Using Technology to Prepare Critically Thinking Global Citizens

Social studies teachers possess a daunting task in a 21st century environment of economic-mindedness and technological infatuation. In a setting of individualism and instant gratification, enabling a future citizenry to realize the patterns of economic disparity and to accept their responsibilities towards other less fortunate citizens provides a formidable challenge. The authors interpret understandings of citizenship as being closely related to conceptualizations of economics and view methods by which classrooms employ instructional technology as paramount to exploring these associations. This paper conveys how technology represents an instructional resource that may foster exploration and examination of these relationships and describes a student-centered cooperative instructional model for its classroom implementation.

Key Words: Citizenship, Global citizen, Constructivism, Economics, Environment, Instructional technology

Introduction

In a climate of global economic flux that witnesses patterns of technologically induced social isolation (Postman, 1985; Putnam, 2000), many elementary students and middle school students experience challenges conceptualizing the social problems that a capitalist society faces. Legislation to require and implement economics education has increased in recent years (The Council for Economic Education, 2009) with financial literacy gaining particular attention (Mandell, 2008). Research literature (Agnello & Lucey, 2008a, Lacey & Cooter, 2008) indicates that current views of economic and financial education derive from narrow conceptions that limit child-
ren’s abilities to connect these areas with global citizenship challenges.

Facilitating children and youth’s working understanding of these concepts represents an important goal for social studies educators. Critically thinking, justice-minded social studies teachers can educate students about inequitable power structures that occur within society and impair full democratic participation (O’Sullivan, 2008). Just as engaging children in dialogues about the interconnected nature of content broadens their conceptions of various subject areas (Postman & Weingartner, 1969), stimulating children’s awareness of the interrelated nature of the National Council for the Social Studies (NCSS) curriculum standards may foster a deeper understanding of democracy (Carr, 2008) that allows for innovative solutions to the shortage of natural resources competed for among societies.

Joel Westheimer and Joseph Kahne’s (2004) three types of good citizens (responsible, participatory, and justice-oriented) illustrate the broad to narrow conceptions of citizenship that can develop through patterns of social studies instruction. According to Pamela Grossman and Alan Schoenfeld with Carol Lee (2005), “Effective teachers need subject matter competence; they need to know how to solve the problems they pose to students and to know that there are multiple approaches to solving many problems” (p. 205). For social studies teachers to create authentic learning environments that facilitate their students’ familiarity with connections among various social studies areas, such as economics and citizenship, deep understandings are needed to engage their students in conversations about the broad and interrelated natures of these concepts.

Early 21st century instructional technology offers vehicles for exploring the thickness of social studies. For instance, the Internet provides glamorous versions of classroom tools, such as maps and images for initiating such conversations (e.g., Bolick, 2006; Milson, Gilbert, & Earle 2007). Yet, just as with conventional classroom resources, the teacher’s choices concerning the methods of instructional technology use may affect how his or her students interpret issues related to global citizenship. Simply enhancing conventional classroom resources is insufficient for stimulating student inquiry. Rather, the method by which teachers use technology determines the learning outcomes.

A teacher must decide whether to use technology as a knowledge dispenser, as an information resource, or as a knowledge disseminator. This determines whether a classroom rehearses the processes from which future citizens learn to passively accept releases of “official” accounts of social matters, pursue various perspectives and deduce informed interpretations, or publicize information about them. A teacher’s pedagogical beliefs certainly impact his or her use of technology in the classroom (Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010). The advent of blogs, wikis, social networking sites, and other collaboration tools has fostered many venues for online communication. By attending to matters of assignment structure, student expertise, and group composition (Lucey, O’Malley, & Janssen, 2009), teachers may employ these tools for inter- and intra-classroom dialogues about global citizenship challenges. Thereby reducing their textbook dependency and stimulating their students’ constructive conversations about the images of society and conceptions of justice-oriented alternatives.

Classroom technology use should engage students in inquiry and conversations about the systemic causes of these problems and foster justice-oriented views of citizenship.
This paper conveys one method for using instructional technology to facilitate students’ examination of the relationships between economic and citizenship issues. It provides literature that conceptualizes citizenship and economics before considering literature-associated methods of technology use. An argument for using technology as a tool for stimulating students’ social inquiry and orienting them to a social justice mindset ensues. The paper then describes a method for using instructional technology to prepare students to inquire into global citizenship issues. For reader adaptation, it offers an example lesson to enable students’ consideration of the patterns of economic inequities that exist and how a justice-minded citizen might respond.

