formative assessments) to reach diverse students and create environments that support differentiated teaching and learning
- Supports the continuous evaluation of students' 21st century skills development
- Encourages knowledge sharing among communities of practitioners, using face-to-face, virtual and blended communications
- Uses a scalable and sustainable model of professional development

21st Century Learning Environments

- Create learning practices, human support and physical environments that will support the teaching and learning of 21st century skill outcomes
- Support professional learning communities that enable educators to collaborate, share best practices and integrate 21st century skills into classroom practice
- Enable students to learn in relevant, real world 21st century contexts (e.g., through project-based or other applied work)
- Allow equitable access to quality learning tools, technologies and resources
- Provide 21st century architectural and interior designs for group, team and individual learning
- Support expanded community and international involvement in learning, both face-to-face and online

About the Partnership for 21st Century Learning

The Partnership for 21st Century Learning recognizes that all learners need educational experiences in school and beyond, from cradle to career, to build knowledge and skills for success in a globally and digitally interconnected world. Representing over 5 million members of the global workforce, P21 unites business, government and education leaders from the U.S. and abroad to advance evidence-based education policy and practice and to make innovative teaching and learning a reality for all.

P21 and member organizations provide tools and resources that help facilitate and drive this necessary change.

Learn more and get involved at www.p21.org.

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Information and Media Literacy

Accessing and managing information. Integrating and creating information. Evaluating and analyzing information.

21st Century Tools for: Communication, Information Processing, and Research

SAMPLE Student Outcomes for: Accessing, Processing, Managing, Integrating and Communicating Information



4th Grade

Newspapers, books, spreadsheets, graphing programs, calculators, computers, Internet, films, TV programs, Websites, databases, internet and digital libraries

- Access information from a variety of media sources.
- Gather data such as taking surveys of their school or community population and create appropriate graphs to display the information.
- Analyze and compare numerical data from a variety of age-appropriate sources such as newspapers and websites, and draw simple conclusions about the data.



8th Grade

Newspapers, books, spreadsheets, graphing programs, calculators, computers, Internet, films, TV programs, Websites, databases, internet and digital libraries

- Find, access, and acquire the necessary data needed to address a question generated by students.
- Formulate questions related to students' physical environment or two populations or cultures, design studies that can answer the questions, and collect appropriate data.
- Analyze graphs and other data representations from the media relative to their truthfulness and ability to persuade/mislead a reader.



12th Grade

Newspapers, books, spreadsheets, graphing programs, calculators, computers, Internet, films, TV programs, Websites, databases, internet and digital libraries

- Find and analyze data sets and collection processes with respect to the authenticity of the data and legitimacy of its use for various purposes.
- Develop methods to collect univariate and bivariate data to describe trends within and between populations or local settings.
- Use understanding of statistical techniques, sampling bias, and population parameters in simulated settings to study the effects on outcomes. Analyze these factors in published scientific or economic reports, and use knowledge of statistical techniques to evaluate the validity of the reports' findings.



Communication Skills

Understanding, managing, and creating effective communications: orally, written, using multimedia.

21st Century Tools for: Communication, Information Processing, and Research

SAMPLE Student Outcomes for: Accessing, Processing, Managing, Integrating and Communicating Information



4th Grade

Word processing programs, graphic programs, presentation software, desktop publishing programs

- Present mathematical information in an oral report accompanied by charts and graphs.
- Construct charts and graphs to display mathematical information such as survey data.
- Use presentation software to present data used in a graph or project (such as a budget, scientific report, or economic analysis).



8th Grade

Word processing programs, graphic programs, presentation software, desktop publishing programs

- Prepare oral presentations of group math projects that demonstrate conceptual understanding as well as application in a specific context.
- Present written explanation of problem solving process and solution with included diagrams, tables, charts, and graphs as needed.
- Use linked table, graph, and symbolic representations (as can be displayed in a spreadsheet) to explain how components of a real-world situation are connected and how changes impact the entire system.



12th Grade

Word processing programs, graphic programs, presentation software, desktop publishing programs

- Give an oral presentation using the language of mathematics to express mathematical ideas precisely to peers and teacher in content specific and applied settings.
- Create a written argument that demonstrates the development of a mathematical conjecture and creates a convincing proof of its validity or disproof.
- Creates a presentation that uses dynamic images to illustrate a mathematical concept, connection, or problem and its applicability to a real-world context.



Critical Thinking and Systems Thinking

Use logical reasoning skills. Becoming numerate. Skillful in using various Problem-Solving strategies.

21st Century Tools for: Thinking and Problem Solving

SAMPLE Student Outcomes for: Thinking and Problem Solving



4th Grade

Word processing software, manipulatives, calculators, graphing calculators, spreadsheet software, probes, GPS, and geometry tool software.

- Apply a variety of age-appropriate strategies to solve simple open-ended problems with real-life applications, such as comparison shopping, time-distance, or measurement and proportion problems.
- Use word processing or online forums to record journal entries of their math experiences.
- Use presentation software to share their problem-solving strategies.



8th Grade

Word processing software, manipulatives, calculators, graphing calculators, spreadsheet software, probes, GPS, and geometry tool software.

- Solve problems using computation, customary and metric measurements, scale factors, ratios, and proportions
- Create graphical representations of data using graphing calculators and spreadsheets.



12th Grade

Word processing software, manipulatives, calculators, graphing calculators, spreadsheet software, probes, GPS, and geometry tool software.

- Employ more complex problem-solving methods to develop a deeper understanding of mathematics, such as simulating a construction project (within certain material & budget constraints).
- Formulate, approach, and solve problems beyond those studied using a variety of problem-solving tools such as graphing calculators, probes, GPS, and geometry tool software.



Problem Identification, Formulation and Solution

Ability to identify, analyze, and solve problems.

21st Century Tools for: Thinking and Problem Solving

SAMPLE Student Outcomes for: Thinking and Problem Solving

4th Grade



Manipulatives, calculators, graphing calculators, Smart Boards, presentation software.

- Plan, visualize, estimate, measure, test and revise their understanding of geometric shapes and measurement concepts.
- Visually demonstrate, highlight and display various patterns and relationships among numbers using virtual whiteboards and calculators.

8th Grade



Manipulatives, calculators, graphing calculators, Smart Boards, presentation software.

- Select and apply appropriate problem-solving strategies in an online group.
- Solve real-life problems involving money, such as using existing e-commerce.
- Use physical and digital models to demonstrate mathematical concepts .
- Use calculators to solve computational problems.

12th Grade



Manipulatives, calculators, graphing calculators, Smart Boards, presentation software.

- Apply an appropriate strategy to solve problems both individually and in a group.
- Use estimation to determine the reasonableness of an answer and use word-processing software to explain the process.
- Use physical and digital models to demonstrate mathematical concepts.



Creativity and Intellectual Curiosity

Develop and communicate ideas to others.

21st Century Tools for: Thinking and Problem Solving

SAMPLE Student Outcomes for: Thinking and Problem Solving

4th Grade



Digital cameras, laptop computers, multimedia presentation software, graphing calculators, probes/CBRs, Website development software

- Use digital cameras to photograph representations of geometry concepts from their surroundings.
- Transfer the photo images to create a math slide show.
- Give a presentation for an audience to explain geometry concepts.

8th Grade



Digital cameras, laptop computers, multimedia presentation software, graphing calculators, probes/CBRs, Website development software

- Use mathematical understanding and problem-solving processes to identify a community problem (such as using a limited number of buses for an expanding student body).
- Generate and analyze possible solutions for the community problem.

12th Grade



Digital cameras, laptop computers, multimedia presentation software, graphing calculators, probes/CBRs, Website development software

- Use graphing calculators and probes to collect and analyze environmental data (e.g., pH of streams) or contextual data (e.g., speed of cars in school zones).
- Develop an audience-appropriate presentation that uses analysis, interpretation and display of data and related inferences to describe the situation and possible solutions.



Interpersonal and Collaborative Skills

Working well on a team. Exercising respect for diversity of opinions.

21st Century Tools for: Interpersonal and Self- Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self- Directional Skills

4th Grade



Calculators, newspapers, Internet, spreadsheet programs, presentation software, video equipment

- Create an age-appropriate portfolio that includes a problem-solving situation related to real life.
- Create a self-assessment for evaluating a variety of age-appropriate concepts, and provide a written reflection of their problem-solving process/thinking.

8th Grade



Calculators, newspapers, Internet, spreadsheet programs, presentation software, video equipment

- Create an age-appropriate portfolio that includes a problem-solving situation related to real life.
- Create a self-assessment for evaluating a variety of age-appropriate concepts, and provide a written reflection of their problem-solving process/thinking.

12th Grade



Calculators, newspapers, Internet, spreadsheet programs, presentation software, video equipment

- Create a culminating project that demonstrates content knowledge and conceptual understanding in at least three distinct content areas; project should demonstrate problem-solving ability and ability to draw connections between mathematics content and real world settings.



Self-Direction

Monitoring one's own understanding and learning.

21st Century Tools for: Interpersonal and Self- Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self- Directional Skills



4th Grade

Calculators, computers, books,
newspapers

- Create an age-appropriate portfolio that includes a problem-solving situation related to real life.
- Create a test with a variety of concepts, and a written reflection of their problem-solving process/thinking.



8th Grade

Calculators, computers, books,
newspapers

- Create an age-appropriate portfolio that includes a problem-solving situation related to real life.
- Create a test with a variety of concepts, and a written reflection of their problem solving process/thinking.



12th Grade

Calculators, computers, books,
newspapers

- Create a culminating project that demonstrates content knowledge and conceptual understanding in at least three distinct content areas; project should demonstrate problem-solving ability and ability to draw connections between mathematics content and real world settings.



Accountability and Adaptability

Exercising personal responsibility and flexibility in various contexts. Setting and meeting high standards and goals for one's self and others.

21st Century Tools for: Interpersonal and Self- Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self- Directional Skills



4th Grade

Internet, presentation software, word processing, desktop publishing

- Establish ongoing communication with students from other communities or countries (via letters, email, or electronic bulletin boards) to share math projects.
- Develop and execute a plan to use measurements and a graphing program to collect and record accurate and complete data about the community playgrounds.



8th Grade

Internet, presentation software, word processing, desktop publishing

- Gather pertinent data from multiple sources to create a math game that reflects concepts from class and explain the game through appropriate channels (e.g., hand in manually; send as email attachment; or present orally).
- Participate in national math competitions, where students are responsible for the quality of the data they submit.
- Gather and critically analyze data from a variety of sources, and understand how and why data may not be consistent.



12th Grade

Internet, presentation software, word processing, desktop publishing

- Work on higher level mathematics that can be submitted to an agency outside the classroom (e.g., national contest, local newspaper, math bee).
- Use online bulletin boards to engage in discussions of math concepts with people (students and/or experts) from around the world; demonstrate tolerance and respect for the points of view of others.



Social Responsibility

Acting responsibly with the interests of the larger community in mind. Demonstrating ethical behavior in personal, workplace and community contexts.

21st Century Tools for: Interpersonal and Self- Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self- Directional Skills



4th Grade

Internet, presentation software, newspapers

- Children use age-appropriate mathematical and ICT skills to participate in a community service project.



8th Grade

Internet, presentation software, newspapers

- Incorporate math concepts into a community service project such as a recycling program – and research facts to determine how much of the recycled parts are used in various items.



12th Grade

Internet, presentation software, newspapers

- Identify a potential community issue that can be analyzed using a wide range of mathematical tools and develop an analysis plan.
- Collect and analyze data, and develop a report presenting data and possible interventions to address local issues.



ICT Literacy Map

DESIGNED IN COOPERATION WITH THE NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

ICT Literacy Maps are the result of hundreds of hours of research, development and feedback from educators and business leaders across the nation. The Partnership has issued ICT Literacy Maps for the core subjects of Geography, Math, English and Science. These tools are available at www.21stcenturyskills.org/matrices/.

The Partnership for 21st Century Skills advocates for the integration of Information and Communication Technology (ICT) Literacy into K-12 education so that students can learn and achieve in the core academic subjects at much higher levels. The Partnership defines ICT Literacy as the use of 21st century tools to perform learning skills.

The Partnership has forged alliances with key national organizations that represent the core academic subjects, including English, Math, Science and Geography. As a result of these collaborations, the Partnership has developed a series of ICT Literacy Maps that illustrate the intersection between ICT Literacy and core academic subjects. The maps enable educators, administrators and policymakers to gain concrete examples of how ICT Literacy can be integrated into core subjects.

LEARNING SKILLS FOR INFORMATION, COMMUNICATION, AND MEDIA LITERACY

Communication Skills

Understanding, managing, and creating effective communications: orally, written, using multimedia.

