

Technology Applications TEKS

Foundations

1. Knowledge of hardware/software components
2. Use correct data input skills
3. Comply with the laws and policies

Acquisition of Information

Work: Manipulation of Data

7. Use appropriate computer-based tools
8. Use research skills and communication tools
9. Use technology tools to evaluate work

Work: Manipulation of Data

Communication/Publishing

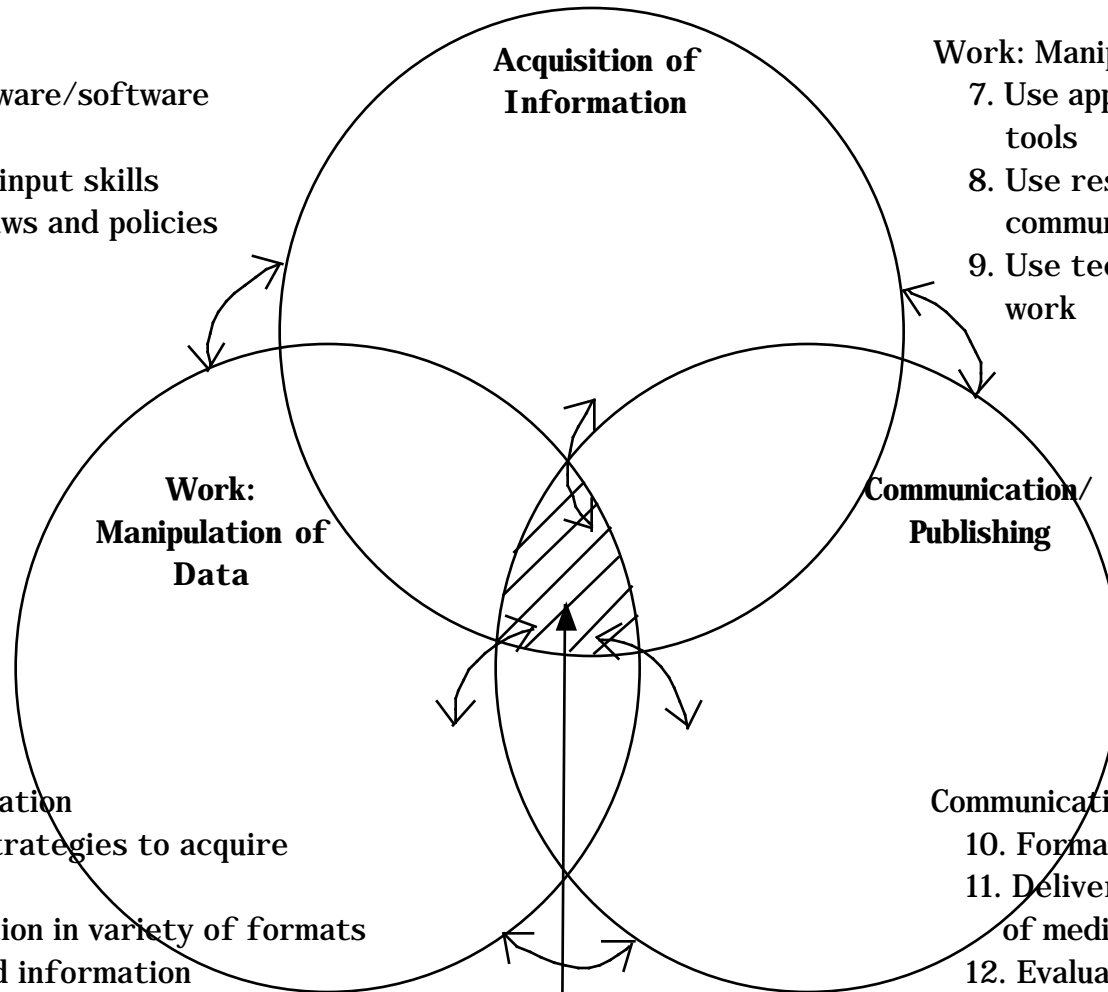
Acquisition of Information

4. Use variety of strategies to acquire information
5. Acquire information in variety of formats
6. Evaluate acquired information

Communication/Publishing

10. Format digital information
11. Delivers product in a variety of media
12. Evaluate product for relevance to task

Foundations



Technology Applications TEKS Framework

The Technology Applications Texas Essential Knowledge and Skills (TA TEKS) were written under a dynamic, spiraling framework in a way that concepts are articulated with rigor from kindergarten through eighth grade. Skills and software applications are appropriately included so that students master the performance descriptors and are technologically literate by the end of the eighth grade. The four major domains of the TA TEKS include Foundations, Acquisition of Information, Work-Manipulation of Data, and Communication/Publishing.