**Understanding Citizenship**

According to the NCSS draft standards (2008),

An understanding of civic ideals and practices of citizenship is critical to full participation in society and is a central purpose of the social studies. All people have a stake in examining civic ideals and practices across time and in diverse societies as well as at home, and in determining how to close the gap between present practices and the ideals upon which our democratic republic is based (p. 21).

Preparing students for global citizenship requires a reconciliation of the diverse perspectives prompted by members’ development in various socioeconomic and geographic contexts. By recognizing the validity of diverse social perspectives, social studies teachers may develop authentic learning opportunities for their students. The recognition of various interpretations of citizenship (Brophy & Alleman 2007) and presence of recurring conflict (Zimmerman 2002; Zinn 2003) necessitates teachers’ creation of authentic learning opportunities that empower students to problem-solve potential economic conflicts and employ justice-minded thinking to address them.

In a postmodern setting, teachers may readily associate these conflicts with ecological issues, particularly access to natural resources. For example, Maryfrances Agnello and Thomas Lucey (2008b) use water rights as a springboard for lessons about economic values. Neil Houser’s (2009) call for an ecological dimension of citizenship that would “represent the ultimate expansion of the circle of we” (p. 210) recognizes the critical relevance of fostering broad citizenship conceptions that enable students to consider informed solutions to these problems.

If citizenship presents a practice of participation, dialogue, and peaceful conflict resolution, then classrooms should model these processes to affect students’ exposure to a broad array of perspectives about social matters. Walter Parker’s (2005) identification of six dimensions of citizenship education (deliberation, voting, community service and action, knowledge, values, and dispositions) that are necessary for developing a participatory democracy conveys the importance of both individual and collective elements. David Welton (2005) affirms that citizenship represents a composite of competencies (multicultural, civic, and community) that enable negotiation of various societal expectations. In fact, the widely accepted National Educational Technology Standards for Students (NETS-S) developed by the International Society for Technology in Education (ISTE, 2007) proposes that students understand ethical, cultural, and societal issues related to technology and information use (Standard 2). John Hoge (2007) writes, “Teachers must show children how to reasonably participate in the many decisions that affect their lives … schools implant the expectations that citizens must be included in making the governmental decisions of their communities” (p. 7). Clearly, citizen-
ship represents a complex process that requires many skills, including working with others to increase the chances for one’s longevity.

Because social justice represents a concept that involves both tangible and abstract elements, elementary classrooms are particularly hard pressed to foster related conceptions among students. This is particularly challenging for classrooms in the most affluent country. Why should social justice matter to an affluent child who can simply ask for and receive the material things that he or she wants? Marilyn Cochran-Smith, Karen Shakman, Cindy Jong, Dianna Terrell, Joan Barnatt and Patrick McQuillan’s (2009) work demonstrates the abilities of pre-service teachers to associate social justice with their practice. How may these relationships be stimulated among younger students? Thomas Lucey and James Laney’s (2009) lessons for elementary and middle level classrooms offer tools for stimulating students’ experience and creation of various art forms that may conjure these associations. Using these instructional strategies as motivators, classrooms may engage students’ inquiry and critical thinking about a myriad of social issues that are necessary for developing thick views of democratic citizenship (Carr, 2008). Thus, students learn to appreciate the necessity of diverse perspectives to develop comprehensive solutions to complex social ills. Absent such interactive learning opportunities, students become deficient in the citizenship skills needed to respect and value the needs of those who are less economically fortunate.

With a society that contextualizes citizenship globally, rather than nationally, the problematic of emphasizing economic underpinnings to expectations for the citizenry become more apparent. Lucey’s argument (2007) that financial literacy contains a moral dimension to the four commonly accepted areas of income, money management, spending and credit, and savings and investment provides an economic bend to Westheimer and Kahne’s (2004) identification of three types of citizens. Just as Cochran-Smith et al. (2009) point out the importance of conceptualizing social justice on both individual and abstract levels, the challenge for a consumer focused society is to consider how a financially literate, justice-oriented, citizen would consider a global setting of diminishing resources. How does a setting that interprets financial literacy through the lens of a responsible or participatory citizen contemplate whether a market of environmental credits is sufficient to address the basic needs of all? It is unlikely that views of financial literacy will extend beyond that of people meeting their financial obligations, unless students are prepared to interpret good citizenship as justice-oriented, rather than simply a matter of laws and compliance.

