FOCUS QUESTIONS

1. How can teachers use technology in the content areas?
2. What factors must the teacher consider when planning to integrate technology?
3. What are the benefits of using technology across disciplines?

Chapter 2 presented profiles of technology-literate teachers and students. Of course, it is ideal when students are introduced to computer literacy topics and learning technologies in their earliest school experiences. The knowledge they gain then serves as a foundation for continued technology-based learning through high school and even into adulthood.

Technology integration requires a cooperative school attitude toward computers and their use. Table 8.1 gives a glimpse of what is involved for successfully integrating technology into the curriculum.

Perhaps the most important concept for students to grasp is that the computer is a powerful tool for getting work done. When computers are used across the curriculum, students begin to appreciate the vast range of tasks that computer power can accomplish. The computer no longer appears to be a technological enigma that can be understood only by science and math wizards. Students come to view the computer as a manageable and multifaceted tool for writing essays and stories, performing sociological and scientific research, solving mathematical problems, and learning more about any subject they wish to study.

**TABLE 8.1 Eight Lessons Learned**

1. Leadership is the key ingredient.
2. If you don’t know where you’re going, you’re likely to wind up somewhere else.
3. Technology integration is a slow process.
4. No matter how many computers are available or how much training teachers have had, there are still substantial numbers who are “talking the talk” but not “walking the walk.”
5. Effective use of technology requires changes in teaching; in turn, the adoption of a new teaching strategy can be a catalyst for technology integration.
6. Each school needs easy access to professionals with expertise in technology and pedagogy.
7. Barriers to using technology to support learning are the same for all poor communities, but some populations have additional issues.
8. Evaluation is often the weakest element of technology programs.

*Source: Seir-Tec Intensive Site Schools (www.seirtec.org/publications/lessons).*
Teachers of all content areas can foster this attitude in their students by designing instruction that integrates technology as a tool for learning rather than relying on technology as a delivery mechanism. This presents quite a challenge to teachers who are themselves novice technology integrators or who specialize in subjects that are not traditionally associated with technology-based learning activities. Remember, the emphasis is not on learning a software application such as PowerPoint, but on how to use the technology to solve problems. This chapter presents sample learning activities for five major content areas: mathematics, science, language arts, social studies, and special education. In addition, four multidisciplinary lessons are outlined. It is our hope that teachers will use these activities as a springboard for their own creativity.

Formulating Learning Activities

Teachers will find that the process of designing learning activities that integrate technology is very similar to designing traditional lesson plans. Many of the same factors must be taken under consideration, whether students work with computers or with pencil and paper. In formulating learning activities, the teacher tries to answer a series of questions:

- For what ages or grade levels is this activity appropriate?
- What is the purpose of the activity?
- What will students know or be able to do after completing the activity? What materials are required to perform this activity?
- What preparation is required on the teacher’s part? On the students’ part? What knowledge, skills, and concepts are necessary for students to complete the activity successfully?
- What tasks are most effective in teaching the topic?
- How will student learning be assessed, and at what points during the activity?
- What extensions might be useful in reinforcing or expanding knowledge gained through the activity?
- What comments will contribute to greater success of the activity?

Most teachers are accustomed to considering these factors in creating learning activities. There are additional factors that can make or break the technology-based learning experience. Other questions a teacher might address:

- How will my classroom change or adapt when I integrate technology?
- Which technology is best suited for meeting the learning purpose?
- How can technology be used to optimize learning?
- What aspect of the computer’s capabilities make it the best tool to use? To a large extent, activities must be tailored according to the hardware and software resources available in the individual teacher’s classroom, school, or district.
- How can an activity meet both curriculum standards and the National Educational Technology Standards for Students?
- What if there is limited access to the technology? Do students have access to computers in the classroom so that the only person controlling the amount of computer time is the classroom teacher?
- If so, how many computers are available?
- Can the entire class participate in the activity at the same time or will students need to work in shifts?
- Will students work individually, in pairs, or in larger groups?
• If computers are available in a central setting such as the media center, what constraints are placed on computer time for students?
• Will students work during normal class hours, or will they schedule computer time outside of normal class hours?

These factors will determine how practical a given activity is for a particular class.

Most educational software is on CD-ROM. Usually, these programs are hybrid versions, meaning that the CD will run on a Macintosh or PC computer. Be sure to read machine requirements carefully before attempting to run the software on your computer. In addition, be sure to read the readme file; specific steps often are required to have the software sound, video, and printing work properly. One final note: Burning a backup copy of the CD is recommended as a safety precaution in case the original CD is lost or damaged.

The same precaution applies to software that requires students to store their work on disks. Have students save their work twice: first on their own disk and second to a shared network folder. Make it a habit to back up the shared network folder on a portable medium such as a zip disk, memory stick, or CD.

All the learning activities presented here have been designed for flexible use. That is, they can be tailored easily to meet the special needs of an individual student or class. Teachers can simplify a complex activity for younger or less experienced students by providing or even inputting data before the activity begins. On the other hand, a relatively simple activity becomes more challenging if students are required to research and key in data on their own. Teachers can also customize the activity by changing the topic. For example, the learning activity for researching scientists is also useful for researching writers, historical figures, athletes, and so forth.

Another feature of the learning activities in this chapter is that they are uniform in format following ISTE’s National Educational Technology Standards for Students: Connecting Curriculum and Technology (Thomas & Bitter, 2000). It is recommended that teachers decide on a standard format for designing learning activities. Doing so makes it easier to share learning activities with other teachers who want to integrate technology in their own classrooms.

The format of the learning activities incorporates the following subheads.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>Title of the Activity</th>
</tr>
</thead>
</table>

**Grade-Level Range**

This is an indicator of the age or grade level for which the activity is considered appropriate. It should be used as a guideline only, not as a hard-and-fast rule. The level of difficulty of the activities can be adjusted for different grade levels or even different ability levels within the same class. Gifted students and those with prior computer experience will probably be quite successful with activities aimed at higher grade levels.

**Purpose.** A simply stated goal or set of goals that the lesson should accomplish.

**Description.** A summary of what students will do. Of course, in a very real sense, all technology-based lessons share an important objective: to help students become comfortable and competent in using technology as a tool.

**Activity Preparation.** This section lists the preparation required before the activity is undertaken. The teacher needs to determine whether sufficient access to technology and learning resources exists to carry out the activity.
• Do computers have enough memory to run the learning technology?
• Is the software or digital media readily available, or must it be ordered externally?
• Does the activity require tools and resources such as textbooks, web pages, guest speakers, and so on? A critical consideration under this category is whether there is an available source of data that students will need to complete the activity.
• Do students have network access to a database, or will they be required to do library research before beginning computer work?

Activity Procedure. This section is a step-by-step description of the activity in which students will participate. Sometimes the activity does not require hands-on work on the computer but instead calls for collaboration, research, discussion, and other activities that are part of the learning experience.

Tools and Resources. Lists the identified software, hardware, websites, and other materials needed to support the learning activity.

Assessment. This section presents ideas for assessing student learning.

Comments. Provides additional information pertinent to the success of the activity or suggestions for varying the activity for use in another content area or with a different group or level of students. In addition, you may want to include special comments or notes that indicate potential problems and solutions.

This model lesson plan is applied in the following content lesson plans. Under each of the five content areas included—mathematics, science, language arts, social studies, and special education—two activities are given. The first is recommended for elementary classes, the second for secondary classes. Again, the teacher can adjust the level of difficulty of the activity to classroom needs. In some instances, commercial software has been identified, but alternatives have also been listed whenever possible.

Learning Activities for Mathematics

Because of its number-crunching ability, the computer is an excellent tool for use in teaching mathematics. Much of the educational software on the market today was written to teach mathematical principles. For that reason, the classroom teacher should have little difficulty in locating effective math packages. The activities in this section enable the teacher to use applications software—spreadsheets—to solve mathematical problems in much the same way a businessperson uses a spreadsheet to make predictions and plans.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>Avery’s Skateboard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade-Level Range: 3 to 6</td>
<td></td>
</tr>
<tr>
<td>Purpose. In this activity students</td>
<td></td>
</tr>
<tr>
<td>• Explore a range of estimation strategies</td>
<td></td>
</tr>
<tr>
<td>• Problem solve with a spreadsheet application</td>
<td></td>
</tr>
<tr>
<td>• Create formulas to solve a linear equation</td>
<td></td>
</tr>
<tr>
<td>• Show different ways spreadsheets can be used</td>
<td></td>
</tr>
<tr>
<td>• Address the following National Educational Technology Standards (NETS) for Students Standards: 3—Technology productivity tools; 4—Technology communication tools; and 6—Technology problem-solving and decision-making tools</td>
<td></td>
</tr>
</tbody>
</table>
Description. Students apply what they know about a spreadsheet application to solve a mathematical problem. Students use a spreadsheet to structure their problem-solution thinking. Students explore new uses for spreadsheets.