	4th Grade	8th Grade	12th Grade
21st Century Tools for: Communication, Information Processing, and Research	Word processing programs, graphic programs, presentation software, desktop publishing programs	Word processing programs, graphic programs, presentation software, desktop publishing programs	Word processing programs, graphic programs, presentation software, desktop publishing programs
SAMPLE Student Outcomes for: Accessing, Processing, Managing, Integrating and Communicating Information	<ul style="list-style-type: none"> Present mathematical information in an oral report accompanied by charts and graphs. Construct charts and graphs to display mathematical information such as survey data. Use presentation software to present data used in a graph or project (such as a budget, scientific reports, or economic analysis). 	<ul style="list-style-type: none"> Prepare oral presentations of group math projects that demonstrate conceptual understanding as well as application in a specific context. Present written explanation of problem solving process and solution with included diagrams, tables, charts, and graphs as needed. Use linked table, graph, and symbolic representations (as can be displayed in a spreadsheet) to explain how components of a real-world situation are connected and how changes impact the entire system. 	<ul style="list-style-type: none"> Give an oral presentation using the language of mathematics to express mathematical ideas precisely to peers and teacher in content specific and applied settings. Create a written argument that demonstrates the development of a mathematical conjecture and creates a convincing proof of its validity or disproof. Create a presentation that uses dynamic images to illustrate a mathematical concept, connection, or problem and its applicability to a real-world context.

PARTNERSHIP FOR 21ST CENTURY SKILLS
145 E. Toole Ste 105 Tucson, AZ 85701-1842 520-623-2466 21stcenturyskills.org © 2004 Partnership for 21st Century Skills 2

- A** Learning Skill
+
B 21st Century Tool
=
C ICT Literacy

An example from the Math ICT Literacy Map illustrates sample outcomes for teaching communication skills.

ICT Literacy Map SCIENCE

THIS MAP WAS CREATED IN COOPERATION WITH THE NATIONAL SCIENCE TEACHERS ASSOCIATION

ICT Literacy Maps are the result of hundreds of hours of research, development and feedback from educators and business leaders across the nation. The Partnership has issued ICT Literacy Maps for the core subjects of Geography, Math, English and Science. These tools are available at www.21stcenturyskills.org/matrices/.

The Partnership for 21st Century Skills advocates for the integration of Information and Communication Technology (ICT) Literacy into K-12 education so that students can learn and achieve in the core academic subjects at much higher levels. The Partnership defines ICT Literacy as the use of 21st century tools to perform learning skills.

The Partnership has forged alliances with key national organizations that represent the core academic subjects, including English, Math, Science and Geography. As a result of these collaborations, the Partnership has developed a series of ICT Literacy Maps that illustrate the intersection between ICT Literacy and core academic subjects. The maps enable educators, administrators and policymakers to gain concrete examples of how ICT Literacy can be integrated into core subjects.

LEARNING SKILLS FOR INFORMATION, COMMUNICATION, AND MEDIA LITERACY

Communication Skills

Understanding, managing, and creating effective communications: (a) orally, (b) written, (c) using multimedia.

Grade	21st Century Tools for Communication, Information Processing, and Research	SAMPLE Student Outcomes for Accessing, Processing, Managing, Integrating and Communicating Information
4th Grade	Video and audio recording devices, microphones, audio enhancement devices, assistive devices, digital recorders, computers, PDAs, word processing, spreadsheets, presentation software, email.	<ul style="list-style-type: none"> Use a variety of tools and formats (oral presentations, journals, and multimedia presentations) to summarize and communicate the results of observations. <p>E.G.</p> <ol style="list-style-type: none"> Explain, using a model constructed of modeling clay and a tree branch, how a caterpillar eats. Prepare a poster illustrating the components of a local habitat; trace a food chain in an illustrated chart. Use simple media instruments to create a clearly labeled chart of organisms observed and identified during a study of the school yard.
8th Grade	Video and audio recording devices, microphones, audio enhancement devices, assistive devices, digital recorders, computers, PDAs, word processing, spreadsheets, presentation software, email.	<ul style="list-style-type: none"> Use a wide range of tools and a variety of oral, written, and graphic formats (e.g., diagrams, flow charts, simulations, graphs) to share information and results of observations and investigations. <p>E.G.</p> <ol style="list-style-type: none"> Explain the effects on plants and animals of the loss of their natural habitat. Develop a chronological model or time scale of major events in the formation of the earth. Design a multimedia presentation explaining the interrelationships of biotic and abiotic elements in a specific ecosystem.
12th Grade	Video and audio recording devices, microphones, audio enhancement devices, assistive devices, digital recorders, computers, PDAs, word processing, spreadsheets, presentation software, email.	<ol style="list-style-type: none"> Select and use appropriate scientific vocabulary to orally share and communicate scientific ideas, plans, results, and conclusions resulting from observations and investigations. E.G. Use historical and current weather data to support a position on future weather patterns. Create written reports and journals to share and communicate scientific ideas, plans, results, and conclusions resulting from observations and investigations. E.G. Graph sunrise and sunset data from observations and investigations and relate them to the motions of the Earth. Create a multimedia presentation incorporating numeric, symbolic and/or graphic modes of representation to share scientific ideas, plans, results, and conclusions. E.G. Present data on different chemical substances in a table using appropriate headings such as compound, element, chemical and physical property.

Annotations:

- A Learning Skill** (points to the top header)
- B 21st Century Tool** (points to the tools lists)
- C ICT Literacy** (points to the sample outcomes)

Equation: A + B = C

A Learning Skill
+
B 21st Century Tool
=
C ICT Literacy

An example from the Math ICT Literacy Map illustrates sample outcomes for teaching communication skills.

Information and Media Literacy

SCIENCE

Accessing and managing information. Integrating and creating information. Evaluating and analyzing information.

21st Century Tools for: Communication, Information Processing, and Research

SAMPLE Student Outcomes for: Accessing, Processing, Managing, Integrating and Communicating Information



4th Grade

Internet, sciLINKS, Online resources, Print resources (Newspapers, Books, Newspapers, Magazines), PDA's, Web Databases (NASA, EPA, NOAA, USGS, etc) Observational and Measurement Tools (microscopes, telescopes, probes) TV programs (NASA, Discovery, National Geographic), Multimedia Applications Videos, DVD's CD ROMs), calculators, telecommunications, spreadsheets, word-processing.

1. Access information from a variety of media sources (i.e. Internet, CD-ROM programs, print resources). **E.G.** Research characteristics of beaks, feet, websites, legs, wings, and coloration to compare adaptations in various species of birds.
2. Use appropriate tools to measure and graph data. **E.G.** Measure and graph indoor and outdoor temperatures at different times of the year to identify patterns of change.
3. Analyze and compare data from a variety of age-appropriate sources such as newspapers and websites. **E.G.** Analyze and compare seasonal changes in temperature and rainfall for different regions.



8th Grade

Internet, sciLINKS, Online resources, Print resources (Newspapers, Books, Newspapers, Magazines), PDA's, Web Databases (NASA, EPA, NOAA, USGS, etc) Observational and Measurement Tools (microscopes, telescopes, probes) TV programs (NASA, Discovery, National Geographic), Multimedia Applications Videos, DVD's CD ROMs), calculators, telecommunications, spreadsheets, word-processing.

1. Use a variety of information access tools to locate, gather, and organize potential sources of scientific information to answer questions. **E.G.** Answer the question: How does the range of sounds that humans can hear compare with the range of sounds that other animals can hear?
2. Collect real-time observations and data synthesizing and building upon existing information (e.g., online databases NOAA, EPA, USGS) to solve problems. **E.G.** Collect data and search print and electronic resources to gather and record past data on the change in the turbidity of a river after a rainfall and its effect on the plants and animals living in this habitat.
3. Use appropriate tools to analyze and synthesize information (e.g., diagrams, flow charts, frequency tables, bar graphs, line graphs, and stem-and-leaf plots) to draw conclusions and implications based on investigations of an issue or question. **E.G.** Compile qualitative and quantitative data gathered through an investigation of past and current earthquake epicenters and regions of volcanic activity in order to identify needs and problems arising from events relating to the earth's crust.



12th Grade

Internet, sciLINKS, Online resources, Print resources (Newspapers, Books, Newspapers, Magazines), PDA's, Web Databases (NASA, EPA, NOAA, USGS, etc) Observational and Measurement Tools (microscopes, telescopes, probes) TV programs (NASA, Discovery, National Geographic), Multimedia Applications Videos, DVD's CD ROMs), calculators, telecommunications, spreadsheets, word-processing.

1. Select and analyze information from various sources, including electronic and print resources, community resources, and personally collected data, to answer questions being investigated. **E.G.** Answer the question: What effect does ultraviolet radiation, carcinogens, water pollution, toxins, or nuclear radiation have on developing organisms?
2. Collect and use qualitative and quantitative data and information, seek evidence and sources of information to identify flaws such as errors and bias and explain how the evidence gathered supports or refutes an initial hypothesis. **E.G.** Explain possible sources of error when predicting weather.
3. Analyze data and information gathered to clarify problems or issues identifying costs and benefits from a social, cultural, and/or environmental perspective; predicting the consequences of action or inaction; and proposing possible solutions. **E.G.** Articulate issues concerning the impact of developments in space research and technology in agriculture, navigation, and telecommunications.



Communication Skills

SCIENCE

Understanding, managing, and creating effective communications: (a) orally, (b) written, (c) using multimedia.

21st Century Tools for: Communication, Information Processing, and Research

SAMPLE Student Outcomes for: Accessing, Processing, Managing, Integrating and Communicating Information



4th Grade

Video and audio recording devices, microphones, audio enhancement devices, assistive devices, digital recorders, computers, PDAs, word processing, spreadsheets, presentation software, email.

- Use a variety of tools and formats (oral presentations, journals, and multimedia presentations) to summarize and communicate the results of observations.

E.G

- Explain, using a model constructed of modeling clay and a tree branch, how a caterpillar eats.
- Prepare a poster illustrating the components of a local habitat; trace a food chain in an illustrated chart.
- Use simple media instruments to create a clearly labeled chart of organisms observed and identified during a study of the school yard.



8th Grade

Video and audio recording devices, microphones, audio enhancement devices, assistive devices, digital recorders, computers, PDAs, word processing, spreadsheets, presentation software, email.

- Use a wide range of tools and a variety of oral, written, and graphic formats (e.g., diagrams, flow charts, simulations, graphs) to share information and results of observations and investigations.

E.G

- Explain the effects on plants and animals of the loss of their natural habitat.
- Develop a chronological model or time scale of major events in the formation of the earth.
- Design a multimedia presentation explaining the interrelationships of biotic and abiotic elements in a specific ecosystem.



12th Grade

Video and audio recording devices, microphones, audio enhancement devices, assistive devices, digital recorders, computers, PDAs, word processing, spreadsheets, presentation software, email.

- Select and use appropriate scientific vocabulary to orally share and communicate scientific ideas, plans, results, and conclusions resulting from observations and investigations.

E.G. Use historical and current weather data to support a position on future weather patterns.

- Create written reports and journals to share and communicate scientific ideas, plans, results, and conclusions resulting from observations and investigations.

E.G. Graph sunrise and sunset data from observations and investigations and relate them to the motions of the Earth.

- Create a multimedia presentation incorporating numeric, symbolic and/or graphic modes of representation to share scientific ideas, plans, results, and conclusions.

E.G. Present data on different chemical substances in a table using appropriate headings such as compound, element, chemical and physical property.



Critical Thinking and Systems Thinking

SCIENCE

1. Exercising sound reasoning. 2. Making complex choices. 3. Understanding the interconnections among systems.

21st Century Tools for: Thinking and Problem Solving

SAMPLE Student Outcomes for: Thinking and Problem Solving



4th Grade

Drawing, graphing, and concept mapping software, observational and measurement tools (microscopes, telescopes, probes), digital cameras, digital recording devices, PDAs, calculators, computers, databases, print materials.

1. Apply a variety of age-appropriate strategies to address real-life issues.
E.G. Identify factors that affect plants and animals in a specific habitat and research the effects on plants and animals of the loss of their natural habitat.
2. Build a concept map to understand a complex problem.
E.G. Illustrate each of the three states of matter and how changes among them are interrelated.
3. Appropriately organize observations and data into tables, charts and graphs for interpretation of interconnections.
E.G. Display data gathered in a population-simulation exercise, using a labeled graph; classify species of insects in the neighborhood according to habitat, using a chart or table.



8th Grade

Drawing, graphing, and concept mapping software, observational and measurement tools (microscopes, telescopes, probes), digital cameras, digital recording devices, PDAs, calculators, computers, databases, print materials.

1. Execute the steps of scientific inquiry to engage in the problem-solving and decision making processes.
E.G. Make qualitative and quantitative observations; classify objects and phenomena.
2. Apply new and unusual applications of existing knowledge to new and different situations.
E.G. Identify factors to be considered in making informed decisions about land use.
3. Make sketches, graphs, and diagrams to explain ideas and to demonstrate the interconnections between systems.
E.G. Create a simulation to demonstrate the movement of water and nutrients between cells and through various organs and systems.



12th Grade

Drawing, graphing, and concept mapping software, observational and measurement tools (microscopes, telescopes, probes), digital cameras, digital recording devices, PDAs, calculators, computers, databases, print materials.

1. Pursue scientific inquiry such as observation and measurement, hypothesis formulation and analysis, and value the scientific “habits of mind” such as persistence, accuracy and collaboration.
E.G. Identify local environmental factors that may lead to a change in a cell's genetic information or an organism's development and investigate the consequences such factors have on human development.
2. Generate solutions to scientific questions and challenges through developing, modeling and revising investigations.
E.G. Demonstrate various methods which can be used to control the conditions of plant growth (e.g., how conditions are controlled in a greenhouse, nursery, or hydroponic installation).
3. Apply scientific knowledge and skills to make reasoned decisions about the use of science and scientific innovations.
E.G. Investigate the impact of genetic engineering of crops on global and local food production, and populations.