**Citizenship and Economics**

The patterns of conflict described by Zimmerman (2002) illustrate how collective self-interest guides interpretations of citizenship. If, as Lucey, Duane Giannangelo, Jeffrey Hawkins, Julia Heath, and Michael Grant (2007) indicate, patterns of economic thinking include elements of material and psychological self-preservation, the challenge for future citizens is how to overcome these mindsets to realize the value of shared decision-making. Jared Diamond (2005) provides accounts of past societies that have disintegrated through devastation of environment and competition over raw materials. These renderings indicate that societies may be so obsessed with their consumption habits that they ignore or misrepresent the realities of the vanishing resources. Economics relates to citizenship through at least two processes. First, it connects with patterns of action that support or challenge distributions of goods and resources for the benefit of the community. Second, it relates to patterns of action that concern acquisition and use of resources for personal use. The challenge for citizenship education involves how to enable students to understand these relationships...
and prompt their appreciation for non-consumerist philosophies, while empowering their synthesis of awareness of associated responsibilities.

One cannot emphasize enough the importance of mutually respectful dialogues about these matters. Howard Zinn’s (2003) description of ongoing conflicts among economic classes throughout the history of the United States illustrates how status defines one’s social expectation. Patterns of stereotyping among college students based on interpretations of people’s economic status (Cozzarelli, Wilkinson, & Tagler, 2001) illustrate the presence of these social judgments within contemporary settings. Indeed, the commercialization of programs (such as Ruby Payne’s “Framework” (1995)) that perpetuate such stereotypes, gives license to a classist mode of education that counters the democratic ideal.

Yet, as society realizes the finiteness of its global resources, the importance of respectful discussions about patterns of choice and matters of consequence becomes urgent (Diamond, 2005). Preparing students to be justice-oriented global citizens includes teaching them that resolving these conflicts in equitable manners requires dialogues that value the views of others from a perspective of global stewardship, rather than control and power. The use of Web-based applications and social media tools affords teachers platforms through which they may engage their students about these issues. For example, SecondLife and SecondLife for Teens (Refer to Appendix A for links to websites mentioned herein) could be employed to simulate the historic settings described by Diamond (2005), discuss the choices made, the assumptions involved, the consequences resultant, and the applications to be considered. In fact, the Global Kids Network has utilized Teen SecondLife as a vehicle for reaching and teaching children about global citizenry. In addition, teacher Candace Pauchnick at Patrick Henry High School (see Anderson, Grant, & Speck, 2008, p. 27-29) describes her vigorous use of e-pals (electronic pen pals) and blogs with ethnically diverse students in San Diego and students from other countries within curriculum standards for culture and sociology. Moreover, wikis, such as Wikispaces and PBWorks could be used as venues for collaboratively researching about social problems (such as target marketing of sin products to minorities), with classrooms of other socio-economic contexts, cooperatively developing letters to local media, community leaders and corporate officials, and developing ideas for justice-oriented action that challenge systemic structures that represent the roots of difficulties. Preparing social studies teachers to create lessons that problem-solve these issues and use 21st century technology to stimulate student inquiries may prompt the collectivist mindsets needed for environmental sustainability.

How should technology be used? Facilitating conversations to discuss the nature of social studies provides insights that direct teaching processes inhibit (Postman & Weingartner, 1969). Employing 21st century technology in these processes provides students with opportunities to utilize tools to both research credible information and affect constructive relevant dialogues. Teachers should recognize that their pedagogical beliefs (Ertmer, 2005) about technology will impact their students’ beliefs about how they can use technology in their roles as global citizens. If economics relates to interpretations of citizenship (Agnello & Lucey, 2008a), then the teacher’s choice of how instructional technology will be used to enable or prevent students’ examination of these associations may shape their actions and decisions as global citizens.