Activity Preparation

• Develop formulas for solving the problem.
• Create spreadsheet template.
• Gather examples of problem solving with spreadsheets.
• Prepare a handout with a clear statement of the problem.
• Invite a parent who is an accountant to talk to the class about his or her career and how he or she uses technology to solve problems.

Activity Procedure

1. As a class, review and discuss the spreadsheet concepts of row, column, and cell.
2. Have the invited speaker introduce the descriptive language appropriate to the problem and related to accounting: words and terms such as cost, save, buy, spend, debit, and credit. Speaker presents a sample problem from work and demonstrates how he or she thinks through a problem and the tools he or she uses.
3. Introduce the problem students will be working on:
   • Each week Avery receives an allowance of $5.
   • Avery wants to save part of her allowance to buy a skateboard, which will cost $60. She also wants to spend part of her allowance on candy and part on video games, which cost 25 cents a game.
   • If Avery plays six video games each week and spends $1 for candy, how many weeks will she have to save in order to buy her skateboard?
   • How many weeks if she stops buying candy and plays four video games each week?
4. As a class, discuss different computational tools (calculator, paper-and-pencil algorithm, or mental strategy) that could be used.
5. Working in groups of three or four, students estimate a solution set. Encourage them to explain their thinking frequently as they estimate.
6. Groups share with the whole class their computational estimation strategies.
7. Using a spreadsheet, small groups of students format the worksheet and input the problem data and formulas. Check their skills and understanding of how a spreadsheet works as they are doing the activity. Have your template ready for students who need assistance.
8. Groups share their spreadsheets with the whole class. Encourage them to explain their thinking as they present their findings and the formulas they used.
9. Compare and contrast their spreadsheet strategies with their estimation strategies.
10. Ask each student to create a similar problem and spreadsheet solution.
11. Students email the problem to another student and arrange a chat time to discuss the solution.
12. As a class, discuss alternative uses for spreadsheets. Share an example you found on the Internet and the search strategy you used. Ask students to find examples by asking their families and searching the Internet.
13. Keep a visible record of students’ spreadsheet examples.

Tools and Resources

Software
• Spreadsheet, presentation
Websites

- Spreadsheets in the Math Class, www.math.byu.edu/~lfrancis/readings302/Spreadsheets.html

Other

- Presentation equipment to display students’ spreadsheets to the whole class (large-screen monitor, LCD panel, or classroom television connected to a computer)

Assessment

Observe students working in groups and individually. Keep anecdotal notes on students explaining their thinking. Evaluate students on their ability to use spreadsheets, determine and explain solutions, and discuss alternative estimation strategies.

Comments

An interesting variation of this lesson is to divide the class into two groups. One group will use the spreadsheet to solve the problem while the other group uses pencil and paper. This helps students appreciate the tremendous speed at which computers can perform mathematical calculations.

ACTIVITY  Slippery Oil Prices

Grade-Level Range: 7 to 12

Purpose. In this activity students

- Use a variety of resources to gather information
- Use spreadsheets to organize data
- Explore data for patterns
- Represent data using graphs
- Make predictions of a future trend based on oil price data
- Discuss and defend their predictions with other students
- Address the following National Educational Technology Standards (NETS) for Students Standards: 3—Technology productivity tools; 4—Technology communication tools; 5—Technology research tools; and 6—Technology problem-solving and decision-making tools

Description. Students access current information on oil prices from a variety of print and media sources including the Internet. Students enter the data into a spreadsheet and use the chart tool to graph the data. They then examine the graphs for patterns in oil prices and extrapolate the data to make predictions. Student groups present their predictions to the class using multimedia authoring software.

Activity Preparation

- Students need to be familiar with basic operations of a spreadsheet package.
- Invite a guest speaker to explain how he or she uses spreadsheet as a prediction and decision-making tool in his or her career field.
- Create a website with a History of the Spreadsheet time line and links to spreadsheet and data analysis tutorials.
• Create an email list of experts willing to answer questions and discuss students’ findings.
• Develop a data collection worksheet.

Activity Procedure

1. As a review, introduce the activity with an historical overview of the spreadsheet from its invention in the 1970s as an accounting tool to its continually expanding applications as a prediction instrument and decision-making tool.
2. As a class, discuss the wide range of current uses of the spreadsheet in business, government, and research. Make connections to other curriculum areas as well.
3. Have the invited speaker explain how he or she uses a spreadsheet in business, government, or research.
4. Introduce the task with a discussion about trends and graphs. Invite the speaker to participate in the discussion.
5. Working in groups of three or four, students collect data about oil prices from the media center (library) and online resources on the Internet.
6. Groups share with the whole class the data and sources they have found.
7. Discuss the pattern of oil prices for a six-month period.
8. Students record their data findings on a spreadsheet.
9. Students research the pattern of oil prices for a prescribed period of time (e.g., six months, one year, five years). Using the spreadsheet’s chart tool, students represent data in a variety of graphs.
10. Students assess the trend in oil prices.
11. Working in groups of three or four, students share their graphs and discuss possible reasons for patterns they detect. Encourage students to explain their reasoning. Groups email a question or a brief presentation of their analysis with a graph to an expert for feedback.
12. Students use the spreadsheet to predict future oil prices for a prescribed period of time and speculate how this trend might affect gasoline prices. Using the results, students generate line graphs of the pricing trend and write a prediction rationale.
13. Working in groups of three or four, students share and discuss their predictions and graphs.
14. Groups synthesize their findings to create a group prediction, rationale, and graph. Groups create a multimedia presentation for the class using software such as PowerPoint or HyperStudio, presenting their future trend and the rationale for their prediction.
15. As a class, discuss possible uses of the spreadsheet as a prediction and decision-making tool.

Tools and Resources

Software
• Spreadsheet, graphics, presentation, or multimedia authoring (PowerPoint, HyperStudio)

Websites
• Statistics—The Facts and Figures of Oil and Gas, www.api-ec.api.org/newsplashpage/index.cfm
• Collection of PowerPoint slides by Jamie MacKenzie that identifies the trends in future supplies and consumption patterns of crude oil, www.igc.org/wri/powerpoints/oil/index.htm
- Crude Oil and Natural Gas Prices, www.bloomberg.com/energy
- Oil Price History and Analysis, www.wtrg.com/prices.htm
- Smithsonian Institution, www.smithsonianeducation.org

Other
- Presentation equipment to display students’ presentations and graphics to the whole class (large-screen monitor, LCD panel, or classroom television connected to a computer)
- Printer for generating hard copies of student graphs and charts
- Data collection worksheet

Assessment. Evaluate students on their ability to graph data, explain and defend their predictions, and work productively in a group. Develop a rubric with students for scoring the independent spreadsheets and predictions and the group presentations.

Comments. A web search can provide students with more information regarding oil sources that can be built into a spreadsheet file. This lesson can be adapted for a class in geography, political science, or economics as part of a study of major oil-producing nations.

Learning Activities for Science

There are many applications of technology in the science laboratory and classroom. In fact, some of our most innovative technological developments have come from computers that were designed for scientific applications. Therefore, it is appropriate that science teachers demonstrate to their students what a powerful tool the computer can be in furthering scientific investigation.

