Technology and the Essential Learnings

The following are starters for teachers using technology to support Washington's Essential Academic Learning Requirements. These were developed by the ESD 112 Educational Technology Support Center.

Reading

1. The student understands and uses different skills and strategies to read.
   - Through interactive educational software, students will develop their reading skills in the areas of phonics, language structure and comprehension. (Examples: Interactive Reading Journey, Word Munchers)
   - Through the use of electronic tools such as dictionaries and thesauri, students will build their reading vocabulary. (Examples: Spell checkers, dictionaries and thesauri that are built into word processors and other publishing software)
   - Through the use of vocabulary software, students will build their reading vocabulary. (Examples: using CrossWord Creator to generate crossword puzzles, and Word Search Creator to generate word search programs)
   - Through interactive literature works on CD, students will understand the elements of fiction. (Example: Just Grandma and Me and The Adventures of Tom Sawyer)
   - With the use of electronic reference material on CD-ROM and on-line resources, students will use the features of the software to locate, sort and use information. (Examples: electronic encyclopedias, databases and Internet search engines that use menus, keyword searches, and icons)

2. The student understands the meaning of what is read.
   - Using textual material (both fiction and non-fiction) on CD's and the Internet, students will demonstrate comprehension of main ideas and details. (Examples: literature and reference material published electronically)
   - Using interactive software student will expand comprehension by analyzing, interpreting and synthesizing information and ideas. (Examples: time-liner software, concept-mapping software, graphic software)
   - Using the Internet, the students with think critically about the authors' use of language, style, purpose and perspective (Examples: separating fact from opinion, evaluating the validity of published information, detect bias and stereotypes in author's perspective)

3. The student reads different materials for a variety of purposes.
   - Using electronic databases, CD's and on-line resources, students will locate and read to learn new information. (Examples: reference materials, poetry, career interests)
   - Using electronic databases, CD's and on-line resources, students will gain information about performing a specific task (Examples: scheduling software, maps, job positions, newspaper ads)
   - Using literature works on CD's and the Internet, students will read for literary experience (Examples: novels, poetry collections, biographies, non-fiction narratives found on electronic sources)

4. The student sets goals and evaluates progress to improve reading.
   - Using tape recorders and video recorders, students will assess their strengths and need for improvement. (Example: an audio or video recording of a student reading sample in his/her electronic portfolio)
Using reading monitoring programs associated with reading books, students will assess their progress and will set reading goals (Example: Accelerated Reader)

Using video-conferencing, multimedia and publishing software, students will share reading experiences. (Examples: interactive video conferences, creation of video tapes of story characters and plots, and publishing book reviews on the world wide web)

Writing

1. The student writes clearly and effectively.
   - Through interactive educational software, students will develop the concept and design of their writing piece. (Example: the use of software that prompts the reader to make decisions about his/her ideas and topics)
   - With the use of word processors and publishing software, students will apply writing conventions (Example: Microsoft Works, PageMaker)
   - With the use of smart keyboards, students will write independently. (Examples: DreamWriters, AlphaSmart Keyboards, E-Mates)

2. The student writes in a variety of forms for different audiences and purposes.
   - Using word processors, publishing software and e-mail, students will write for different audiences. (Examples: word processor for teacher, e-mail for electronic pen pals, page layout software for community)
   - Using educational software, word processors and publishing software, students will write in a variety of different forms. (Example: Broderbund's Amazing Writing Machine prompts elementary students and provides templates for letters, journals, poetry, essays and stories. Word processors and publishing programs are more appropriate for older students.)
   - Using technical software, students will write for career-related applications. (Examples: web publishing software for homepages, word processing for research reports, CAD software for blueprints, spreadsheets for consumer-spending charts)
   - Using features in word processors, students will cite sources or technical documents (Examples: bibliographies, references, footnotes, endnotes)

3. The student understands and uses the steps of the writing process.
   - Using concept-mapping and outlining software, students will engage in the pre-writing process. (Example: Story mapping software such as Inspiration and outlining software such as PowerPoint or word processors for brainstorming and generating ideas)
   - Using word processing software, students will draft, revise and edit their writing piece. (Examples: the word processor for entering text, the cut/copy/paste features for revisions, the dictionary and thesaurus for vocabulary work)
   - Using graphic programs, clip art from CD's and on-line resources, students will illustrate the writing piece with appropriate images. (Examples: illustrations created with SuperPaint, and images from clip art CD's and Internet sources)
   - Using publishing software, students will produce a final published piece. (Examples: web-publishing software for putting the piece on the WWW, desktop publishing software for creating professional layouts, such as newspapers, brochures, flyers and reports)