Neil Postman’s (1985) argument that patterns of technology use shape societal values and decision-making prompts the consideration of whether instructional technology methods direct patterns of citizenship understanding and conversation. The Corporation for Public Broadcasting’s (2002) dated report suggests
that children ages two to five and six to eight are the fastest growing groups of Internet users, some spending upwards of three hours per week online. Victoria Rideout, Ulla Foehr, and Donald Roberts (2010) recently corroborated these results, reporting eight- to ten-year-olds spend almost five and a half hours interacting with television, music, computers, and video games. These young children’s experiences and their older counterparts, which represent between approximately eight to eight and a half hours of media use (Rideout, Foehr, & Roberts, 2010), represent the challenges of both technological excesses and deficiencies that foster differentiations between real and cyber experiences. Robert Putnam’s (2000) discussion of research that conveys the isolating effects of technology that occur through passive patterns of use conveys an ominous message. Children’s rare and extreme online experiences (e.g., Bailey, 2006a, 2006b) with cyberbullying, sexual predators, and media consumption offer cause for concern. Thus, a passive instructional approach to teaching citizenship issues prompts acceptance of the status quo, both on and off line. Classroom technology use should engage students in inquiry and conversations about the systemic causes of these problems and foster justice-oriented views of citizenship. Such processes have both practical and moral merit because they teach socialization skills that critically thinking citizens need, while creating a broader awareness of knowledge that may potentially balance economic structures (Lucey & Grant, 2009).

Moreover, leading authors and research suggest that Marc Prensky’s (2001) digital natives — the students of today — require new literacy skills to be functional as citizens. Kay Bishop (2003) recommends that children and youth obtain requisite information literacy skills to evaluate the quality of information sources, as well as use and produce information. Renee Hobbs and Richard Frost (2003), similarly, suggest individuals need critical thinking skills with regard to media and media literacy, so they can reflect on and analyze their media consumption. For example, the proliferation of YouTube videos, music downloads, and text messaging short-hand represent the variety of information and media students are producing and consuming, estimated at over seven and a half hours per day (Rideout, Foehr, & Roberts, 2010). To build students’ social capital, social studies educators should employ technology in a manner that builds substantial physical interfacings by active citizens who to gather information and value interpretations of others. Such efforts may stimulate justice-minded social action.

**Technology Integration**

Numerous authors explicate the role of the computer as a “partner” in learning. Still relevant, Robert Taylor's (1980) seminal taxonomic piece proposed an initial conceptual framework for the role of the computer in the learning context. The role of the computer as a tutor, a tool, or a tutee helps illustrate the interactions between the individual and the computer during learning.

*If citizenship presents a practice of participation, dialogue, and peaceful conflict resolution, then classrooms should model these processes to affect students’ exposure to a broad array of perspectives about social matters.*
The role of the computer as tutor is usually synonymous with computer-assisted or computer-aided instruction. This is replicated in David Jonassen’s (Jonassen, Howland, Marra, & Crismond, 2008) notion of “learning from technology” (p.5). Experts program the software to teach or review content with learners. Exemplars of the computer as tutor present content, and respond to patterns of user interpretation by adapting the presentation or complexity (Lockee, Moore, & Burton, 2004). In these unique cases, records are kept, so progress can be tracked. Many software applications in this category are simply “drill and practice,” sometimes called “drill and skill,” modifying only level of difficulty. In fact, a history of research reports this type of computer use is widely pervasive in classrooms (Becker, 1985, 2001; Grant & Mims, 2009a).

The second role a computer can take in the learning context is as a tool. The computer as a tool is in the most basic sense a function to accomplish a task. With software, the computer can become a word processor, calculator, presentation editor, or web page builder, for example. As a tool, the computer is often flexible in its applications, employable to teach multiple disciplines simultaneously. One could use a spreadsheet to track stocks or economic trends and to chart sociological patterns. Many computer tools also increase productivity by, for example, editing texts in word processors or editing photographs in image manipulation software. Henry Becker (2001), Deborah Lowther, Fethi Inan, J. Daniel Strahl, and Steven Ross (2008), and Grant and Cliff Mims (2009a) concluded that word processors and Internet browsers continue to be two of the types of tools most often observed in classrooms. That Internet browsers are one of the most reported applications reflects Anna Clifford and Michael Grant’s (2008) findings that teachers rate access to the Internet as the
most integral tools to their success in integrating technology.

Jonassen et al. (2008) extended the principles of technology as a tool to “learning with technology” (p.7). In these instances, technology moves to support knowledge construction, representing and simulating problems, communications, as well as reflecting. In many cases, technology in these contexts is cognitive tools (Jonassen & Reeves, 1996), where technologies support causal, analogical, expressive, experiential, and problem-solving thinking (Jonassen et al., 2008). More recently, though, Grant and Mims (2009b) suggested Web-based applications, such as blogs, wikis, concept mapping applications, and online annotation tools, are small niche software that can match an individual’s mental model during learning. Moreover, these small applications allow learning with technologies that match users’ own conceptions and schemata.