ACTIVITY The Weather Report

Grade-Level Range: 2 to 5

Purpose. In this activity students
- Plan and conduct a simple investigation
- Apply their understanding of data collection
- Generate bar graphs and pie charts
- Gather and analyze information
- Observe differences in weather conditions for different geographical locations
- Share their results with peers
- Address the following National Educational Technology Standards (NETS) for Students Standards: 3—Technology productivity tools and 5—Technology research tools

Description. Students collect data on weather conditions. They observe, graph, and write about local weather for a month. Small groups synthesize their findings to demonstrate the relationship between weather and geographic location. Groups share their projects by creating a multimedia presentation.
Activity Preparation

- Students need to be familiar with the process of generating bar graphs or pie charts.
- Students understand the rudiments of systematic collection of data.
- Prepare a student worksheet listing the types of weather to be observed (sunshine, rain, clouds, snow, wind, etc.) and the days of the month during which weather will be observed.
- Gather resources (books, maps, CDs, weather videos, Internet sites). Invite a local climatologist to present and discuss weather concepts. Create a large outline of your state map. Create symbols for different types of weather (sunshine, rain, clouds, snow, wind, etc.) and different types of geographic features (mountains, lake, valley, river, grassland, plain, delta, desert, cape, rain forest, etc.).

Activity Procedure

1. Introduce the activity by placing a marker on a large state map indicating where the students live. Ask students to identify other cities or towns in the state. Hand out the weather worksheets and explain the project.
2. Begin each class by reminding students to observe the weather and record the data on their worksheets. Have a student select the appropriate weather symbol for the day and place it on the map.
3. Assign students to groups with three or four members, divided according to different state regions. On a weekly basis, have the groups locate weather sources to collect data on their assigned regions.
4. Encourage students to record weekend weather conditions at home and add these data to their worksheets as well.
5. Have students collect data for a prescribed period of time (e.g., one month).
6. After students complete data worksheets, assist them in entering the data into a graphing program as the basis for a pie chart or bar graph showing the number of sunny, rainy, cloudy, snowy, and windy days during the month.
7. Display students’ graphs on a bulletin board for easy comparison.
8. Have each group complete its group worksheets and enter the data into a graphing program to create a pie chart or bar graph. Display group graphs.
9. As a class, discuss geographical differences of the state regions. Use Internet resources to locate landscape pictures. Have students place the appropriate geographic symbols on the state map.
10. Working in their region group, students discuss the differences between the region and local graphs and why they are different. Have each group reach a conclusion about the weather patterns for the month and prepare a short presentation for the class.
11. Following group presentations, discuss the conclusions and trends. Use weather sites on the Internet to show national and global weather patterns. Discuss how climatologists use computers to gather, calculate, and display weather data. Ask students to write a general description about weather patterns they observed.
12. Invite a local climatologist to speak to the class and bring samples of computer-generated displays of weather data.
13. Encourage students to continue collecting data over a longer period of time so that their body of data is larger. Have them select a city in another country to observe its weather pattern. The Internet is an excellent source for up-to-date information for class projects and research.
Tools and Resources

Software
• Graphics (or enter data into a spreadsheet and use the chart tool), presentation

Websites
• National Climatic Data Center, www.ncdc.noaa.gov
• Climate Prediction Center, www.cpc.ncep.noaa.gov
• National Weather Service Homepage, www.nws.noaa.gov
• Weather Learning Resources, www.exploratorium.edu/ti/resources/weather.html
• Weather Channel’s website, www.weather.com/homepage.html
• University of Michigan’s Weather Cams, http://cirrus.sprl.umich.edu/wxnet/wxcam.html
• Smithsonian Institution, www.smithsonianeducation.org

Other
• Presentation equipment to display students’ graphics to the whole class (large-screen monitor, LCD panel, or classroom television connected to a computer)
• Printer for generating hard copies of student graphs and charts
• Data collection worksheet

Assessment
Compare the students’ graphs. Compare the group graphs. Are they similar? What accounts for differences between graphs? Use a rubric to score individual graphs, data collection worksheets, writing assignments, and group presentations and graphs.

Comments
Older students may enjoy trying to predict the weather. Have students contact a website of your region of the National Weather Service for normal and record-setting weather conditions in your area within the past year. Students can use data to make weather predictions and then observe the actual weather to determine the reliability of their predictions. Check with your local television station for possible software. Using a weather radio and an LCD panel will allow students opportunities to be classroom meteorologists and give weather reports just like on television.

ACTIVITY

Who’s Who in Science

Grade-Level Range: 6 to 12

Purpose. In this activity students
• Explore individual contributions to the scientific field
• Gather and summarize information
• Apply their understanding of databases
• Address the following National Educational Technology Standards (NETS) for Students Standards: 2—Social, ethical, and human issues; 3—Technology productivity tools; 4—Technology communications tools; and 5—Technology research tools

Description. Students collect information about a scientist using different types of resources. Students use a database to store and organize information about scientists. Students share with peers their information by creating a multimedia pre-
sentation. Students discuss the relationships among scientists and illustrate these relationships by creating a concept map and timeline.

**Activity Preparation**

- Students are familiar with basic operations of database software.
- Vocabulary terms that must be presented are template, record, field, and key.
- With younger students, teachers may want to design a template including fields such as
  - Name
  - Nationality
  - Science field
  - Born
  - Died
  - Contribution
- Older students can benefit from designing their own templates; this will give them experience in naming fields and designating keys.

**Activity Procedure**

1. Have students research the library and the Internet for biographies of scientists.
2. Students should keep note cards with pertinent information to be keyed into the database later.
3. After records have been keyed in, students can access the database to share information they have uncovered or create trivia games.
4. Have students create brief multimedia presentations on the scientists they have researched.
5. As a class, discuss the relationships among scientists. Is there evidence that some of the scientists were influenced by others?
6. Using a concept-mapping tool such as Inspiration, create a concept map using terms from the contribution category.

**Tools and Resources**

- **Software**
  - Database, presentation, graphics, concept mapping (Inspiration)
- **Websites**
  - Internet History of Science Sourcebook, [www.fordham.edu/halsall/science/sciencesbook.html](http://www.fordham.edu/halsall/science/sciencesbook.html)
  - Women and Minorities in Science and Engineering, [www.mills.edu/ACAD_INFO/MCS/SPERTUS/Gender/wom_and_min.html](http://www.mills.edu/ACAD_INFO/MCS/SPERTUS/Gender/wom_and_min.html)
- **Other**
  - Presentation equipment to display students’ spreadsheets to the whole class (largescreen monitor, LCD panel, or classroom television connected to a computer)

**Assessment.** How many records are contained in the database? By which keys can records be retrieved? Do students understand the sorting capabilities of the database? Score the project with rubric. The rubric can reflect not only the multimedia presentation and database competency but also the research methods used to search, collect, and organize information.

**Comments.** Students may wish to make use of the database to generate a timeline that illustrates the scientists’ contributions as well as other major events.
Learning Activities for Language Arts

There may have been a time when teachers of language arts thought that the computer had nothing to offer their students. Fortunately, this is no longer the case. Many teachers and students have discovered that the computer is a wonderfully patient tutor of reading and writing skills. There is an abundance of word processing and desktop publishing software programs on the market for students of all ages. In addition, there are programs that assist with spelling, grammar, and word choice.

**ACTIVITY**  
**Write a Story**

**Grade-Level Range:** PreK to 5

**Purpose.** In this activity students
- Work cooperatively with others to produce a storybook
- Demonstrate their knowledge of short story elements
- Express their ideas using a variety of media and technological tools
- Address the following National Educational Technology Standards (NETS) for Students Standards: 1—Basic operations and concepts; 2—Social, ethical, and human issues; 3—Technology productivity tools; and 4—Technology communications tools

**Description.** Students use basic functions of a word processing package or writing software program such as Pajama Sam’s One-Stop Fun Shop to create a short story.

**Activity Preparation**
- Format a disk or CD and create a document file with a story title.
- Students have had some practice with typing on a keyboard.
- Students understand the basic elements of a short story plot, setting, and characters.

**Activity Procedure**

1. Introduce the activity by reading a short story aloud and reviewing its basic elements.
2. Explain the short story writing project to the class.
3. To demonstrate the process, write a class story. Begin the story by typing the first sentence or simply an introductory phrase such as “Once upon a time.”
4. After that, each student will add a sentence of his or her own.
5. Once all students have had an opportunity to add a sentence to the story, have everyone read aloud and in unison the finished story.
6. Students print the story (one to two sentences per page) and illustrate their sentence contribution. Have them take the story home to share with family members.
7. Discuss cooperating with others and sharing ideas.
8. Divide students into teams of three. Have them create a short story and illustrate it using a word processing, slide-show presentation, or story writing program.
9. Teams share their stories with the class.
Tools and Resources

Software
- Word processing, graphics, presentation, Pajama Sam’s One-Stop Fun Shop, KidPix Studio, Easy Book, Kid Works Deluxe

Other
- Presentation equipment to display students’ stories to the whole class (large-screen monitor, LCD panel, or classroom television connected to a computer)

Assessment. Were students able to formulate and type in original sentences? Were they interested in the story? Did the story have basic elements such as plot, setting, and characters? Assess students on their ability to work cooperatively with others and their contribution to the short story. Before the project, develop a rubric with the students that addresses state writing standards and short story elements.