Problem Identification, Formulation and Solution

1. Ability to frame, analyze and solve problems.

21st Century Tools for: Thinking and Problem Solving

SAMPLE Student Outcomes for: Thinking and Problem Solving



4th Grade

Computers, observational and measurement tools (microscopes, telescopes, probes), PDAs, spreadsheets, graphing tools, modeling software, word processing, Internet, databases, print materials.

1a. Ask questions and plan investigations to find answers and solutions.

E.G. Predict, test, and draw conclusions about the removal of a part from a series circuit made with wires, battery, light bulb, and socket.

1b. Compile data gathered through observations in order to record and present results, using tally charts, tables, and graphs.

E.G. Compile and display data gathered from a study of electric circuits to demonstrate the function of their component parts (e.g., switches, power source).

1c. Use evidence to construct explanations.

E.G. Design and construct a simple circuit that will operate a device such as a light bulb.



8th Grade

Computers, observational and measurement tools (microscopes, telescopes, probes), PDAs, spreadsheets, graphing tools, modeling software, word processing, Internet, databases, print materials.

1a. Formulate a scientific question about phenomena, a problem, or an issue and using a broad range of tools and techniques; plan and conduct an inquiry to address the question.

E.G. Investigate how local recycling efforts help conserve energy and natural resources.

2. Use evidence collected from observations or other sources (e.g., Internet, databases, print materials) and use them to create models and explanations.

E.G. Compile data gathered from to record and present results of local recycling effort.



12th Grade

Computers, observational and measurement tools (microscopes, telescopes, probes), PDAs, spreadsheets, graphing tools, modeling software, word processing, Internet, databases, print materials.

1. Formulate scientific questions about an issue and define experimental procedures for finding answers.

E.G. Research the use of fertilizers and pesticides on soil.

2. Plan and conduct practical tests to solve problems or answer a question, collect and analyze data using appropriate instruments and techniques safely and accurately.

E.G. Test water quality, air quality, and/or soil composition.

3. Develop models and explanations to fit evidence obtained from investigations.

E.G. Develop a flowchart graphic to illustrate the flow of fertilizers and pesticides through a local ecosystem.



Creativity and Intellectual Curiosity

SCIENCE

I. Develop, implement and communicate new ideas to others.

21st Century Tools for: Thinking and Problem Solving

SAMPLE Student Outcomes for: Thinking and Problem Solving

4th Grade



Brainstorming software, collaboration software (including web-based collaborative network software), telecommunications, presentation software, digital cameras, projectors.

I. Use a variety of equipment and software packages to enter, process, display, and communicate information in different forms using text, tables, pictures, and sound.

E.G. Create a shade chart of a selected color; make a spinning color wheel to demonstrate how “white” light is composed of all the colors.

8th Grade



Brainstorming software, collaboration software (including web-based collaborative network software), telecommunications, presentation software, digital cameras, projectors.

I. Use a variety of media tools to make oral and written presentations, which include written notes and descriptions, drawings, photos, and charts to communicate the procedures and results of investigations.

E.G. Communicate the procedures and results of an investigation that evaluates and compares the quality of water from different sources by performing simple tests (e.g., for pH, salinity, hardness, temperature, turbidity).

12th Grade



Brainstorming software, collaboration software (including web-based collaborative network software), telecommunications, presentation software, digital cameras, projectors.

I. Prepare multimedia presentations to share results of investigations, demonstrating a clear sense of audience and purpose.

E.G. Use a multi media presentation to describe the factors determining the quality of a water source.

2. Use electronic networks (e.g., chat rooms) to share information.

E.G. Share the results of an investigation of water quality with neighboring communities.

3. Model solutions to a range of problems in science and technology using computer simulation software.

E.G. Create a simulation illustrating the movement of water and nutrients between cells and through various organs and systems.

Interpersonal and Collaborative Skills

1. Demonstrating teamwork and working productively with others. 2. Demonstrating and the ability to adapt to varied roles and responsibilities. 3. Exercise empathy and respecting diverse perspectives.

21st Century Tools for: Interpersonal and Self-Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self-Directional Skills



4th Grade

Brainstorming software, collaboration software (including web-based collaborative network software), calculators, newspapers, Internet, spreadsheet programs, presentation software, video equipment, computers, team competitions (e.g. Science Olympics, Exploravision).

1. Plan and conduct scientific investigations in group settings.
E.G. Work in teams to design and construct a boat that holds paper clips, and moves through water using a magnet.
2. Engage in group decision making activities.
E.G. Collaborate on the design and construction of a boat that holds paper clips, and moves through water using a magnet.
3. Role-play different points of view on an issue
E.G. Role-play various viewpoints on maintaining a healthy environment.



8th Grade

Brainstorming software, collaboration software (including web-based collaborative network software), calculators, newspapers, Internet, spreadsheet programs, presentation software, video equipment, computers, team competitions (e.g. Science Olympics, Exploravision).

1. Work in diverse pairs/teams to answer questions, solve problems and make decisions.
E.G. Participate in NSTA's ExploraVision, state-based Science Olympiads).
2. Plan and develop team science projects.
E.G. Design a project which will address the factors that must be considered in making informed decisions about land use (e.g., environmental impact, jobs, present and future values of natural resources).
3. Articulate understanding of content through personal interaction and sharing with peers.
E.G. Create a table to show peers the relationship between the buoyant forces and the size of objects.



12th Grade

Brainstorming software, collaboration software (including web-based collaborative network software), calculators, newspapers, Internet, spreadsheet programs, presentation software, video equipment, computers, team competitions (e.g. Science Olympics, Exploravision).

1. Create a culminating team project that demonstrates content knowledge and conceptual understanding and shows connections between science content and real-world settings.
E.G. Construct and test a simple loudspeaker; construct, test, and demonstrate a simple audio amplifier.
2. Collect, synthesize and report information from a variety of points of view (e.g., debates, discussions, presentations).
E.G. Create a report for local authorities highlighting the pros and cons (E.G. economic, personal, and scientific factors) of long term storage of radioactive waste materials.

Self-Direction

SCIENCE

1. Monitoring one's own understanding and learning needs, locating resources, and transferring learning from one domain to another.



4th Grade

Planning, scheduling and evaluation tools (personal digital, computer, and web-based resources), calculators, computers, books, newspapers.

1. Keep a journal record of observations, recognizing patterns, summarizing findings, and reflecting on the observations.

E.G. Maintain a journal describing changes in the characteristics, behavior, and location of living things that occur in seasonal cycles E.G. trees shed their leaves, birds migrate, humans change clothing, do different activities.



8th Grade

Planning, scheduling and evaluation tools (personal digital, computer, and web-based resources), calculators, computers, books, newspapers.

1. Keep a journal of observations and investigations, and periodically evaluate entries to assess progress toward achieving the understanding of key ideas.

E.G. Maintain a journal describing changes to a specific habit over extended periods of time.



12th Grade

Planning, scheduling and evaluation tools (personal digital, computer, and web-based resources), calculators, computers, books, newspapers.

1. Use key ideas of science to document and explain through an investigation the relationship between science concepts

E.G. Investigate the complex interconnectedness of physical, chemical, and biological processes as they apply to the Earth.

2. Self-assess progress toward a predetermined outcome and decide what needs to be done to meet the goal.

E.G. Maintain a journal highlighting understandings of various science concepts and questions still needing to be addressed.

21st Century Tools for: Interpersonal and Self-Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self-Directional Skills



Accountability and Adaptability

1. Exercising personal responsibility and flexibility in personal, workplace and community contexts. 2. Setting and meeting high standards and goals for one's self and others.

21st Century Tools for: Interpersonal and Self-Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self-Directional Skills



4th Grade

Planning, scheduling and evaluation tools (personal digital, computer and web-based resources), Internet, presentation software, word processing.

1. Establish ongoing communication with students from other communities or countries to share and compare data.

E.G.

- Use letters, email, or electronic bulletin boards to share and compare data on rainfall, temperatures, migrations, etc.
- Write a letter to an electronic pen pal highlighting progress in a specific investigation.



8th Grade

Planning, scheduling and evaluation tools (personal digital, computer and web-based resources), Internet, presentation software, word processing.

1. Develop and execute a plan to collect and record accurate and complete data from various sources to solve a problem or answer a question. Gather and critically analyze data from a variety of sources.

E.G. Participate in an electronic project such as NASA's "Globe" initiative.

2. Participate in science competitions, where students are responsible for creating a product or participating in an event.

E.G. Design a device or participate in the Science Olympics.



12th Grade

Planning, scheduling and evaluation tools (personal digital, computer and web-based resources), Internet, presentation software, word processing.

1. Identify the reputable and appropriate communities of learners to whom research findings should be reported, compare data, and adapt it as needed.

E.G. Identify key decision makers in the community who are responsible for determining the site of a landfill, share class research and obtain feedback.

2. Use science learned to create a personal action plan on a community issue.

E.G. Use technological solutions to address local transportation needs and use scientific principles to explain the way they function.



Social Responsibility

SCIENCE

1. Acting responsibly with the interests of the larger community in mind. 2. Demonstrating ethical behavior in personal, workplace and community contexts.

21st Century Tools for: Interpersonal and Self-Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self-Directional Skills



4th Grade

Web-based forums, online communities of learners.

1. Collaborate with other learners by letter, phone, or online.
E.G. Use letters, email, or electronic bulletin boards to share and compare data on rainfall, temperatures, migrations, etc.
2. Participate in simulation or role-playing activities.
E.G. Wear appropriate protective equipment and select and apply appropriate techniques for handling, storing, and disposing of laboratory materials when doing science investigations.



8th Grade

Web-based forums, online communities of learners.

1. Collaborate with a network of learners by phone, video, virtual classroom platform.
E.G. Use letters, email, or electronic bulletin boards to share and compare data on rainfall, temperatures, migrations, etc.
2. Participate in simulation or role-playing activities in which students grapple with the ethics of complex issues.
E.G. Debate the pros and cons of stem-cell research.



12th Grade

Web-based forums, online communities of learners.

1. Collaborate with interested learners using appropriate web resources and publication media such as journals (print and electronic).
E.G. Use a variety of information sources to conduct a cost-benefit analysis of the environmental impact of a particular technology.

ICT Literacy Map ENGLISH

DESIGNED IN COOPERATION WITH THE NATIONAL COUNCIL OF TEACHERS OF ENGLISH

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	4th Grade	8th Grade	12th Grade
21st Century Tools for: Communication, Information Processing, and Research	Historical fiction, photos, internet and other information research tools, TV	Historical fiction, photos, internet and other information research tools, TV, comic strips, movies, electronic correspondence, TV, magazine ads	Historical fiction, photos, internet and other information research tools, TV, comic strips, movies, electronic correspondence, multimedia resources, primary sources, audio recording, internet
SAMPLE Student Outcomes for: Accessing, Processing, Managing, Integrating and Communicating Information	<ul style="list-style-type: none"> After reading a piece of historical fiction, view related historic or family photos. Make inferences about the people portrayed and their lifestyle, analyze what is not in the photo as well as what is, or evaluate how these photographs help students understand this period in history. Using an internet bibliography (bookmarks) on an endangered animal, locate and select interesting and accurate information and create a scavenger hunt for classmates to follow. Make a record of commercials aired during Saturday morning cartoon programming. Categorize and tally such details as the kinds of products advertised, the method(s) the ad uses to attract younger viewers, the gender the ad seems to address, and estimated ages of children appearing in the ads. Select several of the ads and survey schoolmates about which ads are favorites. Analyze the survey for patterns of popular appeal. What are "patterns of popular appeal"? 	<ul style="list-style-type: none"> Survey and compare movie viewing habits and popular types of movies and titles with a partner class in another region or country. Include a well-formatted bibliography of the most popular movies. Analyze the results for trends or conclusions. Compare the results with national surveys. Search information from a variety of print, online, and non-print sources for a report on a topic of personal interest related to the Holocaust. Evaluate the information using criteria for validity and reliability. Give rationale for any sources suspected to be unreliable. From a favorite magazine, choose a variety of advertisements of products that are personally appealing. Analyze the techniques used by each advertisement to attract teen buyers. 	<ul style="list-style-type: none"> Analyze the portrayal of bosses in popular media (comic strips, TV comedies, TV dramas, movies), identifying stereotypes found and identifying the kinds of "real life" bosses that are not included. Choose a social issue or controversy that has been a subject of protest songs. Using primary sources (print, digital, or community resources), research an aspect of the issue to use as background in writing an original protest song or lyrics. Identify characteristics of suspect information that may indicate it is an internet hoax, fraudulent activity or an unreliable source. Distinguish satire and parody from other non-ironic forms of expression.

A Learning Skill
+ B 21st Century Tool
= C ICT Literacy

An example from the Math ICT Literacy Map illustrates sample outcomes for teaching communication skills.

Information and Media Literacy

ENGLISH

Analyzing, accessing, managing, integrating, evaluating and creating information in a variety of forms and media. Understanding the role of media in society.