The final category — computer as tutee — presents the most challenge to the individual. The learner must tutor the computer by learning to program. Taylor (1980) suggested that three benefits to tutoring the computer exist. First, a learner must understand the content in order to instruct the computer. Second, the learner through structuring the programming and content for the computer will learn how the computer works, as well as how his own thinking is structured. “Third, because no pre-designed tutor software is necessary, no time is lost searching for such software and no money spent acquiring it.” (p. 4). This last benefit may or may not be applicable for everyone. Time is required to research the appropriate programming language for specific learners and for specific disciplines or tasks.

A social studies teacher who intends to enable connections to learning content and process may structure lessons that employ the computer as a tutee to foster students’ mastery of computer and research skills, while shaping awareness of their social identities (Schmitt, Dayanim, & Matthias 2008; Stoddard, Hofer, & Buchanan 2008). While time and expense also relate to using the computer as a tutor and tool, the gains for using the computer as a tutee are still considerable: “deep” thinking occurs (Dwyer, 1976) as suggested by Taylor above, and there is flexibility in what is learned and how it is learned (Papert, 1980).

While this framework is not exhaustive, it does offer beginning typology from which to describe technology integration and to recognize the role of the computer in the learning context. New applications such as Javascript and AJAX (asynchronous Javascript and XML) for web pages, Adobe Flash, and Stagecast™ Creator for building simulations are beginning to blur the lines among these categories. Moreover, mashups, or remixes of multiple media (Lessig, 2008), and social networking systems, like Facebook, combine disparate points of data or applications together into a new media or medium that may cross multiple categories.

Preparing students to be justice-oriented global citizens includes teaching them that resolving these conflicts in equitable manners requires dialogues that value the views of others from a perspective of global stewardship, rather than control and power.”
Blending technology with time may empower students to observe and discuss the various conditions that prompt conflicting attitudes towards citizenship. Val Turner and Elisha Chambers (2006) illustrate the value of safe environments that accept divergent responses. By using the computer as a tool for social inquiry and following Jonassen et al.’s (2008) principles of learning with technology, teachers provide students with opportunities to conceptualize the positive and negative economic relationships to citizenship issues. For example, the invention and proliferation of the automobile yielded positive economic outcomes from complementary businesses such as repair shops and supply stores. It also bolstered the profits for oil companies that profited from gasoline sales. Simultaneously, it has produced challenges as well, such as air pollution and parts disposal. How does a globally minded citizen responsibly address the challenges of a society that economically depends on products that adversely affect the environment?

The iNtegrating Technology for InQuiry (NteQ) Model

There is growing literature to support constructivist-learning strategies. For example, Thomas Lord (1999), Archie George, Gene Hall, and Key Uchiyama (2000), Clare Von Secker (2002), and R. Bruce Ward, Philip Sadler, and Irwin Shapiro (2007-2008) reported improved student achievement with constructivist instructional strategies. Likewise, advocates for meaningful technology integration emphasize student-centered processes as the strategies necessary to leverage the computer as a powerful tool for student learning (Bickford, Tharp, McFarling, & Beglau 2002: Lowther, Ross, & Morrison, 2003). In addition, previous researchers (e.g., Becker, 2001, 2006; Mims, Polly, Shepherd, & Inan, 2006; O'Dwyer, Russell, & Bebell, 2004; Smeets, 2005) reported that constructivist strategies and epistemologies resulted in higher levels of technology use.

The appendix contains a lesson plan that models an example for facilitating students’ learning, relating citizenship to economics using technology. The iNtegrating Technology for InQuiry (NteQ) instructional technology model (Morrison & Lowther, 2010) offers one method to employ the computer, and associated software, as tools to facilitate students’ discovery and thinking of academic content. By placing the teacher in the role of a technology expert, the model facilitates student use of computer as a tool problem solving through the acquisition and manipulation of data, along with the presentation analysis results. The model provides a method for using technology to enhance students’ problem solving of real world problems related to citizenship and economics.