Comments. With very young children, it might be a good idea to provide illustrations that spark ideas and lend a coherent plot to the story. An interesting variation of this lesson is for the teacher to create a form in which students can fill in their own names and other information to create a story about themselves. Most major software companies have specific writing software programs that allow students to write and illustrate their own storybooks. The Key Caps accessory allows for foreign-language stories. Some programs are also available in a second language. Students should be encouraged to decorate their book covers further with their own artwork. This lends color and creativity to the book. Giant George and Ruby Robot, BIG and Little (Sunburst Communications) requires a Muppet Slate but also allows students to create and design various publications of differing sizes up to 5 feet tall. Clifford’s Big Book Publisher (Scholastic New Media) provides graphics, clip art, and fonts for younger students to write their own big books. Other related programs are Print Shop Deluxe (Broderbund), Hyperstudio (Roger Wagner Publishing), Kids Works Deluxe (Davidson & Associates), My Own Stories (The Learning Company), Children’s Writing and Publishing Center (The Learning Company), and The Multimedia Workshop (Davidson & Associates).

ACTIVITY Research Notes

Grade-Level Range: 6 to 12

Purpose. In this activity students
- Conduct research on a topic
- Demonstrate their knowledge of search strategies
- Apply their understanding of databases
- Address the following National Educational Technology Standards (NETS) for Students Standards: 1—Basic operations and concepts; 2—Social, ethical, and human issues; 3—Technology productivity tools; and 5—Technology research tools

Description. Students use a database to store and organize research notes and format a bibliography.

Activity Preparation
- Students are familiar with basic operations and applications of databases.
- Students are familiar with the terms template, record, field, and key.
Middle school teachers may want to design a database template including the following fields:
- Author
- Title
- Publisher
- City of publication
- Year of publication
- Topic(s)
- Notes

High school students may benefit from designing a template of their own and designating keys such as author, title, and topic.

**Activity Procedure**

1. Working with a common topic or with individual topics, students research the topics using library and Internet resources.
2. Students should keep note cards or word processing files with information to be keyed into the database. After all the records are keyed in, students can retrieve information or print listings of it.
3. Depending on the report formatting capabilities of the database, students format bibliographies with correct placement and punctuation of information.
4. Students use a standard style sheet to format their bibliographies.
5. Have students work in small editing groups to proofread and revise their bibliographies.
6. Discuss other ways databases simplify the research process; for example, allowing direct access to up-to-the-minute information.
7. Explore ways in which the computer is likely to change the way we do research. Discuss the advantages of formatting various reports of the same data for different purposes.

**Tools and Resources**

*Software*

- Database, presentation

*Websites*

- Electronic Reference Formats Recommended by the American Psychological Association, [www.apastyle.org/elecref.html](http://www.apastyle.org/elecref.html)
- Modern Language Association, [www.mla.org](http://www.mla.org)
- Using Modern Language Association (MLA) Format, [http://owl.english.purdue.edu/handouts/research/r_mla.html](http://owl.english.purdue.edu/handouts/research/r_mla.html)
- Research Papers, [http://owl.english.purdue.edu/handouts/research/index.html](http://owl.english.purdue.edu/handouts/research/index.html)
- Network Bibliography (Example of database bibliography), [www.cs.columbia.edu/~hgs/netbib](http://www.cs.columbia.edu/~hgs/netbib)

*Other*

- Presentation equipment to display students’ bibliographies to the whole class (large-screen monitor, LCD panel, or classroom television connected to a computer)
• Printer and bibliography style sheet such as the MLA’s Handbook for Writers of Theses and Dissertations

Assessment. Check the bibliographies for correctness and style. What have students learned about the process of research and the use of the computer to expedite research? How did students evaluate resources?

Comments. This lesson can be used as an effective prelude to writing a research paper because students have created a working bibliography while completing the lesson. The web has access to most writing guidelines as well as step-by-step approaches for writing papers with projected time lines.

Learning Activities for Social Studies

Disciplines within the social studies area have benefited greatly from computer applications such as databases and spreadsheets. Especially in fields such as psychology and sociology, in which large bodies of statistical data contribute to a greater understanding of human behavior, the computer has made life easier for both teachers and students. Simulation programs can bring history to life by placing students in the midst of historical situations. Social studies teachers can choose from a wide range of computer applications to challenge their students.

ACTIVITY You Want to Sell Me What?
The Many Forms of Advertising

Grade-Level Range: 3 to 5
Purpose. Through this learning activity, students
• Understand advertising and the role it plays in the marketplace
• Discover the ways in which the attributes of various media contribute to the effectiveness of advertising for a particular audience
• Become discriminating consumers of advertising strategies
• Address the following National Educational Technology Standards (NETS) for Students Standards: 3—Technology productivity tools; 4—Technology communication tools; 5—Technology research tools; and 6—Technology problem-solving and decision-making tools

Description. This learning activity takes place over an extended period of time and explores the purpose of advertising media. As a class, students examine advertisements using focus questions to determine their attributes, audience, and influences. In small groups organized by media type, students use focus questions to research a specific media type. Groups then present their findings to the whole class using presentation software. Small groups meet again to design and produce an advertisement in their researched medium. They also conduct a market analysis, including the cost of placing their ad. Finally, they present their ad to the whole class using the focus questions for discussion.

Activity Preparation
• Gather samples of advertisements in various media forms: newspapers, magazines, radio and television recordings, and websites.
• Preview relevant media-related websites. Assemble and troubleshoot necessary technology tools (see Tools and Resources).
• Schedule a guest speaker who either is involved in advertising or uses advertising extensively to promote his or her business.
• Schedule adult helpers or cross-age tutors to assist younger children with group activities.

Activity Procedure

1. As a class, discuss the purposes of advertising.
   • How do advertisements influence the way you act on needs and wants?
   • How do fact and opinion play a part in advertising?

2. As a class, study one advertisement from at least three media types (choose from newspaper, magazine, radio, television, and the web). Discuss the following focus questions:
   • How does the ad make you feel?
   • Were you persuaded to buy the product?
   • What do you think the purpose of the ad is?
   • Who do you think is the target audience?
   • What ad components were effective?
   • Was this a product that you need or that you want?
   • Why is this medium effective for this particular ad?

3. In small groups, students research advertisements found in various types of media. Each group works with one of the following: newspaper, magazine, radio, television, or the web.

4. Each group chooses a representative advertisement in its medium and discusses the attributes of the ad, using the list of focus questions.

5. Using presentation software, each group presents the results of its analysis to the class. As a class, discuss the similarities and differences among the media types, and their perceived strengths and weaknesses. Determine why a particular media type was used for a particular target audience.

6. Small groups meet again to design advertisements for a product of their choice, for the media they have been working with. The group chooses a particular audience to which it will advertise the product, focusing on how consumers in this particular group can best be reached by the attributes of this medium.

7. Small groups perform market research on their advertisements by soliciting opinions from their peers in a focus group setting. (Creating research questions that can be analyzed numerically is a valuable mathematics task.) How students ask questions about the product will define how the results are reported. (Use a rating scale? Comparison with other like products? Attributes of product? etc.) Market research begins by sharing ads with other groups in the class, other students at school, family members, or others in the local community. Students can then create graphs of their research results, using spreadsheet or graphing software.

8. After refining their advertisements, student groups use the web to find representative groups from their target audiences, experts in the advertising fields, and others with knowledge about their products. Students electronically send their advertisements to these groups for further comment.

9. Small groups investigate the cost of placing their advertisements in the media by contacting newspapers, magazines, and radio and television stations, or by researching the costs of advertising on the web. Discuss the impact of easy access to the web. Do a cost–benefit analysis comparing advertising costs with potential profits.
10. Small groups use electronic presentation software to present their final advertisements to the class, along with the results of their market research and cost–benefit analyses.