21st Century Tools for: Communication, Information Processing, and Research

SAMPLE Student Outcomes for: Accessing, Processing, Managing, Integrating and Communicating Information



4th Grade

Historical fiction, photos, internet and other information research tools, TV

- After reading a piece of historical fiction, view related historic or family photos. Make inferences about the people portrayed and their lifestyle, analyze what is not in the photo as well as what is, or evaluate how these photographs help students understand this period in history.
- Using an internet bibliography (bookmarks) on an endangered animal, locate and select interesting and accurate information and create a scavenger hunt for classmates to follow.
- Make a record of commercials aired during Saturday morning cartoon programming. Categorize and tally such details as the kinds of products advertised, the method(s) the ad uses to attract younger viewers, the gender the ad seems to address, and estimated ages of children appearing in the ads. Select several of the ads and survey schoolmates about which ads are favorites. Analyze the survey for patterns of popular appeal. What are "patterns of popular appeal?"



8th Grade

Historical fiction, photos, internet and other information research tools, TV, popular movies, electronic correspondence, TV, magazine ads

- Survey and compare movie viewing habits and popular types of movies and titles with a partner class in another region or country. Include a well-formatted bibliography of the most popular movies. Analyze the results for trends or conclusions. Compare the results with national surveys.
- Search information from a variety of print, online, and non-print sources for a report on a topic of personal interest related to the Holocaust. Evaluate the information using criteria for validity and reliability. Give rationale for any sources suspected to be unreliable.
- From a favorite magazine, choose a variety of advertisements of products that are personally appealing. Analyze the techniques used by each advertisement to attract teen buyers.



12th Grade

Historical fiction, photos, internet and other information research tools, TV, comic strips, movies, electronic correspondence, multimedia resources, primary sources, audio recording, internet

- Analyze the portrayal of bosses in popular media (comic strips, TV comedies, TV dramas, movies), identifying stereotypes found and identifying the kinds of "real life" bosses that are not included.
- Choose a social issue or controversy that has been a subject of protest songs. Using primary sources (print, digital, or community resources), research an aspect of the issue to use as background in writing an original protest song or lyrics.
- Identify characteristics of suspect information that may indicate it is an internet hoax, fraudulent activity or an unreliable source.
- Distinguish satire and parody from other non-ironic forms of expression.



Communication Skills

ENGLISH

Understanding, managing and creating effective oral, written and multimedia communication in a variety of forms and contexts.

21st Century Tools for: Communication, Information Processing, and Research

SAMPLE Student Outcomes for: Accessing, Processing, Managing, Integrating and Communicating Information



4th Grade

READING

Internet and other information research tools, Library of Congress American Memory database, print media, video games, novels, newspaper, email, science textbook

WRITING

Chat rooms/discussion forums, cameras/recording equipment, multimedia resources, video camera/editing, book production tools

READING

- Read and skim pre-selected print and online materials on pre-civil war occupations. Search the American Memory database (or a similar sponsored digital archive) for relevant and interesting images, textual explanations, and sound files.
- Use pre-selected magazines, books, and newspapers for information on local or regional authors. Create a keyword list for online searches on the author and his or her famous works.
- As a group, select a class reading and contact the author for an online or face-



8th Grade

READING

Internet and other information research tools, Library of Congress American Memory database, print media, video games, novels, newspaper, email, science textbook, multi-media, collaborative telecommunications, novels

WRITING

Chat rooms/discussion forums, cameras/recording equipment, multimedia resources, video camera/editing, book production tools, novels, multimedia resources, presentation tools (slideshow, video), audio recording equipment

READING

- Describe one's own process for reading and evaluating a website or other text containing a variety of embedded links
- Using a topic of interest (based on units covered in the class science, social studies, history, or math classes), create an annotated bibliography of important resource materials (books, newspapers, magazines, online sources, video, music, etc.). Include a working bibliography of sources consulted or skimmed but not selected.
- Interact with peers, authors, and others using collaborative telecommunications



12th Grade

READING

Internet and other information research tools, Library of Congress American Memory database, print media, video games, novels, newspaper, email, science textbook, electronic communications, non-linear texts/movies, multimedia

WRITING

Chat rooms/discussion forums, cameras/recording equipment, multimedia resources, video camera/editing, book production tools, novels, multimedia resources, presentation tools, print publication tools, audio/video production tools

- Identify, read, and navigate multiple resources and information venues for a chosen interest area or occupation. These resources should include collections of books, print and online magazines and journals, websites, email lists, professional blogs, and other forms of professional interactions between members of the chosen field. Create a chart of the personal responses (both positive and negative) of this occupation.
- Interpret the status of the materials they read, collect, transfer, and use based on the current conventions governing intellectual property, trademark, copyright, Fair Use and plagiarism.

Communication Skills (continued)

ENGLISH

Understanding, managing and creating effective oral, written and multimedia communication in a variety of forms and contexts.

SAMPLE Student Outcomes for: Accessing, Processing, Managing, Integrating and Communicating Information (continued)



4th Grade

- to-face class discussion of that work.
- Collect information on appropriate gaming systems that require students to read (and write) and navigate complicated online spaces. If technically possible, demonstrate the navigation and reading skills required to use these games.
- Compare reading skills used in reading a novel with the skills used in reading a newspaper article, an email, a chat format, a note from a friend, or a chapter in the class science textbook.



8th Grade

- tools (i.e., email, threaded discussion, audio and video conferencing) to conduct literature circles on a novel read in common.
- WRITING**
- Conduct research on an award-winning adolescent literature book they have read. After researching the author and award, students write a review for the children's section of the local newspaper, or for school newspaper.
 - Compose a team short-story presentation that includes a script, text, sound, images, and video clips. Create it around this question: "What would it be like to stand beside Martin Luther King, Jr. as he looks over thousands of Americans, their faces full of hope, and begins his famous speech, 'I Have a Dream?'"
 - Create an audio history presentation (suitable for school broadcast if possible) by producing audio profiles of students' parental occupations.



12th Grade

- Navigate a non-linear text (such as tutorials written in individualized, hyperlinked power-point presentations, or a non-linear film) to access relevant information or to follow the sequence cues of non-linear narratives.
- Select and organize abundant materials (digital and print) according to the basic principles of information management. Read and understand the organizational efforts of others. Students can demonstrate this by creating a substantial web site of personal portfolio materials that is not only easy to navigate and read at the interface level, but also organized and understandable at the file-management level.
- Write and illustrate a brochure introducing a classmate to a classic book, film, web site, musical, etc. Then, combining audio and video formats, create a persuasive presentation for classmates about it. Describe the advantages of brochures and audio/video presentations for a particular audience member in a specific situation.

Critical Thinking and Systems Thinking

ENGLISH

Exercising sound reasoning in understanding and making complex choices, understanding the interconnections among systems.

21st Century Tools for: Thinking and Problem-Solving Skills

SAMPLE Student Outcomes for: Thinking and Problem-Solving Skills



4th Grade

Internet and other information research tools, multi-media production tools

- Complete an inquiry-based WebQuest (<http://www.webquest.org/>) or other information portal, asking students to complete activities that exercise content area reading strategies.
- Research a great thinker or writer; locating, evaluating and collecting information from a variety of sources; and presenting findings through a multi-media presentation in the form of a piece of art, an original song, a news review, or a slideshow.
- Present a survey of the digital and non-digital technologies fellow students use in the course of a typical week, explaining how these technologies affected their abilities to learn and communicate.



8th Grade

Internet and other information research tools, novels

- Complete a collaborative research project that utilizes online research methods.
- In the novel *The Last Book in the Universe*, by Rodman Philbrick, the main character poses the question: "Why bother to read any more if you can just probe [experience the world exclusively through virtual "reality"]?" Participate in a panel discussion, giving a reaction to this question from one of these viewpoints: William Shakespeare, a Sony executive in charge of the PlayStation division, a science fiction author, a student of 1990, a student of 2050.



12th Grade

Internet and other information research tools, multi-media/digital production tools, novels

- Construct a virtual museum exhibit depicting the role of the American Dream in classic texts.
- Maintain a generative self-reflective journal (either print or online) that is utilized and referenced throughout the development of a project or unit.



Problem Identification, Formulation and Solution

Ability to frame, analyze and solve problems.

21st Century Tools for: Thinking and Problem-Solving Skills

SAMPLE Student Outcomes for: Thinking and Problem-Solving Skills



4th Grade

Internet and other information research tools, email, online collaboration tools

- Conduct a research project using print, multimedia, CD-Rom, and online resources.
- Correspond with email pals or mentors from other cultures or geographic areas, comparing homework policies, looking for ways to improve one's own classroom's homework procedures.
- Ask for and give writing and editing suggestions in an online collaborative writer's workshop.



8th Grade

Internet and other information research tools, email, online collaboration tools

- Collaborate with mentors or peer groups to generate shared questions and lines of inquiry.
- Participate in class discussions of peer reviewed writing to select pieces for a class anthology.
- Develop and publish a collaborative essay (a multiple-authored work).



12th Grade

Internet and other information research tools, email, interactive communication tools, digital camera/production tools, online collaboration tools

- For a selected topic, evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources.
- Participate in an online interactive debate with student panels and evaluator-experts.
- As an analysis of the work of an influential film director, annotate video sources to identify key scenes and/or information, react and respond to content, and communicate interpretations and understanding to a select audience.
- Create digital videos that present a persuasive argument that calls for social action or community change.

Creativity and Intellectual Curiosity

ENGLISH

Developing, implementing and communicating new ideas to others, staying open and responsive to new and diverse perspectives.

21st Century Tools for: Thinking and Problem-Solving Skills

SAMPLE Student Outcomes for: Thinking and Problem-Solving Skills



4th Grade

Digital video/presentation tools, multimedia production tools

- Use digital video or presentation software to create narratives, communicate oral histories, or to present a visual read aloud.
- Contribute multi-media, multi-genre artifacts or displays to a community historical society that provide information about a community group (e.g., new immigrants, community occupations, children's activities) not represented in the society's exhibits.



8th Grade

Audio & video recording & production equipment, multimedia production tools

- Create and record a parody of a familiar song, echoing the original rhyme scheme and rhythm, and creating a humorous or satiric effect.
- Compile a digital classroom anthology (e.g., on CD, DVD, or web published) of student work in a variety of genres on the theme "Where I'm From."
- Using a video camera, record a montage of scenes from a classroom or the school as a whole, creating special effects with shooting angles, range, lighting, composition, camera features. Describe the impact of these effects.



12th Grade

Audio & video recording & production equipment, multimedia production tools, print publication tools

- Create multimedia presentations to communicate multiple levels of understanding on a specified topic.
- Use productivity tools to publish a class anthology of book reviews of novels read during a unit on international authors.



Interpersonal and Collaborative Skills

ENGLISH

Demonstrating teamwork and leadership; adapting to varied roles and responsibilities; working productively with others; exercising empathy; respecting diverse perspectives.

21st Century Tools for: Interpersonal and Self-Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self-Directional Skills



4th Grade

Presentation tools, online message board, print publication tools

- Complete a presentation using commonly available presentation tools as a class with each student assuming responsibility for one or two slides.
- Respond to an online message board responding to questions concerning literary texts.
- Create a class literary magazine.
- Contribute to a storytelling website in conjunction with a local civic organization.



8th Grade

Presentation tools, online message board, print publication tools, email, collaborative writing tools

- Fulfill individual roles in a Webquest (<http://www.webquest.org/>) researching a topic of local interest and creating an informative newscast using the findings.
- Analyze the effectiveness of the interaction in a group problem solving task such as solving a mini-mystery with each group member having only a small piece of the information.
- Create a class survey on the various communication methods class members have used outside school in the last month.
- Collaborate with email pals and online mentors from other cultures and geographical areas in order to write a collaborative essay or create an interactive, interpretive project (i.e., on Mark Twain's America).
- Use a wiki (a web-based collaboration tool) or other discussion tool like a weblog to create and maintain a dialogue journal discussing the reading of a shared text with a partner or group.
- Participate in the class interpretive community through class opinion bulletin boards or interactive graphs, class response walls featuring marginal notes captured on sticky notes, or posting graphic representations of understanding such as timelines, picture maps or storyboards.



12th Grade

Presentation tools, online message board, print publication tools, collaborative writing tools chat rooms, email, video camera/ editing tools

- Interact thoughtfully with class members in a class-created chat room for responses to novels.
- Assume the persona of a character from multicultural literature in collaboration with e-pals from across the world and research the culture and ideologies of that character.
- Use video cameras and editing software to create a DVD of a collaboratively written play.



Self-Direction

ENGLISH

Monitoring one's own understanding and learning needs, locating appropriate resources, transferring learning from one domain to another.

21st Century Tools for: Interpersonal and Self-Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self-Directional Skills



4th Grade

Internet and other information research tools

- Search the Internet for reliable and trustworthy websites to enhance classroom research.
- Use Internet information in oral storytelling activities.



8th Grade

Internet and other information research tools, multimedia production tools,

- Develop a reflective online journal or weblog detailing new understandings, connections, and ideas developing in the course of creating an individual project.
- Debate opposing viewpoints found on the Internet.



12th Grade

Internet and other information research tools, web authoring

- Evaluate information found on the internet to distinguish between information and propaganda, satire, or commercialism on the Internet.
- Compare and contrast information on same topic found in a variety of media, such as newspapers, journals, magazines, and websites, for authenticity and voice.
- Develop a "Frequently Asked Questions" type research paper (that explains a topic thoroughly, based on likely questions about the subject) as a webpage.

Accountability and Adaptability

ENGLISH

Exercising personal responsibility and flexibility in personal; workplace and community contexts; setting and meeting high standards and goals for one's self and others; tolerating ambiguity.