The model provides students with the content; it also empowers them to use technology tools to examine information in ways that lead them to more questions for pursuit. For example, when researching information online in relation to the British Petroleum catastrophe in the Gulf of Mexico, students may research the histories of political contributions from oil companies to the federal government, political appointments of petroleum industry executives, and governmental regulation of oil companies. Rather than depend upon data or charts provided by textbooks, supplemental worksheets, or even websites, that are censored or controlled by political parties, students may confirm depicted data patterns and explore other statistical relationships to find supporting or alternative perspectives. Instead of passively responding to electronic stimuli, students cooperate within groups to collect information and manipulate data, and present findings.

The model requires that the teacher establish a problem for students to investigate. Before working at the computers, students (with teacher assistance) study and discuss material providing background to the topic and
consider their roles while at the computer. At the computer, group members discover and manipulate data together within assigned group roles (recorder, keyboard operator etc.). After using the computers, students review their information and develop conclusions based on their findings.

During the experience, teachers facilitate the processes by keeping students focused and supporting their efforts. In this manner, students discover and discuss information and form conclusions based on their own experiences. In the process, they learn to use technology as a tool for data collection, manipulation, and communication, rather than as a passive device for direct instruction.

**An Example Lesson**

The NteQ lesson is applied to a problem that all global citizens should consider; the extent that economic patterns in society represent matters of choice and fate and how these conditions relate to interpretations of a good citizen. In this lesson, the students use computer tools to locate, retrieve, and manipulate data about their local populations and local corporate polluters. As students relate independent variables (e.g., income, education level) to amounts and types of corporate pollution, they use literature to consider different ways to interpret the data and support ideas for presentation and class discussion. By providing students with literature from a variety of sources, students have opportunities to interpret data patterns from various viewpoints and consider both the influences on and consequences for their social choices.

This lesson represents a device to facilitate students’ examination of relationships among various societal elements. The patterns among the data provide students with opportunities to consider citizenship issues such as corporate responsibility, civic involvement, economic tradeoffs, and environmental awareness, and perceptions of choice. Students may discuss the patterns of related laws and regulations, consider their responsibilities toward civic involvement, and suggest ideas for their amendment.

**Conclusion**

This paper has presented an argument that a technology-based inquiry approach to social studies learning represents a valuable strategy for empowering students’ realization of relationships between citizenship and economics. Within this process, employment of various tools may be utilized to stimulate meaningful dialogues about global citizenship. Social studies teachers should engage their students in such conversations to develop a citizenry that critically considers economic patterns of decision-making.

In particular, it illustrated a process by which students employ technology as a tool to construct their social understandings. This model represents a method for vitalizing connections between students and their responsibilities as global citizens. By reducing their dependence on the computer as an information dispenser and increasing their employment of the computer as an information mining and synthesizing tool, social studies educators may facilitate appreciation for the divergent patterns of thinking necessary to develop creative solutions to the problems that global society faces.

**References**


Lucey, T.A., & Laney, J.D. (2009). This Land Was Made For You and Me: Teaching the concept of social justice in the elementary and middle school grades. The Social Studies, 100(6), 260-272.


Web-Based


Appendix A

Global Kids Network  Second Life  Wikispaces

PBWorks  Second Life for Teens
Appendix B

Pollution and Populations

Grade Level: 8

Time Required: This lesson plan requires six days for instruction, scheduled as follows:

Day 1: Classroom discussion about historical population trends and environmental issues

Day 2: Computer lab, creating a spreadsheet

Day 3: Classroom discussion about local or regional demographic history

Day 4: Computer lab, expanding spreadsheet and graphing data relationships

Day 5: Individual classroom work on think-sheet, drawing from research findings.

Day 6: Computer lab, using a Wiki to collaborate and broaden responses to think-sheet items

Day 7: Classroom debriefing through presentations of action plans that build from the spreadsheets and graphs

LESSON SUMMARY

This lesson plan stimulates students’ awareness of how economic decisions affect the lifestyles of various population groups. The learner will analyze his or her community or region for relationships among locations of polluting corporations and population characteristics. Students will access the data online, create a database, manipulate a spreadsheet, graph results, discuss findings, and present an action plan.

Learning Objectives

By the end of the lesson, the students will be able to:

1. Gather demographic and economic information about different communities.
2. Analyze and interpret data in a spreadsheet.
3. Graph associated findings
4. Collaborate about implications of findings.
5. Develop an action plan
Problem Statement

Location represents a very important factor that affects lifestyle. Using information from the Internet, every student will be able to explain the population patterns in their city or region, relate this information to the location of major corporate polluters, collaboratively analyze findings, and develop an action plan to address the social injustices that may be evident.