11. As a group, have the class reflect on the results of the small group work, discussing which media are most cost effective for different audiences and purposes.

12. Further topics of discussion may include
   - Consumer spending habits of different population groups
   - How personal choices may affect the economy
   - How local advertisements compare with nationally run advertisements

Tools and Resources

*Software*
- Word processing, presentation, spreadsheet or graphing, video editing

*Hardware*
- Audiotape player, video camcorder

*Websites*
  - Newspapers
    - [www.denverpost.com](http://www.denverpost.com)
    - [www.Azcentral.com](http://www.Azcentral.com)
    - [www.nytimes.com](http://www.nytimes.com)
    - [www.latimes.com](http://www.latimes.com)
  - Magazines
    - [www.time.com](http://www.time.com)
    - [www.usnews.com/usnews/home.htm](http://www.usnews.com/usnews/home.htm)
    - [http://pathfinder.com/people](http://pathfinder.com/people)
    - [www.zdnet.com](http://www.zdnet.com)
  - Radio stations
    - [www.web-radio.fm](http://www.web-radio.fm)
  - TV commercials
    - [www.usatvads.com](http://www.usatvads.com)
    - [www.clipland.net/index_tvc.shtml](http://www.clipland.net/index_tvc.shtml)

*Other*
- Newspapers, magazines, recordings of radio and television advertisements, World Wide Web advertisements (found on almost any commercial website)

**Assessment.** Develop a scoring rubric to evaluate each group advertisement. As the assignment develops, share the rubric with the class. Be sure to adjust the rubric based on appropriate student suggestions. Students use the rubric to evaluate their group advertisements. Give samples of advertisements in various media and have students discuss the ads in terms of the beginning focus questions.

**Comments.** Many teachers have found that the combination of group and individual work in this learning activity works well in meeting the needs of all students. This is especially true for classrooms in which there are second-language learners. Nuances in the words used in advertising can be deceiving to second-language learners. The group work helps take care of finding the many grammatical and spelling errors that used to show up in final projects. The use of the new technology has made this project much more successful than when conventional tools were used. Students are always pleased with the professional-looking results.
**ACTIVITY**  
**Career Decisions**

**Grade-Level Range:** 8 to 12

**Purpose.** Through this learning activity, students

- Access multiple sources to a research topic
- Formulate a decision based on prioritizing strategies and data comparison
- Apply understanding of databases
- Address the following National Educational Technology Standards (NETS) for Students Standards: 3—Technology productivity tools; 4—Technology communication tools; 5—Technology research tools; and 6—Technology problem-solving and decision-making tools

**Description.** Students make career decisions after researching several major U.S. cities.

**Activity Preparation**

- Students are familiar with basic database operations and terminology, particularly *template*, *record*, *field*, and *key*.
- Middle school teachers may want to design a template that includes fields such as
  - City
  - State
  - Population
  - Population under 35
  - Per-capita income
  - Unemployment rate
  - Average temperature
  - Average rainfall
  - Number of colleges
  - Number of hospitals
  - Popular sports
  - Number of churches
- Older students can benefit from designing their own templates to include factors they consider important in making career decisions.

**Activity Procedure**

1. Tell the students to imagine that they have completed their education and are ready to enter their chosen career fields. They have received three job offers in three different cities. Before making decisions about which offers to accept, they are to conduct research about the three cities.

2. Either have the class choose three cities for research or have individual students select three cities that appeal to them.

3. Encourage students to select major cities so that current data will be readily available.

4. After students have conducted research on three cities, assist them in entering the data into the database. Students can then print a listing of their data for easy comparison.

5. After students have had an opportunity to review their listings, ask them to choose one of the job offers based on their findings.

6. Have them list the factors that most influenced their decisions and prepare brief presentations. Suggest that they use tables to show data comparisons.
7. Have students write essays explaining their decisions and the factors on which they are based.
8. Discuss the different factors people consider in relocating and how these factors are prioritized differently by different people.

Tools and Resources

Software
- Database, presentation

Websites
- USA City Information, www.pe.net/~rksnow
- The USA CityLink Project, www.usacitylink.com
- Weather maps, www.weather.com/weather/maps
- The Travel Site, www.randmcnally.com/rmc/home.jsp
- Understanding the USA, www.understandingusa.com

Other
- Presentation equipment to display students’ spreadsheets to the whole class (large-screen monitor, LCD panel, or classroom television connected to a computer)

Assessment. Were the students able to locate all of the information called for in the database? Did the students suggest additional characteristics that could be included? Were students able to reach decisions with which they felt comfortable?

Comments. The Carmen Sandiego series by Broderbund may be used to build a classroom database on countries, states, and cities. Several commercial software programs and some websites provide maps as well as related information.

Learning Activities for Special Education

The computer is an extremely effective tool in the special education classroom because it is infinitely patient. Students can work at their own pace without feeling threatened or rushed. Also, the computer seems to motivate many students to repeat lessons and exercises, thereby reinforcing the knowledge they have gained. In effect, the computer provides the student with limitless individual attention that the special education teacher cannot always provide. Although there is limited educational software on the market that has been designed specifically for use in special education, most educational programs can be adapted to the unique needs of the special education classroom. It is especially easy to tailor educational software that includes authoring components so that the teacher may create questions or problems that relate specifically to the subject area under consideration. The lesson plans that follow present educational software that adapts well to use with exceptional students.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>Logic Builders</th>
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Grade-Level Range

Because Logic Builders (Scholastic New Media) allows the student to choose from three levels of difficulty, the game can be adapted to a wide range of skill levels.
**Purpose.** Through this learning activity, students

- Improve their ability to follow directions by re-creating spider webs according to computer-generated patterns
- Address the following National Educational Technology Standards (NETS) for Students Standards: 1—Basic operations and concepts; 2—Social, ethical, and human issues; and 4—Technology communication tools

**Description.** Students use the software gaming program, Logic Builders, to create a graphic image.

**Activity Preparation**

- Students understand basic operations of the computer and have minimal typing skills.
- Teachers should be familiar with loading the programs and selecting the appropriate games from the main menu.

**Activity Procedure**

1. Students select DRAW A WEB from the main menu of Logic Builders. This game enables students to experiment with the process of drawing a spider web with the help of on-screen spiders.
2. Students play MATCH A WEB in which they are required to re-create a master design displayed on the right side of the screen.
3. Still more challenging is RECALL A WEB, which requires students to re-create the master web from memory. Students achieve high scores for re-creating webs in as few moves as possible.
4. As students earn points, they receive promotions to the level of Big Boss.
5. Have students share their thoughts about the game using a synchronous communication tool (CHAT program).

**Tools and Resources**

**Software**

- Logic Builders (Scholastic New Media), synchronous communication tool

**Assessment.** The score maintained by the computer can be used as an indicator of student success in redrawing patterns. Do students select higher levels of challenge after gaining experience with the program? Do they demonstrate positive social and ethical behaviors when using technology?

**Comments.** Factory (Sunburst), The Oregon Trail 2 (The Learning Company), Lego TC Logo (LCSI), Carmen Sandiego series (Broderbund), and the Sim series (Maxis) of programs are alternative software approaches to this lesson. Students can do screen captures to cut and paste their webs into a paint program to color them or even use them as screen savers.

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**ACTIVITY Recreation and Leisure**

**Grade-Level Range:** 8 to 12

**Purpose.** Through this learning activity, students

- Locate and participate in recreational and leisure activities in the community
- Address the following National Educational Technology Standards (NETS) for Students Standards: 1—Basic operations and concepts; 2—Social, ethical, and...
Description. Students use a database to store and organize their research findings.

Activity Preparation
- Students are familiar with databases and have minimal typing skills.
- Students are familiar with collecting data from the Internet.
- Design a template to include the following fields: Activity, Organization, Address, Cost, Services, Hours, and Eligibility.
- Develop a bookmark folder with local websites.
- Format a data disk or CD in advance of the lesson.

Activity Procedure
1. Students create lists of recreational and leisure activities that they enjoy.
2. As a class, discuss what opportunities are available in the local community.
3. Students search online resources, contact public agencies, and conduct research to discover other leisure activities offered in the community.
4. After students have completed their research, have them key their data into the database. This is an excellent opportunity to teach students about retrieving and sorting records in the database.
5. Have students print a copy of their databases for a referral list.
6. Have students email friends, key pals, or relatives their listings of available community activities.