4. The student analyzes and evaluates the effectiveness of written work.
Using word processors, scanners, and mass storage devices such as zip disks or recordable CD's, students will assess their own strengths and needs for improvement. (Examples: the collection of writing pieces included in an electronic portfolio)

Using electronic mail and video-conferencing, students will seek and offer feedback on their own writing and the writing of others. (Examples: on-line collaboration to interact with other students)

**Communication**

1. **The student uses listening and observation skills to gain understanding.**
   - Using videotapes, laserdisks and video broadcasts, students focus and listen to gain and interpret information. (Examples: The use of these technologies allows the student to receive information auditorally and visually.)
   - Using videotapes, laserdisks, CD-ROM and live interactive video-conferencing, students check for understanding by asking questions and paraphrasing. (Examples: Videotapes laserdisks and multimedia CD's allow the student to focus and review the material as many times as needed for clarification and evaluation. Live interactive video-conferencing allows students to check for understanding by asking the presenter questions and paraphrasing information.)

2. **The student communicates ideas clearly and effectively.**
   - Using a variety of software and electronic resources, students develop content and ideas. (Examples: concept-mapping and outlining software for generation of ideas; timelining software for sequencing of ideas; location of pertinent material on CD-ROM and on-line resources)
   - Using multimedia software and projection devices, students will use action, sound, and/or images to support presentations. (Examples: the use of presentation software to create slide shows; the use of CD's, scanners, digital cameras and video to digitize and include supporting graphics and sound; the use of data projectors and presentation cameras to present information)

**Mathematics**

1. **The student understands and applies the concepts and procedures of mathematics.**
   - Using interactive educational software, students understand apply concepts and procedures from number sense. (Examples: software such as Number Munchers, Treasure Mountain, Fraction Action)
   - Using interactive educational software and multimedia, students understand and apply concepts and procedures from measurement. (Examples: software such as Building Perspective, interactive laserdisks that describe and look for solutions to real world problems using math)
   - Using graphics and simulation software, students understand and apply concepts and procedures from geometric sense. (Examples: software such as Tessellations and Geometer's SketchPad.)
   - Using simulation and productivity software, students understand and apply concepts and procedures from probability and statistics. (Examples: software such as Probability Constructor and Microsoft Excel's spreadsheet)
   - Using programs with graphical capabilities, students will understand and apply concepts and procedures from algebraic sense. (Examples: the use of KidPix stamps to create and extend a pattern; the use of Microsoft Excel's spreadsheet to utilize an automatic fill with sequential patterns; the use of the Tessellations software to understand the relatedness of geometric patterns)
Using presentation tools, students will understand and apply concepts and procedures from algebraic sense. (Example: using a desktop presenter to for visual learning of patterns)

Using interactive educational software, students will understand and apply concepts and procedures from algebraic sense. (Example: the use of Alge-Blaster software for students to practice their algebra skills)

2. The student uses mathematics to define and solve problems.
   - Using multimedia and graphics software, students investigate situations, formulates questions and defines the problems. (Examples: the use of the Math Investigations laserdisk from D.C. Heath; the use of fractal software to search systematically for patterns in complex situations)
   - Using productivity and graphics software, students construct solutions. (Examples: the use of Microsoft Excel's spreadsheet to organize and apply methods to constructing a solution; the use of Rain Forest Web Pack by Sunburst Software with links to the Internet for authentic problem-solving)

3. The student uses mathematical reasoning.
   - Using productivity software, the students analyze information. (Example: the use of the Microsoft Excel's spreadsheet to interpret, compare and contrast information, and to validate thinking)
   - Using productivity software, students predict results and make inferences. (Examples: the use of FileMaker Pro to make and explain conjectures; the use of Microsoft Excel's spreadsheet to display and explain conjectures)
   - Using groupware and simulation software, students draw conclusions and verify results. (Examples: using the interactivity of Geometer's Sketchpad, FileMaker and Microsoft Excel's spreadsheet to test conjectures and check for reasonableness of results; using Tom Snyder's Decisions, Decisions series to construct examples and non-examples and then test and evaluate solutions to the problems.)