Standards

National Council for Sciences
National Science Education Standards for Grades 5-8
Science in Personal and Social Perspectives
Populations, Resources, and Environments

- When an area becomes overpopulated, the environment will become degraded due to the increased use of resources.
- Causes of environmental degradation and resource depletion vary from region to region and from country to country.

National Council for Social Studies
II: People Places and Environment
IV: Individuals, Groups, and Institutions
VII: Production, Distribution, and Consumption
VIII: Science, Technology, and Society

Resources

Computer
Computer, printer, spreadsheet software (e.g., Microsoft Excel, AppleWorks), Internet browser

Literature
Annual reports of local corporations; newspapers and press reports involving local politicians and environmental policies; summaries of research concerning chemical toxicity; resources concerning local and regional population trends

Other Materials
Computer paper, notebook, and pens

Handout
Think Sheet
COMPUTER APPLICATIONS

Application and Activity

Internet

Students will search the Census Bureau’s website [http://factfinder.census.gov](http://factfinder.census.gov) for statistics regarding demographic and economic patterns in their community. They will also locate information about major polluters in their locale or region at [http://www.scorecard.org](http://www.scorecard.org). Finally, they will discuss and edit their findings at [http://www.wikispaces.com](http://www.wikispaces.com) by developing a plan for action.

Spreadsheet

Students will transfer the collected information to a spreadsheet labeled with the appropriate categories provided. They will modify the spreadsheet to indicate the location of corporate polluters in relation to different demographic or economic groups. Students will then graph their major results.

Data Manipulation

For this lesson, the students are learning through sequential tasks. The first involves collecting data assembled on the Internet. The second involves constructing a worksheet, sequencing the information in the following order Zip Code, Management/Professional, Sales/Office, less than $15,000 income, $15,000-$34,999 income, less than $34,999 income, Median Household income, Families less than Poverty, Individuals less than Poverty, White, Black, and Pounds of Pollution.

Note: The teacher may change these categories, as dictated by population characteristics.

Activities:

Before the Computer

1. Review the patterns of population movements.
2. Use historical population maps and historical references to summarize trends in population shifts.
3. Present “Because of patterns in our populations, certain members of our community are at more risk to environmental pollutants than others. It is important to create safe environments for all people in our communities” to the class.
4. Review the geography of your locality or region and have the students offer ideas about how this geography affected the distribution of population.
5. Separate the students into pairs. Each pair will decide who will be the secretary and who will be the computer operator.

At the Computer

1. First team pair (or team of two) has 45 minutes at the computer. The pairs will spend their time:
• Finding the census data by zip code using the Internet link: http://factfinder.census.gov/
• Selecting the menus to access the online data
• Labeling the data categories
• Determining the zip-codes of the polluters
• Imputing the data

2. Second team will be involved in the rotating activity.

3. After 45 minutes, the two teams will switch activities.

After the Computer

Every student will work on his or her respective think sheet.

At the Computer

1. First team has 45 minutes at the computer. Teams will spend their time:
   a. Posting think sheet responses to a wiki
   b. Editing wiki responses

2. Second team will be involved in working on their action plan to respond to findings.

3. After 45 minutes, the two teams will switch activities.

Rotating Activities (45 Minutes)

Students will review literature at the resource table, consisting of annual reports of local corporations, media reports effects associated with local environmental hazards, scientific reports on pollutants, and resources about locale histories.

Web-links

Factfinder
http://factfinder.census.gov/servlet/ACSSAFFPeople?_submenuId=people_7and_sse=on

Scorecard
http://www.scorecard.org/community/

Wikispaces
Culminating Activity

Students will develop and perform a documentary that demonstrates their understanding of the political, social, economic, and environmental influences on poverty and how they might address them.

Supporting Activities

1. Host a debate between corporate representatives and environmental researchers about corporate responsibility.
2. Use Student Leadership’s e-congress program to post research-based legislation.
3. Spend an afternoon assisting an environmental cleanup or trash pickup.
4. Conduct a community forum about environmental responsibility.

ASSESSMENT

See the attached rubric for grading purposes. The total score is out of 36 possible points.