Tools and Resources

Software
- Database (ClarisWorks, Filemaker, Microsoft Access, Inc.)

Other
- Reference materials on local recreational and leisure activities

Assessment

Have students uncovered valuable information about leisure activities available to them? Are students able to enter and access their information quickly and easily? Do some of the students participate in any of the activities included in the database?

Comments. As an ongoing class project, ask students to bring in information about new activities, schedule changes, and so forth to keep the database up to date. Students who participate in community activities can report their experiences to the class. Have students plan a class trip using their database information. The previous lessons presented a number of suggestions for introducing students to common computer applications such as word processing, database, graphics, spreadsheet, as well as the Internet and educational software. Teachers can adapt learning technologies easily to fit into virtually all areas of the curriculum.

Multidisciplinary Units

The following lessons will demonstrate how technology can be integrated into multidisciplinary units. When creating multidisciplinary units that integrate technology, the teacher needs to consider the same factors as in the previous content lesson plans. The availability and location of computer hardware certainly affect the way activities will be presented and whether students will work individually or in groups.
When using educational software, read the product’s suggestions for maximizing the learning experience. It is a good idea to review these suggestions carefully before presenting activities.

Teachers may also benefit from talking with other teachers about their technology integration experiences. For example, teachers who have used educational software before can judge how much knowledge—both of computer usage and of the subject being presented—is required for the student to operate the program effectively. Are there bugs in the program that may hinder learning? Are some activities in the program more interesting, more useful, or more challenging to students than others? Experienced software users can answer these and other questions that the new user may have. Schools could build a resource bank of technology-based learning activities that includes teacher comments.

Planning is the key to integrating technology. For example, ordinary software may take several weeks to order and receive if it is not available at a local software or teaching supply store. Teachers may face limited choices if their districts have not set aside sufficient funds for the purchase of software. In some cases, it is possible to rent software for a short period of time at much less expense than the purchase price of the package. But rental also requires planning and lead time. Teachers are strongly urged to do some research of their own to see what other learning technologies are available for teaching all areas of the curriculum.

The sample multidisciplinary units follow the ISTE (Thomas & Bitter, 2000) National Educational Technology Standards for Students: Connecting Curriculum and Technology format for multidisciplinary resource units incorporating the following subheadings:

- Title of Unit
- Activities
- Tools and Resources

These units provide a powerful theme on which to build multidisciplinary learning activities. Each unit addresses content standards from two or more discipline areas as well as the National Educational Technology Standards for Students.

Multidisciplinary Unit for Primary Grades (PreK–2)

**UNIT** Helping Hands

Helping Hands examines the theme of cooperation and community. This unit provides students with hands-on experience working with peers, family members, and other community members. Students learn how to work as a team and interact with others.

In this unit students address the following National Educational Technology Standards (NETS) for Students Standards: 1—Basic operations and concepts; 2—Social, ethical, and human issues; 3—Technology productivity tools; and 4—Technology communication tools.

**Activities**

1. Students use drawing or painting software to make a banner entitled Helping Hands. Assign each letter to a group of two or three students. Display the banner on a wall or bulletin board.

2. Have each student trace his or her hand on paper. Use a scanner to digitize the tracing. Use drawing or painting software to decorate the hand, and use the text tool to write the student’s name anywhere on the hand. Print the hand pictures, cut them out, and decorate the banner with them.
3. Students use a digital camera to create group pictures (pictures of students working cooperatively).
4. Students use interactive CDs to explore and learn about community helpers.
5. Have students use Big Book software (e.g., Big Book, Scholastic SuperPrint Deluxe) to create and print a story based on a group picture.
6. Students use painting or drawing software to make a picture dictionary that describes and illustrates cooperation.
7. Use a video camera to document classroom activities. As a class, check the video for examples of cooperative and uncooperative behavior.
8. At the end of each day, determine the classroom cooperation level. Record cooperation levels on a large graph posted on a wall.
9. Have students use a spreadsheet program or graphing software to draw, tabulate, or graph the information for use in a class discussion.
10. Have students work with an adult family member to learn about neighborhood watches or other types of community activities designed to help neighbors meet each other and look out for each other. Use a digital camera to take pictures of your neighborhood. Use slide-show software such as Kid Pix Studio to create a neighborhood watch presentation.
11. Students visit Mr. Rogers’ Neighborhood website to learn about families and their neighborhoods.
12. From a list of I-statements, have students select one to role-play cooperative behavior with a partner.
13. Go on a field trip to the local police station. Have students send the station a thank-you email.
14. Work with the local fire department to develop a home safety chart. Have students use the chart to investigate the safety level of their homes.

Tools and Resources

**Software**
- Kid Pix Studio (Broderbund)
- ClarisWorks for Kids (Apple Computer)
- Easy Book (Sunburst Technology)
- SuperPrint (Scholastic)
- HyperStudio (Knowledge Adventure)
- Kid Works Delux (Davidson & Associates)
- Graph Club (Tom Snyder Production)
- Richard Scarry’s Busytown (Simon & Schuster)
- Multimedia encyclopedia (Grolier)

**Hardware**
- Color inkjet printer
- Video camcorder
- Digital camera
- Scanner
- Large-screen monitor, LCD panel, or classroom TV connected to a computer
- VCR

**Website**
- Mr. Rogers’ Neighborhood, [http://pbskids.org/rogers](http://pbskids.org/rogers)
Multidisciplinary Unit for Intermediate Grades (3–5)

**UNIT**  Eco Busters

Eco Busters emphasizes the causal link between the United States’ tremendous consumption of natural resources and the resulting effect of that consumption on the rest of the planet. Students will learn about the impact fossil fuels and other wastes have on the Earth.

In this unit students address the following National Educational Technology Standards (NETS) for Students Standards: 1—Basic operations and concepts; 2—Social, ethical, and human issues; 3—Technology productivity tools; 4—Technology communication tools; 5—Technology research tools; and 6—Technology problem-solving and decision-making tools.

**Activities**

1. Students form small groups and list the items found in the garbage in their homes and in their classroom.

2. Have students research the impact unchecked consumerism has on the world’s natural resources, as well as its effect on the rain forests, the coral reefs, and the Earth’s atmosphere.

3. Students investigate means by which they can educate parents, relatives, and each other on how to reduce the damage done to our world.

4. Students publish their findings on a website as well as send an email or letter to news media reporting their findings.

5. Go on a field trip to a sewage plant. Discuss modern technology’s impact on waste disposal. Take digital pictures to record observations on how sewage is treated to become effluent. Working with an adult or older student, develop a small multimedia project that reports the observed water treatment processes. Send the sewage plant an email thanking the personnel there for the visit.

6. Go on a field trip to a recycling plant. Take digital pictures to record observations on the recycling process. Working with an adult or older student, develop a small multimedia project that reports the observed recycling processes. Send the plant an email thanking the personnel for the visit.

7. Students explore the environmental impact of landfills. Have students learn about landfills in their area, regulations imposed on them, and their expected ecological impact over time.

8. Have students create pieces of art constructed entirely of recyclable materials.

9. Students use the Internet to research different advocacy groups that campaign against vinyl plastics. Email one of these groups a question.

10. Have students chart statistics from the past 10 years regarding recycling, landfill size, and monies involved in recycling.

11. Have small groups of students create charts examining the amount of time it takes for different products to biodegrade. Students share their findings by preparing a multimedia presentation.

12. Students working with a partner create recycling posters aimed toward motivating other students to recycle. Try to include statistics and other facts in each poster.

13. Working in small groups, students brainstorm solutions on how to make recycling a part of daily life.

14. Have small groups of students develop a slide-show or multimedia presentation illustrating what happens to a plastic bottle or styrofoam cup sent to be
recycled contrasted with one sent to the landfill, including the environmental effects of these processes and their results.