21st Century Tools for: Interpersonal and Self-Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self-Directional Skills



4th Grade

Internet and other information research tools, computer software

- Complete a research task on the computer within the assigned timeline.
- Use a variety of keyword research strategies when faced with difficulties in finding information.
- Understand the importance of doing one's own work and not plagiarizing other's work.



8th Grade

Internet and other information research tools, word processing and revision tools

- Work independently utilizing a variety of information resources.
- Respond to writing of classmates with appropriate feedback and reflective critiques, using computer programs or online formats that have commenting features and other interactive revision and collaboration tools.
- Collaboratively explore information and process that information in a variety of forms – poetry, websites, storytelling, video, photography.



12th Grade

Internet and other information research tools, word processing and revision tools, multimedia production tools, presentation tools

- Complete complex, higher-level projects utilizing a diverse range of resources including media, personal interviews, and group presentations.
- Create and produce a DVD or website promoting personal responsibility.



Social Responsibility

ENGLISH

Acting responsibly with the interests of the larger community in mind; demonstrating ethical behavior in personal, workplace, and community contexts.

SAMPLE Student Outcomes for: Interpersonal and Self-Directional Skills



4th Grade

- Understand when technology will enhance their learning.
- Make practical decisions in selecting the use of a technology to enhance learning in a particular situation.
- Illustrate respect for all when sending communication via the Internet.
- Act with respect for others when using PDAs, cellular phones, text messaging, and digital cameras.
- Acquire a spirit of global understanding through virtual field trips, conferencing, and distance learning opportunities.



8th Grade

- Apply responsible research practices to avoid plagiarism.
- Understand the global nature of technology and understand the sensitivity of information posted electronically.
- Access real-time global news through technology to stay informed of current events.



12th Grade

- Make responsible decisions about use of material based on the rules governing intellectual property, trademark, copyright, fair use and plagiarism.
- Understand that critical literacy reaches beyond print materials.
- Take responsibility for personal communications, websites, and other information products.
- Be aware of fraudulent practices, Internet theft, threats to personal information.
- Reach out to those who have no access to technology.
- Understand the value of information technology for their future careers.



Critical Thinking and Problem Solving Skills

Exercise sound reasoning in understanding. Make complex choices. Understand the interconnections among systems. Frame, analyze and solve problems.

21st Century Tools for Learning & Thinking

4th Grade



- Search engines & strategies
- Spreadsheet & graphing software
- Online sources
- Print resources
- Digital images
- Web publishing software
- Brainstorming software
- Graphics software (drawing, painting, image editing)
- Multimedia resources (clip art, video, sound, animations)
- CAI & simulation software
- Videoconferencing and interactive TV
- TV, Video, & DVD
- GIS & GPS tools

8th Grade



- Search engines & strategies
- Electronic reference material (online libraries, databases, encyclopedias, atlases, almanacs, E-texts)
- Primary Sources (text, graphic, audio, multimedia, & material culture)
- Print sources (newspapers, journals, books, magazines, maps)
- Graphics software (drawing, painting, photo & video editing)
- Publishing & multimedia creation (clip art, video, sound, animations, Web authoring, word processing & layout programs)
- Data collection, manipulation, & storage tools (spreadsheets, graphing, databases, digital cameras, surveys)
- Concept mapping/graphic organizers (Inspiration, Timeliner)
- Presentation tools (software, projection devices, "smart" whiteboards)
- CAI & simulation software
- Videoconferencing and interactive TV
- TV, Video, & DVD
- GIS & GPS tools

12th Grade



- Search engines & strategies
- Electronic reference material (online libraries, databases, encyclopedias, atlases, almanacs, E-texts)
- Primary Sources (text, graphic, audio, multimedia, & material culture)
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- Videoconferencing and interactive TV
- TV, Video, & DVD
- GIS & GPS tools



Critical Thinking and Problem Solving Skills (continued)

Exercise sound reasoning in understanding. Make complex choices. Understand the interconnections among systems. Frame, analyze and solve problems.

SAMPLE Student Outcomes for Learning & Thinking

4th Grade



1. Use digital reference material to identify and describe the natural resources, human resources, and/or capital goods needed for proposed economic activity in the regional community or state.

E.G. Students will research on the Internet the composition of Southwestern adobe, in order to dig the appropriate soil to make small adobe bricks for a model of a 17th century mission (San Xavier del Bac, Mission Santa Barbara, San Diego de Alcala, etc.).

2. Use technology to graphically display data used to make a complex choice involving a regional community or state public issue.

E.G. Students will make a spreadsheet showing the funding provided by school districts within their state for each public school pupil; they will display the information alphabetically and then by largest to smallest dollar amount, and discuss their observations about this data. Which districts do they think will be the most sought after and why? What might the differences be in the schools in the lowest funded areas compared with the highest funded areas?

8th Grade



1. Analyze problems in the past and evaluate the decisions made by individuals and groups involved.

E.G. Students use online databases and search engines to locate primary source material from the Civil Rights Movement and identify the problems the movement intended to address. Students present this information in a slide show and evaluate the effectiveness of a specific event, such as the 1965 march on Selma, Alabama, in reaching the movement's goals. Students then explore their local community for examples of equal rights, whether related to race, age, gender, or culture and document these examples using digital cameras.

2. Evaluate ethical considerations related to an issue or problem and determine whether alternative courses of action are/were available and/or viable given the circumstances.

E.G. Students and teacher brainstorm a list of problems from the recent past, such as responses to the 9/11 attacks, or hurricanes Katrina, and Rita. Cooperative groups choose a problem, develop ideas for finding materials online that detail the issues, and provide possible solutions. Groups use this information to evaluate the steps that were taken to deal with the problem they chose to

12th Grade



1. Analyze contemporary problems and evaluate the decisions made by individuals and groups involved.

E.G. In groups, students use the Internet and digital libraries to identify and analyze the work being done by various organizations to provide alternative, sustainable economic and environmental responses to significant resource depletion in specific regions. Student groups create wikis that explain their perspective on the effectiveness of the organizations.

2. Identify and analyze different ways that electronic news sources define and present a problem.

E.G. Students use various online news media sources from different areas in the Middle East to analyze how each describes the relations between Israel and Palestine and the reasons for the conflicts in that region. They then compare these portrayals with digitized primary news reports of the founding of Israel and articulate how and why the descriptions and explanations of the conflict differ.

3. Collect and analyze information about a public policy issue from diverse electronic news sources, look for bias and analyze how the information is interpreted differently.



Critical Thinking and Problem Solving Skills (continued)

Exercise sound reasoning in understanding. Make complex choices. Understand the interconnections among systems. Frame, analyze and solve problems.

SAMPLE Student Outcomes for Learning & Thinking (continued)

4th Grade



3. Access information to discover the interconnections between the role of government and a service it provides to the public.

E.G. All fourth graders in a school will be surveyed for sports and hobby interests, and results will be reported in graphs. Students will use GIS and GPS to show the location of areas in which these sports can be played throughout their community.

8th Grade



- investigate. Groups then create a multimedia presentation to teach the class their findings, or create an online blog in which students suggest and debate alternatives that might have been taken.
3. Identify and analyze different ways that electronic news sources define and present a problem.

E.G. Students conduct an online search and compile representative news reports about persons of Middle Eastern descent published in major online news sources around the country. Working in small groups, students review, analyze and discuss any apparent biases evident in the way news agencies report incidents of ethnic profiling and/or cooperation among various ethnic groups in America. Groups present their findings to the class in a slide show format and/or podcast.

4. Use electronic charting and graphic tools to graphically display data that can be used to make a complex choice involving a regional community or state public issue.

E.G. Using electronic reference material, students investigate the issues involved (economic feasibility, asbestos removal), and resources that would be needed to renovate a school built in

12th Grade



- E.G.** Students gather information on global warming from diverse electronic sources such as the United Nations, scientific associations, and non-profit organizations; research the organizations; and analyze how the beliefs and nature of the organization might influence the interpretation of the information. Using programs such as Timeliner or GIS, students then illustrate the history and impact of global warming on U.S. Territories. Students produce a news broadcast explaining the issue of global warming from the perspective of a resident of one of these territories.
4. Demonstrate an understanding through the use of technology about how the relationship among social, economic and governmental systems affects change in a community over time.

E.G. Working in groups, students follow an inquiry approach to analyze and present the relationship between changes in population in communities and zoning decisions made by local governments over a 20-year period by using information such as GIS, census data, digitized zoning and population distribution maps, and electronic transcripts of local government meetings.

5. Use technology to research and graphically display a reasonable prediction about a public issue.



SOCIAL STUDIES

Critical Thinking and Problem Solving Skills (continued)

Exercise sound reasoning in understanding. Make complex choices. Understand the interconnections among systems. Frame, analyze and solve problems.

SAMPLE Student Outcomes for Learning & Thinking (continued)



4th Grade



8th Grade



12th Grade

the 1950's. Students will use clip art, video and other multimedia products to demonstrate their position on the issue. Students will make a presentation containing charts and graphs as well as analysis to the school board recommending whether the school should be rehabilitated or abandoned in favor of building a new school and why.

E.G. Students use voting patterns, demographic and socio-economic data from the U.S. Census bureau for the counties in their state to predict the outcomes of an upcoming national, state or local election, and display their projection, with supporting information, on a digital map.



Contextual Learning Skills

SOCIAL STUDIES

The ability to take advantage of education in a variety of contexts both inside and outside the classroom; understanding that knowledge is acquired within a context.

21st Century Tools for Learning & Thinking



4th Grade

- Search engines & strategies
- Spreadsheet & graphing software
- Online sources
- Print resources
- Digital images
- Web publishing software
- Brainstorming software
- Graphics software (drawing, painting, image editing)
- Multimedia resources (clip art, video, sound, animations)
- CAI & simulation software
- Videoconferencing and interactive TV
- TV, Video, & DVD
- GIS & GPS tools



8th Grade

- Search engines & strategies
- Spreadsheet & graphing software
- Online sources
- Print resources
- Digital images
- Web publishing software
- Brainstorming software
- Graphics software (drawing, painting, image editing)
- Multimedia resources (clip art, video, sound, animations)
- CAI & simulation software
- Videoconferencing and interactive TV
- TV, Video, & DVD
- GIS & GPS tools
- Digital production tools (Digital photography & video)
- Video editing software
- Multimedia resources (clip art, video, sound, animations)
- Concept mapping/graphic organizers
- Presentation tools, blogs



12th Grade

- Search engines & strategies
- Spreadsheet & graphing software
- Online sources
- Print resources
- Digital images
- Web publishing software
- Brainstorming software
- Graphics software (drawing, painting, image editing)
- Multimedia resources (clip art, video, sound, animations)
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- Videoconferencing and interactive TV
- TV, Video, & DVD
- GIS & GPS tools
- Digital production tools (Digital photography & video)
- Video editing software
- Multimedia resources (clip art, video, sound, animations)
- Concept mapping/graphic organizers
- Presentation tools, blogs



Contextual Learning Skills (continued)

The ability to take advantage of education in a variety of contexts both inside and outside the classroom; understanding that knowledge is acquired within a context.

SAMPLE Student Outcomes for Learning & Thinking

4th Grade



1. Use online tools to locate and distinguish among varying landforms and geographic features, such as mountains, plateaus, islands, and oceans.
E.G. Using a search engine, find examples of 5 different landforms. In a presentation tool display each landform and identify its characteristics.
2. Identify and use various sources for reconstructing the past, such as documents, letters, diaries, maps, textbooks, photos, and others, in an electronic presentation.
E.G. Use digital images to construct an electronic presentation depicting a timeline of a historical event, state history or family history.
3. Use technology tools to examine the interaction of human beings and their physical environment: the use of land, building of cities, and ecosystem changes in selected locales and regions.
E.G. Compare a dated aerial photo of one's own community and a more recent aerial photo captured online. Identify the changes that have taken place and speculate the purpose(s) of the changes.

8th Grade



1. Take advantage of historical witnesses in one's own community to gain, record and present knowledge in a publicly accessible electronic format.
E.G. Conduct and electronically record an interview of a community member who participated in a labor strike. Edit the interview to create a short video or podcast documentary highlighting how the strike impacted this person, his/her family, and the community. Broadcast it on the web, local access television, or show it at the local public library.
2. Conduct Internet research to identify and describe the roles of international and multinational humanitarian organizations.
E.G. After conducting research using the Internet and electronic library databases, formulate a list of questions (e.g., questions about the Red Cross's efforts to provide humanitarian relief to children impacted by the civil war in Angola.) Email the questions to the proper contact person at one of the identified organizations and report to the class on their responses.
3. Observe and speculate about social and economic effects of environmental changes and crises resulting from phenomena such as floods, storms, and droughts.

12th Grade



1. Examine the interactions of ethnic, national, or cultural influences in specific situations or events.
E.G. Create an online document with hyperlinks to help middle schoolers understand the Palestinian-Israeli conflict. Use the hyperlinks to provide background information and context for the past and current events.
2. Compare and contrast different political systems (their ideologies, structure, institutions, processes, and political cultures) with that of the United States, and identify representative political leaders from selected historical and contemporary settings.
E.G. Using concept mapping/graphic organizer software, create a presentation that compares two political systems (including aspects such as: ideologies, structure, institutions, processes, leaders and their roles, and political culture) using both text and visuals.
3. Analyze how cultural values and beliefs are presented and leveraged in different societies to influence buying decisions.
E.G. Using digital advertisements, students will examine how buying decisions are influenced by the values and beliefs of various locations within



Contextual Learning Skills (continued)

SOCIAL STUDIES

The ability to take advantage of education in a variety of contexts both inside and outside the classroom; understanding that knowledge is acquired within a context.