4. The student communicates knowledge and understanding in both everyday and mathematical language.
   - Using spreadsheets and databases, students gather information. (Examples: using Microsoft Excel's spreadsheet to record and sort data; use of FileMaker Pro to record, sort and filter data; use of word processors to record data and observations in journals)
   - Using spreadsheets and concept-mapping software, students represent and share information. (Examples: the use of the charting feature of Microsoft Excel's spreadsheet to graph information for a visual display; the use of Inspiration to represent models that show relationships)

Science

1. The student understands and uses scientific concepts and principals.
   - Using spreadsheets, databases and word processors, students will identify, describe and categorize substances, materials, object and living things. (Examples: use of Microsoft's Excel spreadsheet to record and sort data; use of FileMaker Pro to record, sort and filter data; use of word processors to record data and observations in journals)
Using simulation, graphics and concept-mapping software, as well as reference materials on CD-ROM and the Internet, students will recognize the components, structure, and organization of system and the interconnections within and among them. (Examples: use of interactive simulation software to learn content; use of electronic reference materials on CD and Internet to research and construct new information; use of graphics and concept-mapping software for visualization of organization and interconnectedness of systems)

Using simulation and graphics software, as well as reference materials on CD-ROM and the Internet, students will understand that interactions within and among systems cause changes in matter and energy. (Examples: use of interactive simulation software to learn content; use of electronic reference materials on CD and Internet to research and construct new information; use of graphics and concept-mapping software for presentation of new knowledge)

Using special equipment that connects to a computer, students will understand that interactions within and among systems cause changes in matter and energy. (Example: use of interactive Vernier probeware to change variables and record results)

Using special equipment that connects to a computer, students will construct and use models to predict, test, and understand scientific phenomena. (Examples: use of interactive Vernier probeware to construct, change, compare and contrast results when variables are changed; use of Lego Dacta materials to construct and evaluate models)

2. The student conducts scientific investigations to expand understanding of the natural world.

- Using word processors, databases and spreadsheets, students will plan and implement scientific investigations. (Examples: use of word processor to plan investigation and record observations in journal; use of spreadsheets and databases to record, sort and filter data; use of charts and graphs to question, analyze and formulate scientific explanations regarding the results)

- Using microscopes that are interfaced with computers and video monitors, students will plan and implement scientific investigations. (Example: the use of a microscope connected to a video monitor by a group of students who are conducting an experiment with microscopic materials)

- Using word processors, databases, spreadsheets, computerized simulations and graphics software, students will think logically, analytically and creatively. (Examples: use of simulation software to learn new content; use of spreadsheets and databases to record, sort and filter data; use of charts, graphs and self-drawn images present new knowledge, use of word processors to report findings)

3. The student applies science knowledge and skills to solve problems or meet challenges.

- Using word processors, databases, spreadsheets, and reference material on CD-ROM and the Internet, students will research, design, and test a variety of ways to address problems and/or challenges. (Examples: use of electronic encyclopedias on CD and databases on the Internet for researching the topic; use of databases and spreadsheets to record results when testing new solutions; use of word processors for reporting)

4. The student uses effective communication skills and tools to build and demonstrate understanding of science.

- Using multimedia and video-conferencing technologies, students will use listening, observing, and reading skills to obtain science information. (Examples: viewing video tapes, laserdiscs and CD's to learn content; use of video-conferencing to interact, question, clarify and paraphrase information presented by an expert)

- Using writing, publishing and multimedia software, students will use writing and speaking skills to organize and express science ideas. (Examples: use of word processor to write explanations; use of crossword creator software to reinforce everyday science terms; use of publishing software for
reporting data; use of digital cameras, scanners and video to effectively support explanations with visual images)

- Using science software, word processors, publishing and graphics programs, multimedia, and telecommunications, students will use effective communication strategies and tools to prepare and present science information. (Examples: use of science software and video sources to demonstrate a concept to an audience; use of desktop publishing software to publish a quality report; use of digital cameras and scanners to support presentation with visual aids; use of Internet e-mail, WWW and interactive video-conferencing to present scientific information to remote audiences)

5. The student understands how scientific knowledge and skills are connected to other subject areas and real-life situations.

- Using spreadsheets, databases, word processors and concept-mapping software, students will use mathematics to enhance scientific understanding. (Examples: use of spreadsheets to collect and organize numerical data from a scientific investigation, and for estimations and predictions; use graphing features of spreadsheets to design charts that explain situations; use word-processors to create tables of data; use Inspiration to describe relationships with symbols)
- Using CD-ROM and the Internet, students will understand the relationship between science and technology, and between science and history. (Examples: the use of electronic encyclopedias on CD-ROM to research scientific explorations and discoveries; the use of the Internet to research and explain the impact of science and technology on the last 500 years)

Arts

1. The student acquires the knowledge and skills necessary to create, to perform and to respond effectively to the arts.

- Using graphics software, video and still images, animation, and art peripherals, students will understand and apply arts concepts and vocabulary to communicate ideas. (Examples: use of digitized video to produce and present a work of art, use of electronic art tablet to create an electronic drawing; use of a scanner and graphics software to digitize, modify and save an image on a computer)
- Using simulation software and graphics programs, students will create, present, and evaluate artworks using visual arts, music, drama and dance. (Examples: use of Opening Night software to express ideas; use of Photoshop to create and present an artistic image)

2. The student applies the creative process with arts knowledge and skills to reason and solve problems.

3. The student uses at least one of the art forms (visual arts, music, drama, and/or dance) to communicate ideas and feelings.