Tools and Resources

**Software**
- Word processing
- Spreadsheet
- Graphics
- HyperStudio
- Presentation
- GraphPower
- Graph Club
- Web-page creation
- Multimedia encyclopedia

**Hardware**
- Color inkjet printer
- Video camcorder
- Digital camera
- Scanner
- Large-screen monitor, LCD panel, or classroom TV connected to a computer
- VCR

**Websites**
- National Environmental Trust, [www.envirotrust.org](http://www.envirotrust.org)
- Greenpeace, [www.greenpeaceusa.org](http://www.greenpeaceusa.org)

**Educational Videos**
*Available through Disney Educational Productions*
- Bill Nye the Science Guy shows (Pollution Solutions, Garbage and the Water Cycle)
- Recycle Rex (stars animated recycling dinosaur)
- The Energy Savers (stars Donald Duck, Mickey Mouse, and Goofy)
- Zort Sorts: A Story about Recycling
- The Great Search—Man’s Need for Power and Energy

### Multidisciplinary Unit for Middle Grades (6–8)

**UNIT**

**Attitude Shapers**

Recognizing that “a picture is worth a thousand words,” it is important that students understand how businesses and governments seek to shape our thoughts and opinions on everyday occurrences through the careful selection and dissemination of photographs and sound bites.

Students will analyze photographs, sound bites, advertisements, and any other media sources they encounter and investigate whether the published material accurately reflects the truth. Students will state whether the published material accurately reflects the actual events or advertised products, and they will state how the published material was used to shape the attitudes and opinions of a specified audience.
In this unit students address the following National Educational Technology Standards (NETS) for Students Standards: 1—Basic operations and concepts; 2—Social, ethical, and human issues; 3—Technology productivity tools; 4—Technology communication tools; 5—Technology research tools; and 6—Technology problem-solving and decision-making tools.

Activities

1. Students form small groups and select photographs, sound bites, advertisements, and any other media sources encountered that they believe misrepresent the truth.

2. Students investigate the selected media sources and research the background issues involved and compile their findings in a group multimedia presentation and written report.

3. Students explore Civil War—picture manipulations. As a class, discuss reasons for the inaccuracies and what benefits, if any, were obtained by the publisher of the inaccurate media.

4. Demonstrate various technologies showing how easily businesses and governments can manipulate media sources for their own purposes.

5. Working with a partner, have students select an inaccurate media source and compose a letter or email to the publisher of the information expressing their concerns about the inaccuracies found.

6. Have students write using a quote from George Orwell’s 1984 as a prompt: “There were the huge printing shops with their sub-editors, their typography experts, and their elaborately equipped studios for the faking of photographs” (p. 43). Have students discuss their responses using a discussion board or classroom listserv.

7. Have students investigate the economics of “sensational” journalism. Do publications that misrepresent the truth make a profit? Have students create charts demonstrating the differences in earnings for several types of publications and news shows.

8. Have students investigate how media shape our attitudes about war. Divide students into small groups and have each group select a war. Groups create multimedia or slide-show presentations to report findings.

9. Discuss heroic qualities. Have students select one of the following heroes to investigate the qualities of heroism their selection represents and the historical circumstances in which their selection emerged. Students determine the historical accuracy or plausibility of the heroic action attributed to their selections. Class develops a website to publish findings.
   - Ellen Ripley/Sarah Connor
   - T. E. Lawrence (Lawrence of Arabia)
   - Joan of Arc
   - Ho Chi Minh
   - Luke Skywalker
   - David and Goliath
   - Homeric heroes—Achilles

10. Discuss Jean Bethke Elshtain’s claim that our “attitudes to war are determined by the traditional stories and histories of war we hear and read” (see her book, Women and War, p. 32).

Tools and Resources

Software

- Word processing
- Presentation
- HyperStudio
- Spreadsheet
- Image manipulating
- Web-page creation

**Hardware**
- Color inkjet printer
- Scanner
- Large-screen monitor, LCD panel, or classroom TV connected to a computer
- VCR
- Film projector

**Websites**
- The Gallup Organization, [www.gallup.com](http://www.gallup.com)
- Center for Media and Public Affairs, [www.cmpa.com](http://www.cmpa.com)
- American Society of Newspaper Editors, [www.asne.org](http://www.asne.org)
- Project for Excellence in Journalism, [www.journalism.org](http://www.journalism.org)
- American Memory Collection: Does the Camera Ever Lie?, [memory.loc.gov/ammem/cwphtml/cwpcam/cwcam1.html](http://memory.loc.gov/ammem/cwphtml/cwpcam/cwcam1.html)
- Visual Literacy Bibliography, [http://tc.eserver.org/15237.html](http://tc.eserver.org/15237.html)
- Digital Photography: A Question of Ethics by Bonnie Meltzer, [www.fno.org/may97/digital.html](http://www.fno.org/may97/digital.html)

**Books**
- *Photography and the American Scene* by Robert Taft (New York: Macmillan Co., 1938)
- *1984* by George Orwell (New York: Harcourt, Brace, 1949)

**Film**
Multidisciplinary Unit for Secondary Grades (9–12)

UNIT

Know Your Propositions

Every year people seek to place new laws on election ballots. The need for new laws arises from concerns, political agendas, mistakes, and historical events. Using a current local proposition, students examine the arguments for and against the proposition and consequences if enacted or not enacted. Students take a position for or against the proposition, supporting their decision with arguments and facts. Students predict the proposition outcomes and follow the election returns.

No specific websites are provided for several reasons. First, searching for information about propositions is considered a valuable part of the learning process. Second, new-proposition websites arise and fall with each new election. Hence, any suggested site will likely be defunct by the time this reaches publication. Third, Internet searches can be tailored to fit any political region around the world.

In this unit students address the following National Educational Technology Standards (NETS) for Students Standards: 1—Basic operations and concepts; 2—Social, ethical, and human issues; 3—Technology productivity tools; 4—Technology communication tools; 5—Technology research tools; and 6—Technology problem-solving and decision-making tools.

Activities

1. Students research pending ballot propositions on the Internet and through other sources and list them according to election date and topic.
2. Working in small groups, have students investigate the sponsors of the propositions, specific interests of the sponsors, and the potential benefits to the sponsors should the propositions be enacted into law. Create a database to store this information.
3. Have students collect copies of the official propositions, along with the official position statements, including officially published arguments for and against the propositions.
4. Working with a partner, have students research the published arguments.
5. Have a chat session with government officials and interest groups about their positions on a proposition.
6. Students take a position, supporting their decision with arguments and facts, and present their findings using a slide show.
7. Discuss the language selected by the government to describe the propositions to see whether there exists an attempt to conceal the true effect of a vote, for or against the propositions.
8. Students draft separate reports of their findings that will be incorporated into a single group report, which will be delivered to the news media for publication.
9. In small groups, students calculate the amount of money, both public and private, expended by both proponents and opponents of the various propositions. Have students write their own proposition listing better uses for the funds spent on the propositions. Create a website to publish the student-generated proposition.
10. Publish class findings and conclusions on a website. Suggested format for displaying database information of the proposition’s analysis follows.

Proposition Number

Title:
Sponsor:
Major Provisions:
Background:
Policy Considerations:
Fiscal Impact:
State Government:
Local Government:
Taxpayers:
Support Arguments:
Opposition Arguments:

• Have students email the media, interested businesses, and government officials a summary of their findings plus a request to visit their website.
• Working in small groups, have students create a WebQuest for another grade level.
• Have students predict proposition outcomes and follow election returns. Discuss prediction reasoning. Have them calculate the accuracy of their prediction.

Tools and Resources

**Software**
- HyperStudio
- Presentation
- Database
- Spreadsheet
- Web-page creation

**Hardware**
- Color inkjet printer
- Scanner
- Large-screen monitor, LCD panel, or classroom TV connected to a computer

Summary

Teachers of all content areas can incorporate technology-based learning activities into their traditional curricula. This increases the number of students who have experience with technology when they finish school. It also increases the amount of technology in use in the classroom and serves as a bridge to the future when technology-based learning activities will be the rule rather than the exception. The first step in incorporating technology into the curriculum is being able to develop effective technology-based learning activities.

In general, technology-based learning activities must account for the same factors that all learning activities depend on:

- Grade-Level Range
- Purpose
- Description
- Activity Preparation
- Activity Procedure
- Tools and Resources
- Assessment
The learning activities presented in this chapter follow a format that includes all these features and may also include an activity description and comments.

With technology-based learning activities, additional factors must be taken into consideration. Most of these factors have to do with availability of software and hardware. Will students have unlimited access to several computers with network connectivity? This situation allows the teacher to plan more extensive use of technology than a situation in which students must go in pairs to a media center where they can use the computer for no more than half an hour. Are there programs available to handle the activities planned?