SAMPLE Student Outcomes for Learning & Thinking (continued)

4th Grade



8th Grade



12th Grade



- E.G.** Using video footage, digitally archived newspaper articles, photographs, government data, etc., describe the impact that the tsunami of December 2004 had on the economy of Thailand and speculate on the impacts it had on government services now and in the future.
4. Compare similarities and differences in the ways groups, societies, and cultures meet human needs and concerns.
- E.G.** Using online research, email interviews and personal experiences in other countries or regions, compare and contrast the homes, food, holidays, etc., to your own. Think about why they may or may not be similar and publish your reflections in a blog entry.

- the United States and its five territories. (It may be important to determine whether the advertising campaign's goals were attained).
4. Identify and participate in an activity that will improve your local community, based on an objective evaluation of critical community needs.
- E.G.** Email local service agencies and community leaders to generate a list of critical community issues; select and participate in a volunteer activity that addresses one of these needs in a meaningful way. Create a PowerPoint presentation describing your reasons for selecting the activity, the results of your participation and the ongoing needs the community should address.

Communication

SOCIAL STUDIES

Articulate thoughts and ideas clearly and effectively.

21st Century Tools for Learning & Thinking



4th Grade

- Search engines & strategies
- Spreadsheet & graphing software
- Online sources
- Print resources
- Digital images
- Web publishing software
- Brainstorming software
- Graphics software (drawing, painting, image editing)
- Multimedia resources (clip art, video, sound, animations)
- CAI & simulation software
- Videoconferencing and interactive TV
- TV, Video, & DVD
- GIS & GPS tools
- Collaboration tools (wikis, listservs, email, asynchronous conferencing, Chat)



8th Grade

- Search engines & strategies
- Spreadsheet & graphing software
- Online sources
- Print resources
- Digital images
- Web publishing software
- Brainstorming software
- Graphics software (drawing, painting, image editing)
- Multimedia resources (clip art, video, sound, animations)
- CAI & simulation software
- Videoconferencing and interactive TV
- TV, Video, & DVD
- GIS & GPS tools
- Collaboration tools (wikis, listservs, email, asynchronous conferencing, Chat)
- Concept mapping/graphic organizers
- Blogs (text & video), Cell phones



12th Grade

- Search engines & strategies
- Spreadsheet & graphing software
- Online sources
- Print resources
- Digital images
- Web publishing software
- Brainstorming software
- Graphics software (drawing, painting, image editing)
- Multimedia resources (clip art, video, sound, animations)
- CAI & simulation software
- Videoconferencing and interactive TV
- TV, Video, & DVD
- GIS & GPS tools
- Collaboration tools (wikis, listservs, email, asynchronous conferencing, Chat)
- Concept mapping/graphic organizers
- Blogs (text & video), Cell phones

Communication (continued)

Articulate thoughts and ideas clearly and effectively.

SAMPLE Student Outcomes for Learning & Thinking

4th Grade



1. Organize, and present information from the social sciences in clear and effective formats.

E.G.

- Write an e-mail to the local newspaper or a public official, explaining concerns about a community issue.
- Using a spreadsheet or charting program, illustrate simple data collected on a social issue (e.g., survey classmates on their opinions about a school or community issue) in graph form.
- Using graphic creation software, create a flyer or a door hanger, which includes a map captured online, showing a local polling location and urging citizens to vote.
- Use primary sources to produce a wiki or website providing information on the history of the local community.
- Use videoconferencing to make a presentation to students in another state about native cultures indigenous to your state.

8th Grade



1. Interpret, organize, and present information from the social sciences in clear and effective formats.

E.G.

- Interpret orally a topical political cartoon from abroad, using online sources such as slate.com.
- Compare & contrast cultures by using online discussion formats or videoconferences with students in another country, via an organization like Peace Corps Partnership.
- Research the timeline of events leading up to the Civil War and use primary sources to create an electronic and/or online presentation that displays what you consider to be the most significant of these events, and why.
- Locate digital advertisements that illustrate sexism or stereotyping and create a presentation that explains the ways in which the ads rely on inaccurate representations of demographic groups.
- Write and produce a video or audio podcast public service announcement that promotes student involvement in the student government association.
- Identify and join a listserv to stay informed about an issue of importance to you and/or your community; email your classmates a description of the listserv, along with an explanation of why you selected it and why others might find it interesting and/or useful.

12th Grade



1. Analyze, synthesize, organize, and present information from the social sciences in clear and effective formats.

E.G.

- Create an electronic presentation that describes and analyzes an issue dealing with aging in American society over several decades (e.g., demographic change, Medicare costs, Social Security). Explain the problem using data (presented in comparative charts where possible), and present some commonly debated ways to address the issue. Via an online discussion board, lead classmates in a discussion about the relative merits of the potential solutions.
- Use Depression era reminiscences from American Memory (Library of Congress website), and choose one to enact as a Reader's Theater piece.
- Create an online photo album of housing patterns in the student's community and use these photos to lead a class discussion on potential growth problems in the student's town.
- Use concept mapping software to make a Venn diagram comparing and contrasting life in Europe before and after the Industrial Revolution.



Information and Media Literacy

Understand, manage and create effective oral, written and/or multimedia communication in a variety of forms and contexts. Analyze, access, manage, integrate, evaluate and create information in a variety of forms and media.

21st Century Tools for Learning & Thinking

4th Grade



- Search engines & strategies
- Spreadsheet & graphing software
- Online sources
- Print resources
- Digital images
- Web publishing software
- Brainstorming software
- Graphics software (drawing, painting, image editing)
- Multimedia resources (clip art, video, sound, animations)
- CAI & simulation software
- Videoconferencing and interactive TV
- TV, Video, & DVD
- GIS & GPS tools
- Collaboration tools (wikis, listservs, email, asynchronous conferencing, Chat)

8th Grade



- Search engines & strategies
- Spreadsheet & graphing software
- Online sources
- Print resources
- Digital images
- Web publishing software
- Brainstorming software
- Graphics software (drawing, painting, image editing)
- Multimedia resources (clip art, video, sound, animations)
- CAI & simulation software
- Videoconferencing and interactive TV
- TV, Video, & DVD
- GIS & GPS tools
- Collaboration tools (wikis, listservs, email, asynchronous conferencing, Chat)
- Blogs (text & video)
- Podcasts

12th Grade



- Search engines & strategies
- Spreadsheet & graphing software
- Online sources
- Print resources
- Digital images
- Web publishing software
- Brainstorming software
- Graphics software (drawing, painting, image editing)
- Multimedia resources (clip art, video, sound, animations)
- CAI & simulation software
- Videoconferencing and interactive TV
- TV, Video, & DVD
- GIS & GPS tools
- Collaboration tools (wikis, listservs, email, asynchronous conferencing, Chat)
- Blogs (text & video)
- Podcasts

Information and Media Literacy (continued)

Understand, manage and create effective oral, written and/or multimedia communication in a variety of forms and contexts. Analyze, access, manage, integrate, evaluate and create information in a variety of forms and media.

21st Century Tools for Learning & Thinking

4th Grade



1. Access information about communities around the world from a variety of media sources.
E.G. Working in small groups, students select a nation from each continent and use online encyclopedias, electronic databases & other websites to study typical families in those nations. Present findings to the class using presentation software. Create a Venn diagram to compare and contrast two communities from around the world using illustrations or information to demonstrate understanding.
2. Gather original data and create graphs or charts to display the information.
E.G. Students use an online survey tool to create a survey that collects data about the likes and dislikes of their own families. Students store the data in a spreadsheet and display their findings using the spreadsheet's graphing tools and use digital images to demonstrate their family's preferences of their favorite places to visit within their community and state.
3. Conduct an interview and create a slide show that describes the main points of the discussion.

8th Grade



1. Download and store relevant data from the Internet about distinct features of selected nations around the world.
E.G. Students consult the U.S. Dept. of Energy website to create a spreadsheet and construct a line graph of crude oil prices since the crisis of the early 1970's. They then examine data on selected oil producing & consuming countries from the CIA World Facts database and develop possible explanations for the fluctuations in price.
2. Create original data sets about key issues in the community, state or nation using tools such as an online survey. Create a presentation that displays the data in a spreadsheet or database and analyzes the significance of the data.
E.G. Students use electronic databases and GIS to gather data regarding gas prices, home heating oil prices, wages, etc. in their city over the past twelve months. Students create an electronic presentation containing the data (in charts, graphs, or maps), and discuss the impact of war in the Middle East on their community.
3. Conduct a visual analysis of digital images (digital photograph libraries, aerial photographs and satellite imagery), other digital primary sources, and digital maps.

12th Grade



1. Locate, download, reference and present information using multiple electronic formats, from sources that offer diverse perspectives about local and national governments in different communities.
E.G. Students will examine local, state and tax rates for commonly used goods, such as milk or bread. Students will research what these taxes are used for.
2. Develop and use a customized search to locate and select multimedia information about a public policy issue of local, national and/or global significance and produce an Internet web page, digital video, podcast, or web page of the findings.
E.G. Students research multiple viewpoints on possible steps that can be taken to improve working conditions in underdeveloped countries and produce a webquest for other students to use in order to better understand this problem.
3. Download and analyze statistical data.
E.G. Students conduct visual analysis using U.S. and U.N. census data about population growth to graphically display the impact of transportation systems on urbanization over time.



SOCIAL STUDIES

Information and Media Literacy (continued)

Understand, manage and create effective oral, written and/or multimedia communication in a variety of forms and contexts. Analyze, access, manage, integrate, evaluate and create information in a variety of forms and media.

21st Century Tools for Learning & Thinking (continued)



4th Grade

- E.G.** Interview a family member about the changes over time in his/her community. Present the main points that result from the interview in a slide show that integrates video images.
- 4. Describe the roles and responsibilities of their elected officials.
 - E.G.** Students download e-text biographies of their Governor, Senators, and/or Representatives and use a graphic organizer tool to display the roles and responsibilities of each.
- 5. Use drawing or timeline software tools to create a timeline of events.
 - E.G.** Using graphics or presentation software, students create an electronic timeline of events leading up to the writing of the Declaration of Independence.
- 6. Access the expertise of sources outside their own community.
 - E.G.** Students participate in an online discussion or interactive videoconference with a museum educator in order to discuss and analyze an artifact found in the student's local community, drawing conclusions about the item's purpose and probable owner.



8th Grade

- E.G.** Students analyze sources of information about transportation systems used over time and draw conclusions about how they are related to changes in population distribution.
- 4. Locate and select sources, representing several types of media, which discuss an elected official's time in office.
 - E.G.** Students create a slideshow or wiki comparing and contrasting the administrations of several of the early American presidents.
- 5. Use concept mapping software to generate and present characteristics, causes, and effects of political revolutions.
 - E.G.** Students map the characteristics of the American Revolution, the French Revolution, the Russian Revolution, and a Latin American revolution.



12th Grade

- 4. Locate and select sources, representing several types of media, which enable one to assess an elected official's effectiveness while in office.
 - E.G.** Students compare and contrast the voting records of different state and local officials on issues that impact their community, such as education and taxes, using digital presentation methods (podcast, slideshow, website or blog).
- 5. Use technology tools to present and analyze data in a meaningful way.
 - E.G.** Create a spreadsheet and from it a graph to display comparative prices over a month of three stocks in different sectors (high tech, hospitality, communications, etc.); conduct research online to describe possible reasons for the fluctuations and trends evidenced by the data.

Creativity and Innovation Skills

SOCIAL STUDIES

Demonstrate originality and inventiveness in work. Developing, implementing and communicating new ideas to others. Being open and responsive to new and diverse perspectives.

21st Century Tools for Learning & Thinking



4th Grade

- Graphics software (drawing, painting, image editing)
- Web publishing software
- Desktop publishing software (word processing & layout programs)
- Spreadsheet & graphing software
- Database creation software
- Concept mapping/graphic organizers (ex. Inspiration, Timeliner)
- Collaboration tools (wikis, listservs, email, asynchronous conferencing, Chat)
- Presentation tools
- GIS & GPS tools
- CAI software
- Videoconferencing and interactive television
- Production tools (Digital photography & video)
- Blogs



8th Grade

- Graphics software (drawing, painting, image editing)
- Web publishing software
- Desktop publishing software (word processing & layout programs)
- Spreadsheet & graphing software
- Database creation software
- Concept mapping/graphic organizers (ex. Inspiration, Timeliner)
- Collaboration tools (wikis, listservs, email, asynchronous conferencing, Chat, MUD, MOO)
- Presentation tools
- GIS & GPS tools
- CAI software
- Videoconferencing and interactive television
- Production tools (Digital photography & video)
- Blogs



12th Grade

- Graphics software (drawing, painting, image editing)
- Web publishing software
- Desktop publishing software (word processing & layout programs)
- Spreadsheet & graphing software
- Database creation software
- Concept mapping/graphic organizers (ex. Inspiration, Timeliner)
- Collaboration tools (wikis, listservs, email, asynchronous conferencing, Chat)
- Presentation tools
- GIS & GPS tools
- CAI software
- Videoconferencing and interactive television
- Production tools (Digital photography & video)
- Blogs

Creativity and Innovation Skills (continued)

Demonstrate originality and inventiveness in work. Developing, implementing and communicating new ideas to others. Being open and responsive to new and diverse perspectives.