- Using text, graphics, animation, sound and video, students will use combinations of art forms to communicate in multi-media formats. (Example: use of digitized video to convey an idea in a presentation)

4. The student understands how the arts connect to other subject areas, life, and work.

- Using a variety of graphics programs (rendering, morphing, texturing, etc.), students will use arts skills and knowledge in other subject areas. (Example: use of morphing software in a presentation about the metamorphous process of a frog)
Health/Fitness

1. The student acquires the knowledge and skills necessary to maintain an active life: movement, physical fitness, and nutrition.
   - Using video cameras, heart monitors, and spreadsheets, students will understand the concepts of physical fitness and develop and monitor progress on personal fitness goals. (Examples: use of video cameras to record progress; use of heart monitors to track heart rates; use of spreadsheets to record and chart progress toward goals)

Social Studies: History

1. The student examines and understands major ideas, eras, themes, developments, turning points, chronology, and cause-&-effect relationships in U.S., world, and Washington History.
   - Using electronic reference materials, databases, chronology and simulation software, students will understand historical time, chronology, and causation. (Examples: use of CD's and on-line databases, as well as simulation software, to research and investigate cause-&-effect relationships of historical events; use of FileMaker Pro to group events and individuals by historical eras; use of Tom Snyder's TimeLiner software to create timelines that explain patterns of historical continuity and change;
   - Using electronic reference materials on CD's and the Internet, students will analyze the historical development of events, people, places, and patterns of life in the U.S., world and Washington State history. (Example: using a CD-ROM on the Civil War to identify and explain major issues, movements, people, and events in U.S. history)
   - Using CD-ROM's and the Internet, students will examine the influence of culture on U.S., world and Washington State history. (Examples: the use of Microsoft's Nations CD to examine the influence of Native Americans on U.S. history; the use of the Internet to research different cultures)

2. The student applies the methods of social science investigation to investigate, compare and contrast interpretations of historical events.
   - Using historical CD's and Internet sites, as well as video and interactive video-conferencing, students will investigate and research. (Examples: use of electronic encyclopedias on CD-ROM to locate and collect information in the form of text, graphics, animations and desktop video; use of the Internet to research topics; use of videotapes, laserdisks, satellite transmissions to investigate historical topics; use of interactive video-conferencing to obtain further information from an expert)
   - Using word processors, databases, spreadsheets and concept-mapping software, students will analyze historical information. (Examples: use of word processors to record information in a text format; use of databases and spreadsheets to organize, sort, filter and report on various categories of information; use of Inspiration to visually display information as it is compared and contrasted)
   - Using productivity software, students will synthesize information and reflect on findings. (Example: use of spreadsheet charts and graphs to interpret/synthesize info)
3. The student understands the origin and impact of ideas and technological developments on history and social change.

- Using historical CD's and Internet sites, as well as video and interactive video-conferencing, as well as publishing and presentation software, students will explain the origin and impact of an idea on society. (Examples: the use of on-line resources to research the effect of land rights or free speech; the use of publishing software to create a quality report or a website about abolitionism; the use of video-conferencing to interactive with a Protestant minister and a Catholic priest to examine how Protestantism and Catholicism have conflicted with each other and shaped history)
- Using timelining software, historical CD's and Internet sites, students will analyze how historical conditions shape ideas and how ideas change over time. (Examples: use of Tom Snyder's TimeLiner to track historical conditions of a period of time; use of electronic reference materials on CD and the Internet to research historical content)
- Using timelining software, historical CD's and Internet sites, students understand how ideas and technological developments influence people, resources, and culture. (Examples: use of Tom Snyder's TimeLiner to technology advancements over a period of time, and the simultaneous changes in values, beliefs and attitudes; use of electronic reference materials on CD and the Internet to research technological developments)

Social Studies: Geography

1. The student uses maps, charts and other geographic tools to understand the spatial arrangement of people, places, resources and environments on Earth's surface.