Foundations:

If represented in a VENN diagram (see illustration), the Foundations domain appears in the intersection of the other three domains, meaning that this set of knowledge and skills weaves among all the rest of the TA TEKS. The three associated categories found in the Foundations domain can be summarized:

1. To be a proficient user of technology, appropriate terminology and concepts associated with hardware devices, including but not limited to computer components, peripherals, and network devices, as well as software applications must be understood.
2. For a student to use technology applications efficiently, skills associated with the input and output of data, including, but not limited to, keyboarding, scanning techniques, compression of digital data (text, graphics, video, and audio) must be mastered. Until the keyboard is no longer the common method for the input of data, students must master the touch keyboarding strategies, and the teaching of these skills must start at the time a student first begins to use the computer keyboard. By the time a student leaves the eighth grade, keyboarding speeds of 35 words per minute with 95% accuracy should be accomplished. Increased speed will develop through the regular use of the keyboard.
3. A thorough understanding of the laws and policies associated with technology applications must be modeled and practiced, such as intellectual property concepts found in the Copyright Law of 1976, Fairuse Guidelines for Multimedia of 1996, and other associated Acceptable Use Policies.

The Foundations domain includes performance descriptors that must be modeled, taught, and practiced throughout the study of Technology Applications and the use of Technology Applications in all subject areas.

Acquisition of Information:

The ability to acquire information using a variety of strategies and from a mixture of formats is critical to the development of higher order thinking skills. Once the information is acquired, it must be evaluated as to the validity and relevance to the task both in process of acquisition and product—that which is acquired. A second dynamic domain of the TA TEKS framework is the Acquisition of Information. Students as early as kindergarten acquire information from age appropriate text, graphics, video, and audio resources. Skills are developed throughout until they are mastered in the eighth grade. The three associated groups found in the Acquisition of Information domain can be summarized:

4. Many strategies must be employed to acquire the information necessary to solve problems, manipulate into new knowledge, and use as stepping stones in critical thinking. Keyword searches and the use of Boolean logic such as AND, OR, NOT, are used on the Internet, intranet, CD-ROMs, and other resources to focus on the desired data to be acquired.
5. A variety of formats, such as text-based data, graphic, video, or sound data, hold electronic information which can be acquired from secondary storage devices such as hard drives, floppy disks, CD-ROM, DVD, laser disc as well as from remote locations via a network. Online help provide immediate support if the student knows how to use such a resource.
6. Information is of little value if it does not correlate to the problem or task. Students must evaluate the acquired electronic information as to validity, currency, and relevance. Strategies to resolve information conflicts must be taught. In order to validate the data, more information might need to be acquired, more research done on the subject or strategies learned for comparing and contrasting the acquired data. Students must also learn how to identify the source, location, media type in order to support the existence of the acquired information and as a check for validity.

The last step, that of evaluation and validation, is often neglected when acquiring information. Many times students do not realize the necessity or the strategies needed to master these skills. The Acquisition of Information domain skills must woven closely with the Foundations domain so that students understand the appropriate terminology, necessary hardware and software, correct input skills, and work within an ethical framework.

Work: Manipulation of Data/Problem Solving

Once data are acquired, students must have the appropriate tools to manipulate the data into information and then to new knowledge. Technology gets in the way of learning if the tools are too complex or too simple for the task. The seventh area of the TA TEKS defines the tools and tasks a student is to begin learning in kindergarten and master by the end of the eighth grade. Because tools continually change, conceptual knowledge of tools is a journey, not a destination. The tools of yesterday and today are not the tools of tomorrow; however, concepts rarely change.