21st Century Tools for Learning & Thinking

4th Grade



Demonstrate creativity and share new ideas and perspectives by incorporating work in the social sciences with technology, to invent products such as plays, games, dances, puzzles, models, writings, speeches, etc.

E.G.

1. Using electronic drawing tools, re-design the student's state flag, using information from the state's history, geography, arts and/or culture.
2. Write clues about colonial times into an electronic crossword puzzle program.
3. Take digital photographs of political signs in your neighborhood and use a graphics program to create a digital election collage.
4. Using desktop publishing software create a newsletter highlighting this month's classroom activities, such as units studied, field trips, special events, etc.
5. Maintain a wiki, for youngsters, by youngsters, for sharing opinions about global problems.
6. Participate in asynchronous discussion with peers in both Israel and in Lebanon to better understand issues in that part of the world.
7. Create a speech representing one side of a cultural or religious belief.

8th Grade



Demonstrate creativity and share new ideas and perspectives by incorporating work in the social sciences with technology, to invent products such as plays, games, dances, songs, puzzles, models, writings, speeches, etc.

E.G.

1. Invent a Smart Board game modeled on "Chutes and Ladders" to illustrate progress and backsliding in the search for peace in the Middle East.
2. Compose and word process in broadside format an additional Federalist paper by "Publius," using references to the real Federalist papers.
3. Write, enact, and film a digital commercial for either Jefferson or Adams in the election of 1800, as though there had been television two hundred years ago.
4. Compose and record an original Civil War ballad based on the one reproduced online in Harper's Weekly, edition of August 17, 1861. Make the recording available for download.

12th Grade



Demonstrate creativity and share new ideas and perspectives by incorporating work in the social sciences with technology, to invent products such as plays, games, dances, songs, puzzles, models, writings, speeches, etc.

E.G.

1. Study FDR's Fireside Chats, and then script and record one of your own which follows the last of the real ones (June 12, 1944, about a war loan drive), for any date between June 12th of 1944 and April 12th, 1945, when Roosevelt died. Make the recording available for download.
2. Construct a circle graph depicting what a single tax dollar buys. Make it the centerpiece of a digital poster you create for this year's Congressional election.
3. Create an online poll consisting of questions on current issues (the war on terrorism, the invasion of Iraq, immigration, etc.). Solicit 50 classmates to complete the poll online, then summarize and publish conclusions using presentation software.
4. With cooperation from your local government or school, organize a listserv that will keep citizens and/or students abreast of community issues.
5. Using GPS and GIS, map in your community hazardous locations of why certain businesses (day cares, etc) should not be near other locations (train tracks) etc.



Collaboration Skills

SOCIAL STUDIES

Demonstrate ability to work effectively with diverse teams. Willing to be helpful and make necessary compromises to accomplish a common goal.

21st Century Tools for Learning & Thinking



4th Grade

- Web publishing software
- Brainstorming software
- Digital networking tools
- CAI & simulation software
- Videoconferencing and interactive TV
- Authoring software
- Email
- Cellular phones
- Blogs
- Asynchronous discussion boards
- Multimedia production tools
- Online chat
- Wikis
- Listservs
- Real-time videoconferencing



8th Grade

- Brainstorming software
- Digital networking tools
- Authoring software
- Email
- Cellular phones
- Blogs
- Asynchronous discussion boards
- Multimedia production tools
- Online chat
- Web publishing and desktop publishing software
- Wikis
- Listservs
- Real-time videoconferencing



12th Grade

- Brainstorming software
- Digital networking tools
- Authoring software
- Email
- Cellular phones
- Blogs
- Asynchronous discussion boards
- Multimedia production tools
- Online chat
- Web publishing and desktop publishing software
- Wikis
- Listservs
- Real-time videoconferencing

Collaboration Skills (continued)

Demonstrate ability to work effectively with diverse teams. Willing to be helpful and make necessary compromises to accomplish a common goal.

SAMPLE Student Outcomes for Learning & Thinking

4th Grade



1. Work together in pairs and small groups in a specified role to plan, investigate, and report the results of their work on a community and/or state political or social issue.

E.G. As news reporters for a newspaper/magazine/online journal, students investigate the impact of a state legislative bill mandating the use of helmets while riding a bicycle. They then use graphics software or other electronic drawing tools to illustrate the results of their study and conduct a town meeting where their views must be presented electronically.

2. As a group, work together to reach a decision and to explain the reasons for it.

E.G. Students participate in an asynchronous discussion forum about how to respond to the state bill requiring bicycle helmets and develop consensus about what the team will do. Using a word processing program, students author a persuasive letter either for or against the proposed bill, providing sound reasons to support their position.

3. Recognize and compare two or more perspectives on an issue.

8th Grade



1. Work together as a group in different roles to plan, investigate and report the results of their work on a state or national political and/or social issue.

E.G. Students use multiple resources, especially communications technology, to gain perspectives from peers in other locales, and to develop a blog that details the team's perspective on violence in schools. Student teams then prepare an electronic proposal regarding violence prevention and present this proposal to the school administration.

2. Recognize and communicate diverse perspectives on an issue and demonstrate how diverse perspectives might lead to different interpretations of an issue.

E.G. After watching videos of the events surrounding the desegregation of Little Rock Central High School, students read online first-hand accounts, then use online tools to find students in other parts of the country with whom they can discuss and compare interpretations of the events. Students then summarize and reflect on their experiences in small group discussions.

3. Communicate to school or community members about opportunities to assist with a group project.

12th Grade



1. Work in groups, taking various roles to plan, investigate and report the results of their study on a national or global political and/or social issue.

E.G. Working in groups, conduct online research & create a report on HIV/AIDS in the U.S. and in Africa, using sites such as MTV's Fight for Your Rights and the United Nations' Cyber Schoolbus, and compare the economic, health and social implications of HIV/AIDS in both settings.

2. Reach consensus on a viable action that could be taken relative to a political and/or social issue and then act accordingly.

E.G. Working in student teams and using online decision-tree tools, research an issue that is a challenge for the local community and develop consensus around three specific actions the group will take to address the issue (e.g., writing letters to elected representatives, local paper, organizing an email campaign or other activity, etc.). Prepare a summary report of the group's decision-making process and what action steps were taken.

3. Recognize, empathize with, and communicate diverse perspectives on an issue and realize how one's perspective influences one's interpretation of an issue and/or work within a group.



SOCIAL STUDIES

Collaboration Skills (continued)

Demonstrate ability to work effectively with diverse teams. Willing to be helpful and make necessary compromises to accomplish a common goal.

SAMPLE Student Outcomes for Learning & Thinking (continued)

4th Grade



E.G. Students select a state, local, or community issue such as recreational use of state property, smoking in restaurants, or skateboarding on sidewalks, and demonstrate their understanding of two or more views by using publishing software to develop a Venn diagram that includes text and images. Conclude by presenting an argument that endorses one of the viewpoints.

4. Working in small groups, encourage and engage other classmates to assist with a group community service project.

E.G. Using digital media, students demonstrate the need of a local food or animal shelter to raise the awareness of their classmates on the issue within their community. Students then create a digital poster that persuades classmates to participate in a school fundraising project.

5. Work as a team to assess individual and/or group work.

E.G. Using a teacher constructed online rubric, students work in teams to review their personal performance and contributions to their team, as well as overall group performance.

8th Grade



E.G. Working in teams, students prepare a digital audio recording, a digital brochure and a digital poster and distribute these in order to enlist the community's help with a food drive to benefit the local food pantry.

4. Assess their performance as a group and develop and implement a plan to work together more productively.

E.G. Students use a wiki or asynchronous discussion board to reflect on a recent group activity, discussing both strengths and weaknesses of their team's interaction and productivity.

12th Grade



E.G. Conduct an online survey among community members about the effects of a recent influx of immigrants and compare responses with digitized accounts from other communities nationwide. Then work in groups to present two opposing viewpoints on the issue, analyzing the merits of each perspective.

4. Engage other students, community members and/or other relevant parties to assist with a group effort.

E.G. Host an online chat, present a podcast and use a discussion board or listserv to involve community members in an online debate on global warming.

5. Assess their performance as a group and develop and implement a plan to work together more productively.

E.G. Create and operate a blog that documents the group's process, work with the teacher to review the online account, and post a recommended improvement plan for the next project.



ICT Literacy Map GEOGRAPHY

DEVELOPED IN COOPERATION WITH THE NATIONAL COUNCIL FOR GEOGRAPHIC EDUCATION (NCGE)

ICT Literacy Maps are the result of hundreds of hours of research, development and feedback from educators and business leaders across the nation. The Partnership has issued ICT Literacy Maps for the core subjects of Geography, Math, English and Science. These tools are available at www.21stcenturyskills.org/matrices/.

The Partnership for 21st Century Skills advocates for the integration of Information and Communication Technology (ICT) Literacy into K-12 education so that students can learn and achieve in the core academic subjects at much higher levels. The Partnership defines ICT Literacy as the use of 21st century tools to perform learning skills.

The Partnership has forged alliances with key national organizations that represent the core academic subjects, including English, Math, Science and Geography. As a result of these collaborations, the Partnership has developed a series of ICT Literacy Maps that illustrate the intersection between ICT Literacy and core academic subjects. The maps enable educators, administrators and policymakers to gain concrete examples of how ICT Literacy can be integrated into core subjects.

LEARNING SKILLS FOR INFORMATION, COMMUNICATION, AND MEDIA LITERACY
Information and Media Literacy
Accessing and managing information. Integrating and creating information. Evaluating and analyzing information.

Grade	21st Century Tools for: Communication, Information Processing, and Research	SAMPLE Student Outcomes for: Accessing, Processing, Managing, Integrating and Communicating Information
4th Grade	Audio/video tapes, films, TV programs, tape/video recorders, newspapers, books, computers, geographic information systems, global positioning systems, remote sensing (aerial photographs and satellite imagery), database and spreadsheet software, Internet and digital libraries	<ul style="list-style-type: none"> Access information about places around the world from a variety of media sources Gather original data such as observations of weather and climate in the students' hometown and create graphs or charts to display the information Analyze and compare information in a variety of media such as photographs, maps, and remotely sensed images (aerial photographs and satellite imagery) to draw conclusions (e.g., describe change over time)
8th Grade	Audio/video tapes, films, TV programs, tape/video recorders, newspapers, books, computers, geographic information systems, global positioning systems, remote sensing (aerial photographs and satellite imagery), database and spreadsheet software, Internet and digital libraries	<ul style="list-style-type: none"> Download and store relevant spatial data from the Internet Create original data sets using tools such as a global positioning system and input spatial data into spreadsheets Conduct visual analysis of remotely sensed images (aerial photographs and satellite imagery), maps and other graphic representations of environmental data from local to global in scale
12th Grade	Audio/video tapes, films, TV programs, tape/video recorders, newspapers, books, computers, geographic information systems, global positioning systems, remote sensing (aerial photographs and satellite imagery), database and spreadsheet software, Internet and digital libraries	<ul style="list-style-type: none"> Identify spatial data for study of the local community appropriate in scale and projection Create new data sets and effectively use these data in a geographic information system Conduct analysis using demographic data in a geographic information system to analyze voting patterns and determine redistricting guidelines

A Learning Skill
 +
B 21st Century Tool
 =
C ICT Literacy

An example from the Math ICT Literacy Map illustrates sample outcomes for teaching communication skills.



GEOGRAPHY

Information and Media Literacy

Accessing and managing information. Integrating and creating information. Evaluating and analyzing information.

21st Century Tools for: Communication, Information Processing, and Research

SAMPLE Student Outcomes for: Accessing, Processing, Managing, Integrating and Communicating Information



4th Grade

Audio/video tapes, films, TV programs, tape/video recorders, newspapers, books, computers, geographic information systems, global positioning systems, remote sensing (aerial photographs and satellite imagery), database and spreadsheet software, Internet and digital libraries

- Access information about places around the world from a variety of media sources
- Gather original data such as observations of weather and climate in the students' hometown and create graphs or charts to display the information
- Analyze and compare information in a variety of media such as photographs, maps, and remotely sensed images (aerial photographs and satellite imagery) to draw conclusions (e.g., describe change over time)



8th Grade

Audio/video tapes, films, TV programs, tape/video recorders, newspapers, books, computers, geographic information systems, global positioning systems, remote sensing (aerial photographs and satellite imagery), database and spreadsheet software, Internet and digital libraries

- Download and store relevant spatial data from the Internet
- Create original data sets using tools such as a global positioning system and input spatial data into spreadsheets
- Conduct visual analysis of remotely sensed images (aerial photographs and satellite imagery), maps and other graphic representations of environmental data from local to global in scale



12th Grade

Audio/video tapes, films, TV programs, tape/video recorders, newspapers, books, computers, geographic information systems, global positioning systems, remote sensing (aerial photographs and satellite imagery), database and spreadsheet software, Internet and digital libraries

- Identify spatial data for study of the local community appropriate in scale and projection
- Create new data sets and effectively use these data in a geographic information system
- Conduct analysis using demographic data in a geographic information system to analyze voting patterns and determine redistricting guidelines





Communication Skills

Understanding, managing, and creating effective communications: orally, written and using multimedia.