This chapter presented sample learning activities. There are two learning activities for each of the five content areas—mathematics, science, language arts, social studies, and special education. Under each content area, the first learning activity is for use by elementary teachers, the second by secondary teachers. It is the authors’ hope that teachers will use these learning activities as a springboard for creating their own innovative and effective technology-based learning activities.

Also in this chapter, four multidisciplinary units based on a powerful theme were presented. Learning through the use of multidisciplinary, student-centered activities has been shown to be effective. The multidisciplinary units follow a format similar to ISTE’s publication National Educational Technology Standards for Students: Connecting Curriculum and Technology (Thomas & Bitter, 2000). The format design facilitates teachers in planning, carrying out, and evaluating units effectively. Teachers are encouraged to discuss with other teachers their technology integration experiences.

These units are intended to serve as guidelines for the teacher who is in the process of integrating technology. Each unit provides a variety of activities, related technology, thematically relevant information, tools, and resources. In addition, each unit addresses content standards from two or more discipline areas while also addressing the National Educational Technology Standards for Students. When designing multidisciplinary units, and lesson activities, teachers should reflect on how technology enables them to teach content at greater depth and how their use of technology enhances instruction.

Bird Rap

Students make use of various technologies to research, gather data, and report on specific elements of ornithology. How does the teacher use these technologies to support the learning of the content?

Challenge Yourself!

1. Present one of the activities in this chapter to your peers and report on the results.

2. Review the DVD/Video Vignette for this chapter. Identify and list the NETS Student Standards that are covered in the lesson. List the strengths and weaknesses of the lesson. Compare your results with those of your classmates.

3. Write a technology-based learning activity for your content area following the format suggested in this chapter.

4. Research the Internet, books, and periodicals that include technology-based learning activities. Develop a web-based bibliography of these resources.

5. Adapt one of the learning activities in this chapter for use with a specific software package.

6. Adapt one of the learning activities in this chapter for a higher or lower grade level.
7. Write a learning activity that develops a thematic learning environment and integrates several content areas.

8. Write a learning activity that includes the WWW for data collection.

9. Integrate cooperative learning into one of the learning activities. Try the activity with a class.

10. Modify one of the learning activities to include portfolio-assessment procedures.

11. Compare and contrast the following terms: interdisciplinary, multidisciplinary, and transdisciplinary. Share your findings with the class by creating a multimedia presentation.

12. Prepare a multidisciplinary unit for a grade-level range following the sample format.

13. Develop a plan for storing software, manuals, and student diskettes or CDs in the classroom.

14. Adapt one of the multidisciplinary units in this chapter for a higher or lower grade level.

15. Create a new lesson plan for software not included in this chapter. Follow the same format as the lessons in this chapter do.

16. The National Council of Teachers of Mathematics (www.nctm.org), the National Academy of Sciences (www.nas.edu), the National Council for the Social Studies (www.socialstudies.org/standards), and the National Council of Teachers of English and the International Reading Association (www.ncte.org/about/over/standards) have established curriculum standards. Develop a multidisciplinary unit addressing these curriculum standards and integrating appropriate technology.

17. Select a multidisciplinary unit from this chapter and integrate new methods of assessment such as portfolios.


19. Connect to the EDUCAST site at www.educast.com and research the resources available through this website. Download several lesson plans for class discussion.

20. Write a lesson plan for the DVD/Video Vignette Bird Rap.

Bibliography


Albritton, D. (September, 2002). LOGO. *PC Teach It*, 46–47.


Websites

Special Kids
www.special-kids.com
There are specific websites to help students with developmental, cognitive, and learning disabilities. For example, Special Kids exists to reach and teach children with autism spectrum disorder, Down syndrome, mental retardation, cerebral palsy, dyslexia, and other learning disabilities, delays, or challenges. See also mykidfix.com.

Mars Student Imaging Project
http://msip.asu.edu
NASA and the Arizona State University Mars Education Program is offering students nationwide the opportunity to be involved in authentic Mars research by participating in the Mars Student Imaging Project (MSIP). Teams of students in grades 5 through college sophomore level will have the opportunity to work with scientists, mission planners, and educators on the THEMIS team at ASU’s Mars Space Flight Facility, to image a site on Mars using the THEMIS visible-wavelength camera onboard the Mars Odyssey spacecraft that is currently orbiting Mars every 2 hours. National Science Education Standards-aligned MSIP curriculum has been developed to assist the lead adult facilitators of student teams. The curriculum is designed to fit within existing science curricula and teach the already required objectives and standards using real-world science instead of worksheets or simulations. Involved students teams can participate in one of three formats for image reception activities.

Project-Based Learning
http://pblchecklist.4teachers.org
A project-based learning method is a comprehensive approach to instruction. Students participate in projects and practice an interdisciplinary array of skills from math, language arts, fine arts, geography, science, and technology.

Teaching Matters
http://www.tminet.org
Teaching Matters is a nonprofit professional development organization that partners with educators to improve public schools. It uses technology in the
classroom to prepare teachers and their students for twenty-first-century learning and achievement.

Geographic Information System (GIS) Technology Lessons for Educators
http://gis.esri.com/esripress/display/index.cfm?fuseaction=display&websiteID=29
On any given day, more than 2 million people around the world use GIS to improve the way their organizations see customers, evaluate situations, and conduct business.


Education Planet
http://educationplanet.com
Education Planet offers many resources, including a place to create your own teacher website.

Discovery Channel
http://school.discovery.com/lessonplans
A lesson plan library maintained by Discovery Channel.

Teacher Created
www.teachercreated.com
Some free lesson plans and activities.

Teachers.net
http://teachers.net/lessons
A lesson plan bank; you can also post your own lessons.

Can Teach
www.canteach.ca
Elementary resources for the classroom; songs, poems, lesson plan ideas, and links to other resource sites.

Awesome Library
www.awesomelibrary.org
Resources for developing lesson plans, including graphics.

Education World
www.educationworld.com/a_lesson/archives
Education World’s collection of lesson plans in all subject areas.

The Educator’s Reference Desk
www.eduref.org

Core Knowledge
www.coreknowledge.org
Core Knowledge website; contains a section on lesson plans.

Essential Questions: Helping Readers Focus
http://wilearns.state.wi.us/apps/default.asp?cid=128

Cool Lessons
www.coollessons.org
Designed as a resource for teachers K–12 who wish to find quality ready-made units and lessons for all subjects, or who wish to develop their own units.

Inquiry-Based Learning
www.biopoint.com/inquiry/ibr.html
Using the Internet to promote inquiry-based learning.

Summer Technology Institute: Essential Questions
www.washington.edu/uwired/outreach/teched/using/mod2less2quest.html

Creating Essential Questions
www.galileo.org/tips/essential_questions.html

Developing Essential Questions
www.rainbowtech.org/workshops/TechInt_WQ/DevEssQuest.htm

Essential Questions
http://mathstar.nmsu.edu/exploration1/unit/content_questions.html

Ask Me a Question: How Teachers Use Inquiry in the Classroom
www.asbj.com/2001/05/0501research.html

Research Papers: Asking Essential Questions and Good Supporting Questions
Makes the Effort More Than a Game of Trivial Pursuit
The Question Is the Answer: Creating Research Programs for an Age of Information
http://questioning.org/Q6/question.html
Francis W. Parker Charter Essential School: Curriculum Assessment School-Wide
Essential Questions
www.parker.org/CurriculumAssessment/curriculum.htm
Teacher Vision
www.teachervision.fen.com
Created by teachers—the goal is to provide teachers with lesson plans, re-
sources, and materials that make professional life easier.
Coalition of Essential Schools Northwest, “Planning Backwards from an Essential
Question”
www.cesnorthwest.org/essential_questions.htm
Lesson Plans Page
www.lessonplanspage.com
1500+ free lesson plans in an easy-to-query database.
Lesson Planz
http://lessonplanz.com
A lesson plan database for all grade levels and subjects; site contains extensive
advertising
ESL Lesson Plans
www.esl-lounge.com
Free ESL lesson materials and ESL lesson plans.
The University of Illinois—Collaborative Lesson Archive
www.buildingrainbows.com/CA/ca.home.php
Reach Every Child
www.reacheverychild.com
A website maintained by Horace Mann with resources for teachers and students.
The Monster Exchange
www.monsterexchange.org