7. The tools are varied in their application. Students must be comfortable and have knowledge in the correct way to use all of the productivity tools.
 - Because the computer is not a typewriter, the differences between a typewriter and a word processing application are major. Regardless of the publisher of the application, students must learn the correct method to input and format digital information, including, but not limited to, tabs, rulers, indents, sections, and use of appropriate typefaces.
 - Students at a very young age can input and analyze data in a spreadsheet. Numbers can be pictorially represented as a variety of charts. Therefore, by the time a student leaves eighth grade, they should master predicting and forecasting with spreadsheets using formulas and functions. Students understand the value of “what-if” spreadsheet scenarios.
 - Although the spreadsheet and database share some common functionality, they are quite different in that a database has disaggregation and reporting capabilities. After a student learns to problem solve (support/refute hypotheses) with data from databases, the definition of field types when creating databases makes more sense. Students design a variety of database reports ranging from layouts with backgrounds and graphics to custom lists, labels, and business cards.
 - In the elementary grades, students learn to do linear presentations such as book reports, science reports, and social studies projects. Later, students learn that presentations can contain links to other screens and applications. They must be taught the skills associated with a hypermedia presentation, such as the elements of design, typography rules, and the creation and efficient saving of vector and bitmap graphics, sound and video files.
 - The computer, a desktop publishing tool, provides the user the ability to produce documents, that only a few years ago, had to be professionally typeset and printed. Elements of design and color as well as typography, frame wrapped graphics, and linked text frames must be taught so that students produce quality products.

- Because graphics is the basis for the productivity tools, students must have knowledge of the difference in the attributes and tools used to create vector and bitmap (pixel) graphics. Once the tools and characteristics of the two kinds of graphics are learned, progression into the use of more advanced graphic programs can be expedited.
- By the time students leave the eighth grade, not only will they have experienced the use of virtual reality and simulation programs, but also they might have had the opportunity to create these kinds of files.
- Once students have learned a skill, they can create technical instructions for others. Students identify the problem, analyze and write the steps necessary for completion of the task. The technical instructions are then peer-edited for accuracy and completeness and published for others to use.

The use of technology is not relevant unless real work is accomplished with the tools. Therefore, students by the completion of the eighth grade will be proficient in the use of the productivity tools and use them to complete tasks in the other curricular areas. This cannot be a “one shot” approach in that only one subject uses one of the tools once or twice during the year; but this must be an organized approach that gives teachers time to teach these skills and students time to learn and practice these skills.¹ These productivity tools must be used in concert with each other in a way that students create products consisting of combinations of tools such as graphics, charts, desktop publishing strategies, and mail merged data from a database.

8. Students know how to use programs to facilitate research and communicate in ways that promote the solving of problems. “He who teaches, learns.” Students must participate in society as a learner, a mentor, and a teacher to promote the comprehension of concepts. Networks and telecommunication applications provide an environment for students to work with others as problem solvers. One of the necessary skills identified by the SCANS 2000 report is the ability to work in a team. Students must be taught the skills necessary for the successful completion of collaborative projects using technology. Service learning can be practiced as students create products for others to use. Students must understand the needs and requirements of the audience for which the project is directed. The integration of skills and knowledge from all subjects, including the use of technology, prevents the student from seeing the world as a “stand alone” environment. As work progresses, the student must continually evaluate the progress, both product and process, so that the problem solved is indeed the problem asked.
9. Technology can be used to identify and monitor time lines, track trends, and perform editions. As the process and product are evaluated, information conflicts can be resolved before “it is too late.”

¹ Senate Bill 1, 1995

Communication/Publishing

So that a variety of audiences benefit from the work and problem solving, new information must be formatted in ways that promote comprehension. People learn in different ways and through different media types; therefore, it is necessary that the data be created in a variety of formats.

10. Products, such as visual presentations, brochures, newspapers, Internet documents, a variety of database reports, spreadsheet layouts and charts, and graphic creations, provide environments to learn related skills.
11. Products are created for a variety of audiences in different media such as the Internet, the monitor, printed copy, CD-ROM, and video tape.
12. The communication and publishing of work must be evaluated as to the product, purpose, and relevance to task or assignment. A variety of techniques can be employed such as the use of rubrics, peer-evaluation, self-evaluation, teacher evaluation. The use of technology plays a major role in these evaluations. Products can be accumulated into a portfolio.

Conclusion

The Technology Application Texas Essential Knowledge and Skills is a dynamic framework, not a static or linear framework. The assignment of discrete and isolated performance descriptors to different subjects or teachers might not accomplish the intent of the TA TEKS in that the TA TEKS occur in domains of skills (Foundations, Acquisition of Information, Work—Problem Solving/Manipulation of Data, and Communication/Publishing. If the evaluation of one domain is unsatisfactory, one moves dynamically to another domain so as to accomplish the objectives. For example, if in acquiring information, the student neglects to cite the information appropriately according to the law, the Foundations domain is revisited to learn/relearn the ethics involved. If, when the student is working with the acquired data, the problem cannot be solved, more information needs to be acquired. Once the information is published and is not understood by the intended audience, more work must be done or more information acquired. The framework not only flows inward -> outward and outward -> inward, but also circularly in all directions. (See the illustration)