32-36 points = A
29-31 points = B
25-28 points = C
21-24 points = D
<= 20 points = U

Relevant Websites and Webpages

Income Data
http://factfinder.census.gov/servlet/ACSSAFFPeople?_submenuId=people_7and_sse=on

NTEQ
http://nteq.com/

Pollution Data
http://www.scorecard.org/community/

Wiki spaces
http://www.wikispaces.org
# POLLUTION AND POPULATIONS ACTIVITY EVALUATION FORM

**Name ______________________**

**Date ____________________________**

**Group Members ____________________________________________________________**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td><strong>Discover Information at Census Website</strong></td>
<td>Website was found no demographics located</td>
<td>Website was found and some demographics provided</td>
<td>Website was found and most information provided</td>
<td>Website was found and all information provided</td>
<td></td>
</tr>
<tr>
<td><strong>Discover Information at Pollution Website</strong></td>
<td>Website was found no polluters located</td>
<td>Website was found and some polluters provided</td>
<td>Website was found and most information provided</td>
<td>Website was found and all information provided</td>
<td></td>
</tr>
<tr>
<td><strong>Label all the categories properly</strong></td>
<td>None of the categories labeled properly</td>
<td>Some of the categories labeled properly</td>
<td>Most of the categories labeled properly</td>
<td>All of the categories labeled properly</td>
<td></td>
</tr>
<tr>
<td><strong>Inputting the data</strong></td>
<td>Data were not input</td>
<td>Some data were input accurately</td>
<td>Most data were input accurately</td>
<td>All data were input accurately</td>
<td></td>
</tr>
<tr>
<td><strong>Locating Polluters</strong></td>
<td>No polluters were input</td>
<td>Some polluters were input</td>
<td>Most polluters were input properly</td>
<td>All polluters were input properly</td>
<td></td>
</tr>
<tr>
<td><strong>Use of Resources</strong></td>
<td>No evidence of literature use</td>
<td>Some evidence of literature use</td>
<td>Reasonable evidence of literature use</td>
<td>Solid evidence of literature use</td>
<td></td>
</tr>
<tr>
<td><strong>Completion of think-sheet</strong></td>
<td>Think-sheet completed with shallow responses</td>
<td>Some of think-sheet completed with in-depth responses</td>
<td>Most of think-sheet completed with in-depth responses</td>
<td>Entire think-sheet completed with in-depth responses</td>
<td></td>
</tr>
<tr>
<td><strong>Communication at Wiki</strong></td>
<td>Students did not participate in Wiki</td>
<td>Student participated in Wiki to a minor degree</td>
<td>Student participated in Wiki to a major degree</td>
<td>Student participated in Wiki to a large degree</td>
<td></td>
</tr>
<tr>
<td><strong>Participation</strong></td>
<td>Student did not collaborate</td>
<td>Student collaborated somewhat Developing skills listening to others</td>
<td>Good communication. Isolated challenges in working with others</td>
<td>Student collaborated well. Listened and respondent well to others’ ideas</td>
<td></td>
</tr>
</tbody>
</table>

**Comments:**
Think Sheet

(You may draft responses on a separate sheet of paper)

1. What are the main goods or services of the corporations that you studied?

2. Based on your research, describe the patterns of pollution that these corporations produce.

3. How would you describe the demographic and economic characteristics of the people who live in homes near these corporations?

4. If you lived near a polluting corporation, describe what you might do to address your living conditions (presume that moving to another neighborhood is not an option).

5. Based on what you have read in the corporate reports, newspaper clippings, and scientific resources, why do you think certain community members live near pollution sites? Explain your reasoning.

6. If you were the C.E.O of a polluting corporation, explain the extent to which you would be concerned with the welfare of those who lived near your business.

7. If you were elected to be the congressional representative for your district, based on your research findings, what legislation might you propose?

8. During the process of making the law from question 7, you find out that the C.E.O. made a large contribution to your election campaign. To what extent would your proposed legislation represent business interests?

9. Using the data collected and conversations experienced in this activity to support your ideas, explain the extent to which the pollution that corporations release justifies the services or products that they provide.

10. Let’s pretend that you are a representative of a state that did not have many financial resources and a corporation in another state offered you a large amount of money to bury a lot of toxic waste in your state. Use the findings from your research to explain whether or not you would accept this offer.

11. To what extent do you think that living in poverty represents a matter of choice? What information can you gather to test your ideas?