21st Century Tools for: Communication, Information Processing, and Research

SAMPLE Student Outcomes for: Accessing, Processing, Managing, Integrating and Communicating Information



4th Grade

Graphics programs, printers, copiers, computer presentation tools, maps (hard copy and digital), word processor, e-mail, desktop publishing programs

- Present geographic information in an oral report accompanied by maps and graphs
- Construct maps, diagrams and charts to display geographic information and write a simple summary of observations
- Use a multimedia tool to create a simple slide show that describes the student's favorite locations in the community (e.g., movie theatre, bike trails, etc.)



8th Grade

Graphics programs, printers, copiers, computer presentation tools, maps (hard copy and digital), word processor, e-mail, desktop publishing programs

- Present an oral report on a recent major geographic event – hurricane, volcanic eruption, resource discovery – using different newspapers, news magazines, and Internet news sources
- Compose an e-mail message to a local or state official stating the student's opinion on a relevant community issue (e.g., suggesting the location of a new community recreation area and supporting the suggestion with factual information)
- Create a series of web pages that use maps to portray information about the student's hometown (e.g., community atlas)



12th Grade

Graphics programs, printers, copiers, computer presentation tools, maps (hard copy and digital), word processor, e-mail, desktop publishing programs

- Prepare an informative oral presentation that evaluates alternative land use proposals using various presentation tools (e.g., multimedia slide show) and incorporating spatial data and maps.
- Write an editorial in favor of or opposing a land use proposal citing relevant geographic data for support
- Use data and maps prepared in a geographic information system to compare and analyze alternative land use proposals and communicate conclusions using such tools as html, advanced multimedia applications, and video technologies





GEOGRAPHY

Critical Thinking and Systems Thinking

Exercising sound reasoning. Making complex choices. Understanding the interconnections among systems.

21st Century Tools for: Thinking and Problem Solving

SAMPLE Student Outcomes for: Problem Solving



4th Grade

Graphs, maps, geographic information systems, remote sensing (aerial photographs, satellite images), database and spreadsheet software, newspapers, books, computers, Internet, television, database and spreadsheet software, digital libraries, presentation devices, LCD projection device, "smart" whiteboards

- Use information gathered from newspapers, television and the Internet to describe how weather and climate influence activities in the students' region on a daily, seasonal, and permanent basis.
- Map and analyze the spatial aspects of routes to and from school and choose most desirable and safe way to school
- Describe the relationship between population growth and air pollution by interpreting a graph displaying information on both topics



8th Grade

Graphs, maps, geographic information systems, remote sensing (aerial photographs, satellite images), database and spreadsheet software, newspapers, books, computers, Internet, television, database and spreadsheet software, digital libraries, presentation devices, LCD projection device, "smart" whiteboards

- Use a geographic information system to compare alternative sites in order to identify the best location for a new park according to defined criteria
- Develop innovative plans, including specific recommendations illustrated by maps, to improve the quality of environments in large cities, weighing the benefits and drawbacks of each plan
- Use a spreadsheet program to compare data, collected from digital libraries, about cities in the developing world. Specific tasks may include investigating the relationships among political, social, and environmental change



12th Grade

Graphs, maps, geographic information systems, remote sensing (aerial photographs, satellite images), database and spreadsheet software, newspapers, books, computers, Internet, television, database and spreadsheet software, digital libraries, presentation devices, LCD projection device, "smart" whiteboards

- Using the Internet and digital libraries, identify and compare alternative, sustainable economic activities in regions of significant resource depletion
- Use a geographic information system to identify physical environments that impose limits on population growth, such as water scarcity in southern California
- Use remote sensing (aerial photographs and satellite imagery) to explore and analyze environmental change such as deforestation in a given region





GEOGRAPHY

Problem Identification, Formulation and Solution

Ability to frame, analyze and solve problems.

21st Century Tools for: Thinking and Problem Solving

SAMPLE Student Outcomes for: Problem Solving



4th Grade

Maps, geographic information system, aerial photographs, remotely sensed images (aerial photos, satellite photos), presentation software, Internet, television, database, digital libraries, LCD projection devices, "smart" white boards

- Use thematic maps to ask and answer questions about the distribution of the human population on Earth



8th Grade

Maps, geographic information system, aerial photographs, remotely sensed images (aerial photos, satellite photos), presentation software, Internet, television, database, digital libraries, LCD projection devices, "smart" white boards

- Create maps using a geographic information system to make decision about the best location for a new bike shop



12th Grade

Maps, geographic information system, aerial photographs, remotely sensed images (aerial photos, satellite photos), presentation software, Internet, television, database, digital libraries, LCD projection devices, "smart" white boards

- Use remote sensing (aerial photographs and satellite imagery) along with thematic maps to analyze selected consequences and impacts of building homes in environmentally sensitive areas, and present possible scenarios for resolution





GEOGRAPHY

Creativity and Intellectual Curiosity

Develop, implement and communicate new ideas to others. Staying open and responsive to new and diverse perspectives.

21st Century Tools for: Thinking and Problem Solving

SAMPLE Student Outcomes for: Problem Solving



4th Grade

Remotely sensed images (aerial photos, satellite photos), videography equipment, Internet, newspapers, maps, geographic information system, word processing software, large format printers, LCD projection devices, "smart" white boards

- Use aerial photos to identify the different economic activities in their communities; in groups create a poster showing the different uses and possible areas for growth in the future
- Use desktop publishing program to create an informational brochure that describes ways to recycle plastic milk cartons in the local community, the likely consequences of the various solutions, and asks people for their opinion on the issue



8th Grade

Remotely sensed images (aerial photos, satellite photos), videography equipment, Internet, newspapers, maps, geographic information system, word processing software, large format printers, LCD projection devices, "smart" white boards

- Use the Internet to locate and download regional and global data about teenage purchase of recorded music, and prepare graphs comparing these two data sets for a multimedia presentation to the class
- Write a dialogue for two people expressing different points of view on the same geographic issue, such as a the foreman of a logging crew and a conservationist debating the use of a national forest



12th Grade

Remotely sensed images (aerial photos, satellite photos), videography equipment, Internet, newspapers, maps, geographic information system, word processing software, large format printers, LCD projection devices, "smart" white boards

- Use a geographic information system to analyze information on soil, hydrology, and other factors in order to choose the best site for a sanitary landfill in an urban region, and prepare an informational video to present findings
- Create a simulation of a meeting between heads of state from a world region to discuss water resources, water stress and sustainable economic development, and the effects of those issues on each representative's area





GEOGRAPHY

Interpersonal and Collaborative Skills

Demonstrating teamwork and working productively with others. Demonstrating and the ability to adapt to varied roles and responsibilities. Exercise empathy and respecting diverse perspectives.

21st Century Tools for: Interpersonal and Self Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self-Directional Skills



4th Grade

Internet, newspapers, global positioning system, database and spreadsheet programs, geographic information systems, books, presentation software, digital libraries, video production tools

- Work on a team to prepare a video news report exploring key issues facing a particular world region
- Rotate tasks on a data collection team: identifying, measuring, recording, reporting, etc.
- Role play a town meeting where different members of the community ask questions about a local issue



8th Grade

Internet, newspapers, global positioning system, database and spreadsheet programs, geographic information systems, books, presentation software, digital libraries, video production tools

- Work on a team using a geographic information system to develop a community response plan in the event of a natural disaster
- Work on a team to write and put on a play about immigrants to a new country struggling to deal with the issues involved in adapting to an alien environment
- Write a dialogue between a farmer and a city water board administrator about the use of regional water resources



12th Grade

Internet, newspapers, global positioning system, database and spreadsheet programs, geographic information systems, books, presentation software, digital libraries, video production tools

- Work on a team to prepare a multimedia presentation on toxic and hazardous waste management at local and global levels (e.g., the movement, handling, processing, and storing of materials)
- Use the Internet and digital libraries to prepare guidelines for humanitarian aid workers to assist them with the transition to living in a different culture
- Prepare a panel simulation of participants who represent different points of view about sustainable development on the subject of cutting rain forests in response to a demand for lumber in global markets and the need locally for an income activity





GEOGRAPHY

Self-Direction

Monitoring one's own understanding and learning needs. Transferring learning from one domain to another.

21st Century Tools for: Interpersonal and Self Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self-Directional Skills



4th Grade

Maps, spatial databases, online mapping programs, remote sensing, geographic information system

- Create an age-appropriate electronic portfolio of maps and other geographic projects, and write a reflective essay explaining how selected portfolio pieces reflect what they have learned about specific topics
- Use latitude and longitude data to track the movement of meteorological events such as hurricanes



8th Grade

Maps, spatial databases, online mapping programs, remote sensing, geographic information system

- Create an age-appropriate electronic portfolio of maps and other geographic projects, and write a reflective essay explaining how selected portfolio pieces reflect what they have learned about specific topics
- Use satellite images to identify changes in a region's biomass over time



12th Grade

Maps, spatial databases, online mapping programs, remote sensing, geographic information system

- Create an age-appropriate electronic portfolio of maps and other geographic projects, and write a reflective essay explaining how selected portfolio pieces reflect what they have learned about specific topics
- Collect appropriate data and use a geographic information system to monitor the spread of disease within a region





GEOGRAPHY

Accountability and Adaptability

Exercising personal responsibility and flexibility in personal, workplace and community contexts. Setting and meeting high standards and goals for one's self and others. Tolerating ambiguity.

21st Century Tools for: Interpersonal and Self Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self-Directional Skills



4th Grade

Global positioning system, geographic information system, email (to submit assignments), electronic bulletin boards, online dialogs, historic maps, online map resources, online spatial databases and data sharing, presentation tools

- Establish ongoing communication with students from other countries (via letters, email, or electronic bulletin boards) to learn about how cultures are the same and different (e.g., language, clothing, music, activities, etc.)
- Develop and execute a plan to use global positioning system receivers and a geographic information system to collect and record accurate and complete data about trees around the school or in a park and share this spatial data with community foresters or other managers.
- Document and suggest reasons for changes in political boundaries and place names over time from observations of historic maps and/or online resources.



8th Grade

Global positioning system, geographic information system, email (to submit assignments), electronic bulletin boards, online dialogs, historic maps, online map resources, online spatial databases and data sharing, presentation tools

- Gather pertinent data from multiple sources to create a traditional or interactive map report on a specific region that explains one or more significant issues currently confronting that area. Submit report using appropriate channels (e.g., hand in manually; send as email attachment; or present orally)
- Actively participate in international investigation projects, such as GLOBE, in which student participants are held responsible for the quality of the data they submit
- Gather and critically analyze information from a variety of sources, and understand (and "tolerate") how and why data may not be consistent (e.g., from two different sources, the population of Los Angeles may vary from 3.5 million (within city limits) to nearly 10 million (metro area))



12th Grade

Global positioning system, geographic information system, email (to submit assignments), electronic bulletin boards, online dialogs, historic maps, online map resources, online spatial databases and data sharing, presentation tools

- Create a high-quality digital map product, including data that has been gathered in the local area, to submit to an agency outside the classroom (e.g., national contest, local newspaper, community member)
- Gather, map, and analyze data from police records (e.g., crime, accident, graffiti) and overlay other variables to detect and interpret any spatial patterns. Share results with community.
- Use online bulletin boards to engage in discussions of controversial topics such as the environment, free trade, or population dynamics with people (students and/or experts) from around the world; demonstrate tolerance and respect for the points of view of others.





GEOGRAPHY

Social Responsibility

Acting responsibly with the interests of the larger community in mind. Demonstrating ethical behavior in personal, workplace and community contexts.

21st Century Tools for: Interpersonal and Self Directional Skills

SAMPLE Student Outcomes for: Interpersonal and Self-Directional Skills



4th Grade

Geographic information system, global positioning system, databases, presentation software, personal management tools, Internet-based projects (e.g., GLOBE), personal digital assistants

- Propose and discuss specific actions that can help alleviate an environmental problem or relevant community issue and the likely consequences of such actions (e.g., recycling, biking to school, reducing consumption, buying local products, etc.)
- Gather data from reliable Internet and traditional sources to describe and assess the impact of litter in the community. Students will design and implement a community service project (e.g., brochure, posters, etc.) to raise awareness of this issue.



8th Grade

Geographic information system, global positioning system, databases, presentation software, personal management tools, Internet-based projects (e.g., GLOBE), personal digital assistants

- Initiate and carry out a community mapping project whereby students, in collaboration with a community partner, use a geographic information system, global positioning system or other spatial tools to create a product for use in the community. This includes scheduling and keeping appointments.
- Participate in simulation or role-playing activities in which students grapple with the ethics of complex issues, such as infant mortality or the refugee crisis.



12th Grade

Geographic information system, global positioning system, databases, presentation software, personal management tools, Internet-based projects (e.g., GLOBE), personal digital assistants

- Develop a strategy to substitute alternative sustainable activities for present economic activities in regions of significant resource depletion (e.g., fisheries and/or logging of the Pacific Northwest, extensive irrigation practices in desert climates)
- Explain how evolving political and economic alliances affect the traditional cohesiveness of world culture regions and discuss ethical issues associated with the loss of diverse cultures.