- Using graphics programs and electronic maps on CD's and the Internet, students will use and construct maps, carts and other resources. (Examples: use of KidPix and KidMaps for constructing maps with legends; use of MapArt for the creation and interpretation of maps and legends)
- Using electronic maps on CD's and the Internet as well as video-conferencing, students will recognize spatial patterns on Earth's surface and understand the processes that create these patterns. (Examples: use of the MapQuest site on the WWW for the location of states, cities and rivers; use of video-conferencing to evaluate the effect of physical and human processes on public policy debate.)

2. The student understands the complex physical and human characteristics of places and regions.

- Using word processors, databases and concept-mapping software, students will describe the natural characteristics of places and regions. (Examples: use of a word processor to write descriptions; use of a database and/or concept-mapping software for observing and comparing the physical characteristics of places and regions)
- Using e-mail, presentation programs, word processors, desktop publishing programs and graphics programs, students will describe the patterns humans make on places and regions. (Examples: the use of PageMaker and graphics to generate a written publication on social, cultural and economic influences; use of HyperStudio to present the human characteristics of the local area and Washington State; use of Claris HomePage or e-mail to write or publish new information on the Internet)
- Using e-mail, desktop publishing programs and presentation software, students will identify the characteristics that define the Pacific Northwest and the Pacific Rim as regions. (Examples: the use of electronic pen pals to describe Pacific Northwest to children in other areas of the Pacific Rim; use of publishing software to create a report on the Pacific Northwest as a region; the use of PowerPoint to cultural and physical features of a region)
3. The student observes and analyzes the interaction between people, the environment, and culture.
   - Using publishing programs, presentation software and groupware, students will identify and examine people's interaction with and the impact on the environment. (Examples: use of Tom Snyder's Decisions, Decisions series to examine the choices and behaviors of people; the use of publishing and presentation software to explain the interactions and impact on the environment.
   - Using groupware, students will examine cultural characteristics, transmission, diffusion, and interaction. (Example: use of Tom Snyder's Cultural Debates to recognize the positive and negative outcomes that may result when people of different cultural backgrounds interact)

**Social Studies: Civics**

1. The student understands and can explain the core values and principles of the U.S. democracy as set forth in foundational documents, including the Declaration of Independence and the Constitution.
   - Using video tapes, Civics CD's and the Internet, students will understand and interpret the major ideas of foundational documents. (Example: use of a CD-ROM on the Declaration of Independence to explain the key concepts and evaluate their impact)
   - Using video tapes, Civics CD's, the Internet and video-conferencing, students will examine key ideas of U.S. democracy. (Example: use of video-conferencing to interact with a U.S. Senator to examine the continuing influence of key ideals of democracy)
   - Using video tapes, CD's, the Internet and video-conferencing, students will examine representative government and citizen participation. (Example: use of Civics CD to examine representative government)

2. The student analyzes the purposes and organization of governments and laws.
   - Using word processors and concept-mapping software, students will understand and explain the organization of U.S. government. (Example: use of Inspiration to diagram the structure of the U.S. government)
   - Using publishing and presentation software, students will compare and contrast democracies with other forms of government. (Example: use of a word processor to describe the purposes of government.

3. The student understands the purposes and organization of international relationships and how U.S. foreign policy is made.
   - Using Civics CD's and the Internet, students will understand how the world is organized politically and how nations interact. (Example: use of a website to gain understanding of U.S. roles and interests in international organizations)
   - Using Civics CD's and the Internet, students will recognize factors and roles that affect the development of foreign policy. (Examples: use of a CD to identify the roles of international organizations in foreign policy; use of the WWW to evaluate U.S. foreign policy decisions)

4. The student understands the rights and responsibilities of citizenship and the principles of democratic civic involvement.
   - Using Civics CD's, the Internet and groupware, students will understand individual rights and their accompanying responsibilities. (Example: use of Tom Snyder's Choices, Choices software to explain democracy)
Using e-mail and video-conferencing, students will identify and demonstrate rights of U.S. citizenship. (Example: use of video-conferencing to participate in civic discussions to solve problems)

Social Studies: Economics

1. The student understands basic economic concepts and analyzes the effect of economic systems on individuals, groups and society.
   - Using simulation software, students will comprehend key economic concepts and economic systems. (Example: use of Virtual Economics CD to understand a competitive market system)
   - Using video technologies, students will observe major forms of business and related careers. (Examples: use of video tapes on economics to learn the ways in which businesses compete against each other; use of interactive video-conference with local business people to compare and contract advantages and disadvantages of three forms of business)
   - Using video technologies, CD-ROM and the Internet, students will understand the monetary system of the U.S. and how individuals’ economic choices involve costs and consequences. (Example: use of the WWW to compare ways that money can be invested)